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Impact of Information Technology Innovations on Resources and Services of Management Institute Libraries in Mumbai: A Librarians' Approach

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Abstract

Management libraries are facing a piquant situation and unforeseen challenges in this age of information technology. They are reeling under pressure to fulfill their obligation of meeting the diverse information needs of clientele. IT has brought in sweeping changes in the traditional way libraries are functioning. Libraries need to evaluate, measure the impact of information technology on them. This will equip them with the knowledge of turning this information Technology into a boon for improving their services. This paper is one such attempt with reference to management libraries affiliated to University of Mumbai, Mumbai City, India.

Introduction

Academics has undergone tremendous change over the years, assuming new dimensions influenced by technology driven applications. Management education is no exception to this trend. Traditional commerce and management education methods are observed to be inadequate. Quality service package delivery is a formidable task for all institutions of management education. To achieve long-term sustainable advantages in business and management education, more attention to the issues of service, quality and cost in the national and international markets is required (Gupta and Jain, 1996).

Libraries are mainly entrusted with a host of predetermined tasks like acquiring, organizing, preserving, retrieving and disseminating information to the user. From ancient times to the present Internet age, the primary objective of library has always been this (Gopinath, et al., 2001). However, the way this purpose has been achieved has drastically changed.

Information technology has influenced the very nature of business and management libraries. The conventional set up of brick and mortar libraries that store information within a constrained physical space have given way to data centers that integrate data sources around the globe by the means of networking.

With the advancement in technology and its direct application to libraries, management libraries are becoming lean and agile libraries that streamline information supply. The pervasive nature of Internet, coupled with platform independent database connectivity, is making library portals more and more effective.

The technological tools for disseminating information have progressed from conventional books and journals to electronic journals and online databases, making it possible to explore the worldwide pool of knowledge while sitting at one's desk or at home (Ashcroft and Langdon, 1999). It is an accepted fact that quality of business education depends on the resources that the institute has. These resources are: Highly qualified faculty, well-designed curriculum, good physical ambience and the very crucial support of a well-stocked and maintained library and information center.

Management Education in India

A growing percentage of young people in recent decades have been going to colleges and universities for higher education and a steadily increasing fraction of them are enrolled in management institutes. The surge in enrollments has led to a rapid increase in the number of institutes offering management and business education. As per the latest AICTE Annual Report, there are over 602 approved management institutes in India (AICTE, 2005). There are several hundred other institutes and colleges, which are private and offer unaffiliated courses. Many of these institutes came into existence to fill the void that was created in the job market as a result of the globalization of Indian economy (Gupta, 2003). Today, the situation seems to have stabilized and many of the institutes may be heading for trouble in the years to come.

Management Education and National Development

Management education, almost unknown in the ninetieth century, has become a dynamic force for change in many universities, in the workplace, and in the societies of both industrialized and developing countries. Economic growth, which can be

defined as stocks of labor, physical capital and human capital (the quality of labor force), is a key catalyst for national development.

The contribution of management education to economic growth is positive and significant whether measured in monetary terms or in terms of industrial efficiency or labor productivity. Management education at all levels contributes to economic growth by imparting general attitudes, disciplines and specific skills necessary for a variety of workplaces. It is said that greater skills lead to progressively greater benefits from the introduction of new technology, which in turn, will lead to the further development of human resources.

The relevance of management education to the labor market, thus, lies fundamentally in its ability to produce a flexible, disciplined labor force through high quality universal education. As Indian economy continues to develop and new technology is applied to production, the demand for workers with more and better education to handle diverse business enterprises has increased. The knowledge intensive aspects of human resources require people with the highest levels of technical and managerial competence. To respond to such needs, management institutes all over India are restructuring the curricula (Mishra, 2002). They are also hiring the best possible faculty, with enough industry exposure, and improving the infrastructure of libraries and computer labs.

Mumbai: Profile of an Industrial City

Delhi is the political and administrative capital of India and Bangalore is the silicon city of software industry. However, Mumbai's position as the country's financial capital remains undisputed. The city is also an important center for many other industries and foreign trade.

