CHAPTER VI
CONCLUSION AND RECOMMENDATIONS

6.0 INTRODUCTION
In this chapter the recommendations based on the statistical analysis carried out on the data collected by the researcher are presented. Further, recommendations based on the intensive personal interviews that the researcher had with various academicians and administrators are presented. The researcher also proposes a model for implementation of e-governance in the research section of an affiliating Indian university and similar models can be developed for other sections. Further, the infrastructure requirements and financial implication in implementing e-governance are also indicated.

6.1 SUMMARY OF THE STUDY
In this study on implementation of e-governance in affiliating Indian universities, the researcher has identified the following six groups of people who are involved in the system, namely, college students, university students, distance education students, research scholars, teaching staff and nonteaching staff of the university. To extract data from each of these groups, the researcher has designed a separate questionnaire for each group which was improved through a pilot study. The final questionnaires were distributed personally to a randomly selected sample from each category. Also, the questionnaires were sent through email to heads of institutions with a request to get response from the members of each of the above mentioned categories. The
Theoretical model chosen for this purpose was technology acceptance model. Also, factor analysis technique was applied to extract factors with order of priorities and these results were used to infer conclusions. In the course of this study, positively significant hypothesis were identified. In addition to this statistical investigation, the researcher had intensive personal interviews with experts in academy and administration and collected information relevant to this study. Through this investigation the researcher could identify potential areas where e-governance can be effectively implemented, steps to be taken for successful implementation and suggestions to overcome the anticipated problems.

6.2 RECOMMENDATIONS BASED ON STATISTICAL ANALYSIS OF DATA

In chapter V, the outcomes of the statistical analysis of the data collected by the researcher through the various questionnaires have been presented. Interpretation and recommendations based on the above outcomes are now presented.

6.2.1 COLLEGE STUDENTS

From the statistical analysis of the questionnaire administered to the college students of various Indian universities the following inferences and conclusions are arrived at. The reliability of the data has been tested and the data has been validated. The factor analysis on the data has resulted in identification of the following three factors.
Factor I: Syllabus and question bank

Factor II: Database creation

Factor III: Examination results

The college students depend on the university mainly for Syllabus for the courses, model question papers, question bank and examination results. Hence, direct contact between students of affiliated colleges and the university is minimal. It is natural that the college students consider the online availability of syllabus and question bank as the most important factor. During the admission process the students need to know the courses offered by various colleges affiliated to the university which helps them in identifying the course and the college for seeking admission. Hence, they consider database creation which consists of the above details as the second important factor. Since, examination results reach the students through the concerned colleges, they are not very particular about online availability of examination results and hence the corresponding factor is rated as the least significant factor from their point of view.

6.2.2 DISTANCE EDUCATION MODE STUDENTS

From the statistical analysis of the questionnaire administered to the research scholars of various Indian universities the following inferences and conclusions are arrived at. The reliability of the data has been tested and the data has been validated. The factor analysis on the data has resulted in identification of the following three factors.

Factor I: Course material and examination

Factor II: Database creation

Factor III: Admission related issues
The distance education students also have minimal direct contact with the university. The students who are undergoing education under the directorate of distance education face maximum difficulty in getting the relevant course materials and other information such as date of commencement of examination, examination center and hence they consider factor I as the most important factor. Hence, it is strongly recommended that the course materials can be made available online and the students who have joined a particular course may be permitted to download the course material relevant for them through a username and password, which the university must provide to each student after completion of the admission process. This step will substantially reduce the expenditure as well as the workload for the university, since, the university can dispense with the tedious process of printing all the lecture notes for various course materials and distributing them to the students through regular post.

During the admission process the aspiring candidates need to know the details of the various courses offered by the university under the distance education mode, syllabi for the various subjects, details of fees for each course, details of study centers offering courses and so on. Hence, database creation is reported to be the second important factor.

6.2.3 UNIVERSITY STUDENTS

From the statistical analysis of the questionnaire administered to the students of the university departments, the following inferences and conclusions are arrived at. The
reliability of the data has been tested and the data has been validated. The factor analysis on the data has resulted in identification of the following four factors.

Factor I: Database creation

Factor II: Admission processes

Factor III: Examination related activities

Factor IV: Students related activities

The first requirement for students who are desirous of getting admitted to a course offered by the university is the availability of database giving all the details of the departments in the university, courses offered by the various departments, rules and regulations and so on. Hence, university students consider database creation and availability of the database in the university website as the most important factor. It is natural that the second most important factor from the point of view of students is the admission process and hence they consider online admission process as the second most important factor. For items mentioned in factors III and IV, the students normally get all the relevant information during the regular contact hours and hence, these factors are not considered to be very significant by the students of the university departments.

