CHAPTER 1

INTRODUCTION
1. Introduction

Information is power and becoming the most important resource. Information is not worth unless it is communicated to proper user at proper time. Now it is information and communication technology (ICT) that enables provision of equal access to knowledge/information to everyone. No country can flourish unless all the citizens have the right to participate in their governing and in preparing facilities and programs for their development. Before last decade, it was impossible to extend information services of quality and relevant to global access. However, now ICT has opened a new vistas before us: the possibility for getting pinpointed and expeditious information on our finger tips irrespective of form, format, language and geographical location. ICT is playing key note in social, economical, cultural, political progress as well as development. Pharmacology is not exception to it.

Much has been discussed and written about ICTs being a possible panacea for the difficulty that all sectors of society have in accessing all kinds of information and library and information science is no exception to it. Indeed, there have been many studies and initiatives concerned with ensuring that middle east countries including Iran are prepared to meet challenges of the information age and much seems to revolve around access to ICTs and its policy development in general.

The Information Centers and Libraries (ICLs), through their long history, have used various and new technologies to provide the required information in all aspects. They are considered pioneers in utilizing the most recent technology to give services to their users. The early technologies of making papers and printing promoted library collections to a great and unprecedented extent which in turn led to the demand for expert librarians to manage them. Modern technologies in information and communication have changed libraries’ catalogs from simple information guidelines into comprehensive information systems that attempt to bring the sources of information directly from libraries and information centers all over world to the user’s desk. Digital data and electronic figures are gradually replacing physical sources of information. The quick methods of accessing information sources are now more important than collecting information sources. As King (89, 2004) believes, more than 80% of newspapers and journals will be in permanent
access through international networks by 2010. Technology has affected all facets of ICL work. Librarians in acquiring section have to find ways to make digital sources accessible to the users, catalog makers should make these sources available to all and reference section librarians should help virtual users as well as in person ones.

In the era of ever-increasing ICT, the other sciences have much benefited from the advancement in ICT mainly through ICLs. Universities and academic libraries undoubtedly are possessing great potentials to use these developments to give services to other sciences. ICLs faced with the rapid and various changes in ICT have to adapt themselves with the same speed the information is produced and distributed. They have encountered a new era, which is quite different from recent past. The amazing increase of scientific researches in science and technology, industry, medicine and other fields has put a great demand on libraries as information centers to provide pinpointed, prompt and comprehensive information to the proper user at proper time, irrespective of form and geographical location. ICT has generally extended its functions all through diverse aspects of social life such as e-learning, e-government, e-health as well as educational and research aspects. ICT has revolutionized the methods of acquiring, sorting and delivering information especially in ICLs. As a recent phenomenon, ICT role in college ICLs could be taken under close concern to find out about its effect on the development of each region and its impact on other various terms such as: the rate of information transfer, the quantity and quality of information sources, the availability of related sources, library expenses and usefulness of materials. However, what evidence is there for the potential of ICTs to assist in Iran’s development? Are ICTs actually changing the ‘shape’ of Iran in general and pharmaceutical ICLs and scenario in particular? It was with these questions in mind, that researcher has proposed the contemporary problem related to Iran in the field Library and Information Science (LISc) with special reference to pharmacy.

Pharmacological ICLs in academic and R&D organizations, who provide information for pharmacy students, scholars and researchers as well as decision makers, could be one of the most important centers in the process of making
knowledge that is closely related to human health and welfare, where ICT could be so beneficial and necessary. Pharmacological ICLs development depends on its capability in providing quick and suitable access to the related information and its ability in coping with the rapid trend of generating information. Pharmacology scientists, academicians and other users, who deal with the challenging career of people’s health and hygiene are in need of new and adequate knowledge and are dependent totally on ICL’ services provided with help of ICT. The present study will attempt to analyze the patterns and evaluate the programs in the development of ICT in ICLs of Pharmacological and other allied sciences in Iran.

1.1. Background to the Study: Iran’s Profile

The term Iran evokes at once the image of an ancient land with a rich cultural heritage of long ago and that of a present reality in the heart of Asia. Known to the west as Persia until 1935, Iran was settled by a group of closely related Aryan tribes as early as the 9th century B.C. The Medes, who first established an empire, were superseded in 550 B.C. by the Persians, who eventually attributed the official name of Iran to the country. Since then, many empires and kingdoms, with the passage of time had come and gone and at the last with the culmination of the Iranian Revolution under the leadership of the late Imam Khomeini, there emerged the Islamic Republic and Iran became officially The Islamic Republic of Iran.