Mumbai's position as the financial capital of India is based on the dominance of its two stock exchanges, the National Stock Exchange and the Bombay Stock Exchange, and the power of its banking sector. The city's commercial and retail banking center is also the largest in India. The service sector attracts the lion's share of Mumbai's incoming foreign investment.

Mumbai is also pre-eminent as a trading center, with pearls and precious and semi-precious stones being by far the largest single category (by value) of both import and export goods handled in the city. Of the other principal industries, cotton and textile business and machine engineering are probably the most important. Between them, these two sectors employ a third of the workforce of the city and account for a sixth of the export trade. Film industry is another prominent industry in Mumbai. The average income per household in Mumbai is higher than in any other large Indian city.

Need for the Study

In the present ever changing information environment, libraries are encountering both opportunities and challenges. Information technology has introduced many changes in the way information is identified, procured, processed and disseminated to library clientele. Furthermore, information technology has created a sense of urgency among library users and librarians themselves. Management libraries and information centers are witnessing new paradigm shifts. These shifts include:

- Transition of information sources and systems from paper to electronic media.
- Complexity in information needs of highly demanding clientele.
- Increase in the cost and quality of information.

It is an accepted fact that the information technology has influenced all the components of a library system: information sources, services, human resources and users (Ramesha and Kumbar, 2004). It is more so in case of management libraries where the emphasis is more on the currency of information. The industry-oriented, case study methods and hands-on methods of imparting management education require management libraries to be ever responsive to the changing information needs of their clientele.

Objectives of the Study

The primary objective of the present study is to examine the impact of information technology innovations on resources and services of management institute libraries affiliated to University of Mumbai, Mumbai. The specific objectives are to:

- Survey the existing information technology infrastructure
- Study the impact of IT on library resources.
- Study the impact of IT on information services.

Methodology, Analysis, and Interpretation of Data

The present study utilized a combination of historical analysis, literature review, questionnaires and personal interviews for data collection. Historical analysis and literature review were useful in collecting textual data from published and unpublished sources. The questionnaire method was quite useful in soliciting information from the librarians of management institutes. Hence, the data collected for this study was a combination of primary as well as secondary data.

The survey was undertaken with the help of questionnaires designed for the purpose. While designing the questionnaire, care was taken that it has the mix of closed and

open-ended questions. To enhance the response rate, multiple-choice questions were included in sufficient numbers. Interviews were also held with the librarians to interpret the questions to them and to collect the data.

As many as 23 management institutes are affiliated to University of Mumbai. These offer a two-year Master of Management Studies (MMS, equivalent of MBA). Narsee Monjee Institute of Management Studies (NMIMS), which became a Deemed University recently, has also been included in the survey. Out of a total of 24 management institutes, 22 institutes responded to this survey, thus achieving a response rate of 91.67%.

Researchers visited in person all the libraries of management institutes affiliated with the University of Mumbai and met with the librarians. Repeated checks and reviews were done on the questionnaire. Librarians, teachers and statisticians were consulted to critically review questions and improve their reliability and validity.

Data collected from published sources and the questionnaires were evaluated and analyzed to produce the results. The Software Package for Social Sciences (SPSS) was used for analysis the data. After interpretation, inferences were drawn and recommendations were made.

Information Technology Infrastructure at Libraries

The nature and efficiency of information services provided by a library depends upon the computer facilities it has. If a library lacks computer infrastructure, then there is every possibility that it fails miserably to meet the demands of users. In the recent decades, a lot of information has been made available in a wide variety of formats like CD-ROM, online databases and e-journals. It becomes necessary for a library to have adequate computer facilities to serve users better.

In order to ascertain the availability of computer infrastructure, certain questions on status of automation, hardware and software availability were asked of librarians. Their responses are recorded in Table 1.

Status of Library Automation

The first step towards taking advantage of the benefits of IT is the automation of library activities. The majority of the libraries, 13 (59.09%), have indicated that their automation is complete. However, a considerable number of management libraries, 9 (40.91%), are still only partially automated.