6.2.4 RESEARCH SCHOLARS

From the statistical analysis of the questionnaire administered to the research scholars of various Indian universities the following inferences and conclusions are arrived at. The reliability of the data has been tested and the data has been validated. The factor analysis on the data has resulted in identification of the following five factors.
Factor I: Facility for research
Factor II: Evaluation process
Factor III: Database creation
Factor IV: Details of projects/doctoral thesis
Factor V: Communication between research scholar and the university

From the analysis, it is inferred that the research scholars consider factor I and factor II as the most important factors. From the point of view of the research scholars, the most important activities in his research career in the university are the process of registration and the process of thesis evaluation. In some cases the research scholars have to wait for even two years to get reports from the examiners on his thesis. Hence, it is natural that the above factors are considered to be most significant from the point of view of the research scholars.

6.2.5 TEACHING STAFF

From the statistical analysis of the questionnaire administered to the teaching staff of various Indian universities the following inferences and conclusions are arrived at. The reliability of the data has been tested and the data has been validated. The factor analysis on the data has resulted in identification of the following five factors.

Factor I: Database creation
Factor II: Online maintenance of students record
Factor III: Online facility for staff members
Factor IV: Examination related activities
Factor V: Administration related activities
It is natural that, the teaching staff in the university departments consider inclusion of
the details about the departments, their personal curriculum vitae and other particulars
as most important, since this information plays a vital role in attracting students to
their departments. The faculty members have to spend substantial amount of time in
maintaining students record such as their internal marks and attendance details. Also,
they spend much time in preparing the course material, examination question papers,
assignments and evaluation of answer sheets and assignments. Hence, online facility
for posting the course materials, classroom notes, assignment topics and facility for
conducting online test will substantially reduce the time they have to spend on such
works. Thus they consider online maintenance of student records as the second most
important factor.

Most of the online facilitates which are proposed under factor III are not considered to
be very significant by the teaching faculty, since such activates are not very frequent
and they are not facing any difficulty as such in carrying out these activities.

Since not all the faculty members are directly involved in the examination and
administration related activities, factors IV and V are considered to be least
significant by the teaching staff in the university departments.

6.2.6 NON TEACHING STAFF

From the statistical analysis of the questionnaire administered to the nonteaching staff
of various Indian universities the following inferences and conclusions are arrived at.
The reliability of the data has been tested and the data has been validated. The factor analysis on the data has resulted in identification of the following seven factors.

Factor I: Record creation and maintenance
Factor II: Distance Education related activities
Factor III: Finance related activities
Factor IV: Meetings of various bodies
Factor V: Process of affiliation
Factor VI: Communication between sections in the university
Factor VII: Examination related activities

Nonteaching staff form the backbone of university administration system. They are the people who are actually involved in the administration process, maintenance of files and day-to-day problems faced in the administration.

The administrative staffs spend much of the time in creating, maintaining and updating various records of the university. This involves lot of paper work and hence converting all these records as soft copies will substantially reduce the work and also repetition of the work. Hence, they have given record creation and maintenance as the most important factor in the process of introducing e-governance. The next major issue which consumes lot of time and energy are the distance education related activates. This is one of the major sources for generating funds for the university. Further, there are large numbers of complaints from the students under distance education such as non receipt of course materials in time, delay in the publication of examination results, problems with various study centers and organization of contact
classes. Hence, introduction of e-governance in this vital area will enhance the image of the university in the public which in turn will attract more students to the system. This is extremely important especially in the context of competition among the various universities in attracting students for distance education mode. Hence factor II dealing with distance education related activities has been rated as the second most important factor.

The factor dealing with finance related activities has been rated as the third important factor since lot of activities such as preparation of monthly pay slip, annual increment and, daily cash transaction are to be carried out almost through the year.

Meetings of various bodies such as Syndicate, Senate, SCAA, BOS are to be conducted every year and such meetings take place almost throughout the year. Administration of such meetings involve sending meeting notices to all the concerned members, preparation of agenda for the meeting, conducting the meeting, preparing minutes, circulating the minutes to the members for approval, incorporating the corrections in the minutes and distributing the relevant portions to the various sections in the university for further action. Hence this activity involves lot of paper work and printing and is rated as the fourth important factor by the nonteaching staff. The remaining factors namely process of affiliation, communication between sections in the university and examination related activities occupy last three positions. The affiliation process is normally completed within a period of three month in the beginning of the academic year. Perhaps the nonteaching staffs feel that the university may not be able to provide the facility required for online communication
between different sections in the university and also perhaps they are not confident regarding successful implementation of such communication since most of the senior nonteaching staff are not familiar with handling of computers.

Examination related activities involve lot of confidential work and this may be the main reason why it is related as the least important factor. Perhaps the staff members are of the opinion that online dealings with question paper setters and printing of question papers may not be feasible.

The following hypotheses were tested for each of the six categories of the population of study.

- **H₁**: PU is positively significant on impact of Intention to Use
- **H₂**: FC is positively significant on impact of Intention to Use

For all the six categories **H₁** is found to be positively significant, thus implying that PU plays a significant role in successful implementation of e-governance projects in affiliating Indian universities. However, **H₂** is found to be positively significant only for the following groups, namely, distance education students, research scholars, teaching staff and nonteaching staff. The two categories, namely, college students and university students are not directly involved in the implementation of e-governance and hence **H₂** is found to be not significant for these two categories.
6.3 RECOMMENDATIONS BASED ON THE PERSONAL INTERVIEWS

The researcher had intensive personal interviews with academicians and administrators at various levels to gather information on issues such as problems that are anticipated and are already faced in implementing e-governance in Indian universities, suggestions to overcome such problems and financial implications. The conclusion and recommendations based on these interviews are presented.

6.3.1 INFRASTRUCTURE REQUIREMENTS

The minimum infrastructures required for successful implementation of e-governance are as follows:

- High end server
- Redundancy for the server
- Secured network connectivity
- Clients (the number of nodes depends on the number of sections, departments and users within the university)
- Software
- Basic infrastructure

The approximate budget for establishing the above mentioned minimum infrastructure may be around rupees 60,00,000. Further, periodical upgradation of the infrastructure is also a must.
6.3.2 SOFTWARE DEVELOPMENT

Some of the universities in India have already invested substantial amount of money ranging from rupees 30,00,000 to 4,00,00,000 for the purchase of software through commercial agencies for implementation of e-governance. However, often it becomes necessary to incorporate modification in such softwares taking into account the local requirements and for each such modification one has to depend on the agency that has developed the software. Hence for any university, it is desirable to create its own package taking into consideration the local needs and requirements.

6.3.3 SECURITY ISSUES

As computer systems have become more user friendly and easy to access, their adoption has grown phenomenally. As a result, we have a scenario wherein multiple operating systems and infrastructure components co-exist. This has increased the potential for security threats. Since data has to be shared by the various sections in the university and data has to be transmitted between the university and colleges affiliated to the university, it is essential that the security mechanism has to be inbuilt to safeguard the data. Further, authentication issues must also be addressed. For communications between various sections within the university fingerprint mechanism may be adopted for authentication.

6.3.4 TRAINING SCHEME

The most important factor which results in failure of an e-governance project is lack of training for the staff members who are actually involved in the implementation. If the users did not have the ability to use the technology to enable access of information
and services, then this will lead to low user base and the system will not be equally accessible by all the members. Hence, qualified staff and training schemes are necessary conditions for successful implementation of e-governance. Since, most of the people involved in university administration are already users of e-mail and internet it is not difficult to implement necessary training for successful implementation of e-governance.

6.4 AN E-GOVERNANCE MODEL FOR RESEARCH SECTION

In this section a model is proposed for creating a package for the research section and similar models can be adopted for other sections.

The activities of a research section involve a huge database and large number of files, one for each research scholar and several other files. Hence, e-governance will reduce most of the problems faced by the students, research guides and others involved in the process. The following is the model proposed for implementing e-governance in the research section.

A database may be created using SQL server. The database will consist of various Tables each of which is stored as a file catering to various requirements. The following are the files/Tables that are to be built into the database.

a) **Student**: the student file/Table consists of the details of full/part time students who have registered with the university under their respective guides. The Table provides information such as students Id, name, age, address, qualification, department in which he has registered, guide, co-guide and date
of registration. In addition further details such as course work that the student has to undertaken, the topic of research, number of journal and conference publications, payment of registration fee details, deadline for thesis submission, and details of time extension given to the candidate are also provided. Among the above details the later ones are students specific.

b) Guide: This file/Table provides details of the list of approved guides from different departments. In general, the name, the department to which the guide belongs, number of publications and area of specialization are stored. In addition, the availability of vacancy with the guide and the number of students who have already completed their PhD under his/her guidance are also mentioned.

c) Evaluation Process: This file/Table is a confidential file, maintained for each candidate. The file contains the date of submission of the thesis by the candidate, panel of examiners submitted by the guide for thesis evaluation, examiners selected for evaluation, the dates on which the thesis has been dispatched to the examiners and all the subsequent correspondents between the research section of the university and the examiners such as reminders sent to the examiners, reports received from the examiners, conduct of Viva-voice examination and declaration of results.

d) Department: This file/Table gives information about the various departments in the university and the heads of each department.