Hardware and Software Availability

Table 1 indicates the availability of computer hardware and software at different management libraries. The availability of information technology related infrastructure is good in the majority of libraries.

Concerning hardware, the majority of libraries, 20 (90.91%), have Pentium computers; 11 (50.00%) have servers to maintain library databases; 10 (45.45%) have workstations to access the library OPAC and other electronic resources. Fourteen (63.64%) libraries have their own printers, 17 (77.27%) have CD-ROM readers, 8 (36.36%) have CD-ROM writers. In addition, 8 (36.36%) of libraries have scanners and one (4.55%) library possesses a CD tower for accessing several CD-ROMS simultaneously.

Table 1. Hardware and Software Availability

Hardware and Software Availability	Number of Libraries
HARDWARE	
PC AT 286/386/486	7 (31.82%)
Pentium I/II/III/IV	20 (90.91%)
Servers	11 (50.00%)
Terminals/Workstations	10 (45.45%)
Apple Macs	0 (0.00%)
Printers	14 (63.64%)
Modems	4 (18.18%)
CD-ROM (Read)	17 (77.27%)
CD-ROM (Write)	8 (36.36%)
CD Towers	1 (4.55%)
Scanners	8 (36.36%)
SOFTWARE	
DOS/UNIX/LINUX/Windows	22 (100.00%)
Library Management Software	20 (90.91%)
Word Processing Software	22 (100.00%)
Networking Software	15 (68.18%)

Concerning software, the majority of libraries, 20 (90.91%), are using Library Management Software; all the libraries, 22 (100%), are using word processing software and they also use different operating systems like DOS, UNIX, LINUX and

Windows. Fifteen (68.18%) of libraries have indicated that they have networking software as well.

Impact of IT on Library Resources

One of the distinct gifts of information technology has been the invention of devices with huge storage capacity. CD-ROM's, DVDs and flash memory cards have changed the face of libraries. Online access to information has turned many libraries into "Virtual Libraries" (*Mishra, 2000*). Libraries are also changing the way in which information is stored and disseminated to users. In order to ascertain the librarians' perceptions about electronic resources, series of questions were asked of librarians. These questions were related to the advantages of electronic resources over conventional print sources.

Librarians' opinions on this is presented in Table 2. For these statements, we calculated the Mean (X), Standard Deviation (SD) and Coefficient of Variation (CV).

Table 2. Advantages of Electronic Resources over Print Versions

Sr.No	Statement	Mean	SD	CV
1	It is not necessary to retain journal bound volumes even after the library has all the back volumes in CD-ROM form or has access to them from a digital repository	3	1.10	34.48
2	We can save lot of storage space by having resources like journal back volumes, dissertations, reports in electronic form	2	0.53	29.81
3	It saves substantial amount of money being spent on maintenance (binding, cleaning, etc) of books, bound volumes by having them in electronic form	2	0.68	35.82
4	It is easy & convenient to conduct a search on electronic resources.	2	0.65	38.43
5	Electronic resources are not very expensive compared to their print versions	3	0.75	24.27
6	It is better to procure an electronic version of a book/journal if its price is equal to or not much higher than print version	3	0.85	32.15
7	In this networked environment, electronic resources achieve the objectives of resource sharing in a far better way than print versions	2	0.83	44.73
8	Electronic resources require expensive infrastructure to disseminate information contained in them	2	0.82	40.82
9	Despite being user friendly, it requires certain degree of computer knowledge to get the maximum benefit of these electronic resources	2	1.00	51.11

10	Librarians need to develop in-depth and rigorous user education programs to create awareness among users about proper utilization of electronic resources	1	0.51	34.12
11	Electronic resources can be updated easily and immediately in case of online sources	2	0.61	34.52

**Note: M - Mean, S.D - Standard Deviation, C.V. - Coefficient of Variation
1-Strongly Agree, 2-Agree, 3-Uncertain, 4-Disagree, 5-Strongly Disagree**

Table 2 reveals that librarians are uncertain ($X=3$) whether to retain the bound volumes when back volumes are available in CD-ROM form. Librarians agree that lots of storage space can be saved by having resources in electronic form ($X=2$), that it is easy and convenient to conduct a search on electronic resources ($X=2$), that resource sharing is easier with electronic resources ($X=2$), that electronic resources require an expensive infrastructure ($X=2$), it requires certain degree of computer knowledge to get the maximum benefit from electronic resources ($X=2$), and that electronic resources can be updated easily and quickly ($X=2$). Librarians also agree they need to develop in-depth user education programmes to create awareness among users about proper utilization of electronic resources ($X=1$).

However, librarians are uncertain about whether electronic resources are inexpensive compared to print versions ($X=3$). They are also uncertain about whether it is better to procure an electronic version of book/journal if its price is equal to or not higher than print version.

An analysis of the data indicates that electronic sources have considerable advantages over print versions and information technology innovations have redefined the way information is stored and disseminated in libraries. Librarians feel that anywhere/anytime multiple access convenience of e-resources achieves the objective of resource sharing in a far better way than print sources did.

It is also observed from the data and analysis of the same table that in spite being user friendly, it requires certain degree of computer knowledge to get the maximum benefit from these electronic sources. The calculated Mean, Standard Deviation (SD) and Coefficient of variation (CV) prove the opinion that there is a need to develop in-depth and rigorous user education programs to create awareness among users about proper utilization of electronic resources.

Impact of IT on Library Information Services

Information has always been prime factor for the development of society and is often regarded as a vital national resource. The growth of information and the dependency

on it have paved the way for the information society and subsequently the knowledge society. Information has become important part of our lives and should be available when needed. Information services try to meet this objective.

Information services are generated using new tools and techniques to facilitate the right users to the right information (Khodeh and Dhar, 2002). Information technology has had a significant impact and has successfully changed the characteristics of information services being generated in libraries.

In order to ascertain the impact of information technology on information services, librarians were asked series of questions to get data on the characteristics of computerized information services. They were also asked to compare computerized and manual services using a predetermined set of parameters. The majority of librarians, 21 (95.45%), indicated that computer-based information services are better than manual services. Only one librarian (4.55%) disagreed with this.

Characteristics of Computer Based Information Services

Librarians were asked specific questions to ascertain what were the characteristics that made computer-based services better than manual services. Table 3 presents the librarians' opinions in this regard. The librarians surveyed agreed that computer-based information services were accurate, consistent, quicker and could be tailor-made for specific user needs ($\bar{X}=2$).

Table 3. Characteristics of Computer Based Information Services

Computer based information services are better than manual services because	Mean	SD	CV
They are accurate	2	0.81	42.49
They are consistent	2	0.59	37.11
They can be provided in much less time	2	0.51	34.12
Can be tailor made for specific user needs	2	0.65	38.43

**Note: M - Mean, S.D - Standard Deviation, C.V. - Coefficient of Variation
1-Strongly Agree, 2-Agree, 3-Uncertain, 4-Disagree, 5-Strongly Disagree**

Among all these statements, "computer-based information services can be provided in much less time" generated the most positive responses (CV=34.12).

Comparison of Computer based Vs Manual Information Services

The best way to understand the impact of information technology on information services is to compare manual and automated services based on certain criteria. Table 4 presents the data about librarians' comparison of computer-based information services to manual information services.

Table 4. Comparison of Computer Based and Manual Information Services

Sr.No	Statement	Mean	SD	CV
1	Users prefer to search electronic resources before they do a manual search of print versions	2	0.97	50.89
2	Users require orientation to make the maximum use of computer-based information services	2	0.59	32.37
3	Computer based information services have a positive effect and thus have improved the image of Library	2	0.51	32.98
4	Staff is required to undergo training in IT periodically to make optimum use of IT facilities	1	0.51	35.04

Note: M - Mean, S.D - Standard Deviation, C.V. - Coefficient of Variation

1-Strongly Agree, 2-Agree, 3-Uncertain, 4-Disagree, 5-Strongly Disagree

Librarians agreed with the statements that users prefer to search electronic resources before they do a manual search of print versions ($X=2$), users require orientation to make the maximum use of computer-based information services ($X=2$), and computer-based information services have a positive effect and thus have improved the image of library ($X=2$).