e) Course work tracker: Each student according to university regulation is supposed to complete the course work prescribed for him. The course work is
designed by the respective guide. This file/Table will have the dates on which a particular student has completed his coursework.

f) **Publication list**: This file/Table provides information about publications of the faculty and research scholars. A publication is accessed through its publication ID and information such as authors, the journal and the year of publication. Anyone interested about a particular publication can choose to obtain it by making a search based on author name, journal or the year and title of publication. This file also contains the list of on-going funded research projects in the university.

g) **Abstracts**: This file/Table contains the abstract all the doctoral thesis for which degrees have already been awarded by university along with the name of the candidate, name of the research guide and year of award of the degree. Research scholars who propos to register for ph.d in the university can have an idea of the topics on which research that has already been carried out in the university.

The above files are sufficient to give all information about the Research and Development taking place in the university. For example, a person willing to obtain information about the availability of a guide in a specific area is easily obtained by writing a query to get information from the guide file/Table. This above database is designed and normalized up to Boyce-Code Normal Form (BCNF).

To access the database a web based application may be developed, which has the various functionalities. To begin with a pdf file stating the rules and regulations of
the PhD programme at the University must be made available for download. The web page may also contain the details of various areas of research persuade in the university departments. Application forms and the application procedure document must be made available for download. General statistics such as number of research scholars currently doing research, various departments offering Ph.D programmes, the details of guides in each of the departments can be obtained by querying the database form the web page. Login may be provided for users so that they can access all the other required information regarding research within the university. Apart from this the main web page must allow the user to give a general feedback about the PhD programmes and also to pose queries classifications which will be accessible only by the research coordinator.

Upon login user is allowed to access the database based on his/her role within the administration/organization. Those users categorized as administrative users such as Vice-Chancellor, Registrar, Coordinator and section staffs are given privilege access to the databases and modify the database based on the role they play within the organization. The extent to which the administrative users modify each file or Table is based on a protocol followed by the university. The second category of users are the set of research guides who are given specific read only permission to specific parts of the database; in this a guide is to be allowed to access information about other guides and information only about the research scholar under his/her guidance. This kind of restriction can be implemented at the application level. The third sets of users are research scholars who are given read only permission and will be able to access information pertaining to him/her.
Login as a research scholar, if the research scholar has submitted his/her thesis then the research scholar will be able to view the various dates on which his thesis was dispatched to the examiners and whether the report of the examiners was received or not. Apart from this he will also able to view his date of viva voice.

Upon modification of database a log entry is created in the form of a text file and the file is stored and emailed to the Vice-Chancellor, Registrar and Research Coordinator for further clarification. From this text file, they can Figure out who modified, when they modified and what they modified. This will help to monitor the works which was done in the section level. The web application may be developed using Visual Basic as tool which can be easily used to connect to the database.

Along similar lines the university authorities may take steps to create a necessary database and the software package for implementing e-governance in other sections of the university.
6.5 CONCLUSION

From the statistical analysis carried out on the data collected by the researcher, it is seen that all the six groups, namely, college students, distance education mode students, research scholars, teaching and nonteaching staff members are in favor of implementing e-governance in university administration. However, college students and university students were practically less dependent on the university administration function, their attraction towards implementation of e-governance in affiliating Indian universities are minimal whereas research scholars and distance education mode students lend their overwhelming supports for the same. Teaching and nonteaching staff members influence towards institutional preparedness is relatively high.

Based on the intensive interview the researcher had with heads of institution, it is found that only a few universities in India have started e-governance initiatives. Some of the universities have partially implemented e-governance, especially in the examination section. However, the heads of most of universities are interested in implementing e-governance at all levels of administration. Administrators in the examination section are of the opinion that there is an element of risk in implementation of e-governance in confidential activities such as setting and printing of question papers. The institutional preparedness and the general atmosphere for implementation of e-governance at various levels in the Indian affiliating universities are encouraging.
Factors have been extracted from the statistical data using factor analysis along with the ordering of the factors. The factors with highest priority must be given importance in designing e-governance model. The following steps may substantially bring improvement in the functioning of an affiliating Indian university.

- Permission to download the study/course materials for students in distance education mode. This will result in the elimination of cost in printing the course material and complaints from students regarding non-receipt of course material.

- Availability of soft copy of syllabi for various courses offered by university. Since the syllabi are accessed by large number of sections such as board of studies, question paper setting, faculty members and the students, this will considerably bring down the printing work of the university.

- Since the officers in the administrative setup of the university are for a period of three years only, a decision support system consisting of details of important decisions taken on specific issues may be computerized. This will ensure continuity and uniformity in decision making by the authorities.