Librarians also agreed that staff is required to undergo training in IT periodically to make optimum use of IT facilities ($X=1$). Among these statements, "users require assistance while searching online databases" generated the most positive responses ($CV=32.27$).

Findings and Suggestions

The present study has evaluated the availability of information technology infrastructure in management libraries affiliated with the University of Mumbai. It also studied the impact of IT innovations on library resources and services.

Findings of the Study:

- It is revealed from the survey that the majority of the libraries have automated their functions and the remaining libraries are partially automated. The availability of software and hardware in these libraries is also encouraging, with most libraries having Pentium IV machines, servers to maintain databases, workstations to access Web resources and all required software.
- One of the important paradigm shifts brought on by information technology is the shift in emphasis from ownership to access. Information sources are available in various formats like CD-ROM, DVD and Web versions. The study indicates that libraries can save much storage space by acquiring journal back volumes, dissertations and books in digital form. It also finds that libraries can greatly decrease the amount being spent on binding, shelving, cleaning and maintenance of bound volumes by migrating to digital sources.
- However, the survey also indicates two things about which librarians are very cautious. E-resources require expensive infrastructure and, though user friendly, they demand a certain degree of efficiency to access them. Analyses reveals that CD-ROM databases and online databases have high utilization, indicating that majority of users have accepted e-resources.
- The study reveals that the majority of librarians agree computer-based information services are better than manual services because they are accurate, consistent, and can be provided in much less time. They agreed computerization has a positive effect and improves the image of the libraries.

Implied Suggestions

The views and comments offered by the librarians have enabled the investigator to offer some feasible suggestions for deriving the maximum benefit from the impact of information technology innovations on library resources and services.

- Digital sources of information like CD-ROM, online databases and e-journals have user-friendly interfaces. However, users have expressed the opinion that they need assistance when using them. Hence, library staff must examine these sources carefully in order to assist users. It is recommended that librarians develop exclusive presentations and demonstrations to educate users on how to get the maximum benefit from these digital sources.
- The present study has considered the lack of efforts by librarians in upgrading their skills to meet the changes brought upon by IT applications in libraries. Librarians must take an interest and continuously make efforts to improve their skill base. Workshops, conferences and seminars offer many opportunities in this regard.

- The study has clearly revealed that electronic resources require an expensive infrastructure to disseminate the information contained in them. Libraries must make provisions in their budgets to procure and maintain the IT infrastructure on a continuous basis. When making a budget provision, the obsolescence of the software/hardware should be taken into consideration, since these tend to become obsolete very quickly.
- The survey explicitly indicates that electronic resources achieve the objectives of resource sharing in a far better way than print versions. Management libraries must come together and form consortiums. This way, they will be able to ensure access to a wider base of electronic resources.

Conclusion

Academic institutions and their libraries are experiencing a massive change in the way they function. Management libraries are no exception to this. Information technology innovations have found their way into applications in management and business libraries. The accelerating pace of information technology continuously raises the standards of users' anticipations and expectations of new value-added services.

Today information is available in variety of forms like CD-ROMs, online databases, e-journals, etc. Inventions of devices like CD-ROMs and flash memory cards, which have huge storage capacities, have changed the outlook of libraries. These digital sources of information and storage devices bring drastic changes in the management libraries because of their distinct advantages in convenience of searching, low search times, most up-to-date information, etc. These digital sources also require considerable expenses in infrastructure development. However, this can be overlooked when we see the manifold advantages.

Information technology also has a positive impact on all library and information services like reference services, current awareness services, online public access catalogue, etc. Human resources is another aspect which is influenced by the developments in IT and its application in libraries.

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