Iran with an area of 1,648,000 square kilometers, is a vast region in South West Asia. Its neighbors consist of Turkey and Iraq in the West, Turkmanistan, Azerbaijan and Armenia in the North, Afghanistan and Pakistan in the East. Iran also has a total of 2,500 kilometers of sea frontier including The Persian Gulf, the Oman Sea in the South and The Caspian Sea in the North. Iran’s capital city, Tehran, is located in the northwestern part of the country (50). Iran has a variety of climates. The population of Iran is 70,472,846 (78). Iran is the second most populous country with the second-largest economy in the Middle East (216). More than half of the country’s population is the active group within the age levels of 15-64, while about 46% percent of the total populations are under 14 years of age.
Consequently, considering age composition the population of Iran is one possessing youngest aged group of population among the countries of the world. The literacy rate is more than 79% and education is compulsory through high school. There are currently approximately 18 million students in the school and about 1.7 million in the universities (184). Moreover, about than 2.3 million staff are working in the governmental organizations, such as ministries, universities and other state institutions (185).

As Iran is situated on the direct route of central Asia, Turkey and Arab countries, a variety of racial groups are found to be living there. The official and common language and script of Iranian is Farsi (Persian). About 98.5% of the population are Muslims, majority of them belong to Shi’a sect. The rights of Zoroastrian, Christians and Jewish groups have been formally recognized. The main exports of Iran includes oil, natural gas, copper, mineral stones, carpets, caviar, agricultural products, etc (51).

1.1.1. Higher Education in Iran

'Higher education' has an ancient past in the dynamic culture and civilization of Iran, that was on its peaks of prosperity at the time of the Sassanids with the establishment of centralized higher education institutions in the cities of 'Riv Ardeshr' and 'Jondi Shapour' from AD241 onwards. Owing to the importance of medicine and medical education in those days and much use of the experiences and scientific achievements of the Greeks, Indians and Iranians, these cities turned into important centers of ancient higher education. Simultaneously with scientific and technological advance in the Western World, the Qajar (Dynasty) Prime Minister 'Amir Kabir' founded the 'Daarul Fonoon' (House of Techniques) as a modern institution in Iran in 1848. In addition to sending students abroad and inviting foreign lecturers to Iran, higher education centers were established in the cities of Tabriz and Urmieh. From 1934, the universities of Tehran, Mashhad, Isfahan and Tabriz were officially opened. Ministry of Science and Higher Education was established in 1967 which provided a uniform structure for public
Presently, Iran’s universities and colleges are based on the western pattern of universities (credit system). The students get their seats at universities and higher education centers through a rigid competitive Nation-wide University Entrance Examination. All universities and higher education centers are run in two forms of Public and Private, according to their financial resources and administration.

1.1.2. Public Universities and Higher Education Centers

Two main bodies govern all public universities and higher education centers in Iran: Ministry of Science, Research and Technology (MSRT) and Ministry of Health, Treatment and Medical Education (MHTME). Furthermore, there are a few other higher education institutes that are affiliated with other ministries including the Ministry of Education, Ministry of Foreign Affairs, Ministry of Communication and Technology, Ministry of Roads and Transportation, Ministry of Defense and Ministry of Petroleum. Education for all students is not free in public universities. Day-time students do not pay tuition fees; however, the so-called night-time students have to pay their relevant tuition. One of the major kinds of universities in public sector is Distance education (Payam-e Nour University) established in 1987 to offer distance education courses at undergraduate level. Presently, this university offer distance courses in graduate and post-graduate levels. The university has 228 centers across the country (119).

1.1.3. Private Universities and Higher Education Centers

Islamic Azad University (IAU) is the first private university established in 1982, which is presently active in over 133 branches in Iran. All campuses are supervised and governed by the Central Organization of IAU, located in Tehran. Students are required to pay the relevant tuitions based on the entering year, major and level of study. The Second type of private universities, are called Non-profit higher education institutes. There are 33 'non-profit higher education institutes' offering both undergraduate and postgraduate courses. Private universities and
institutions have to abide (MSRT), (MHTME) and Ministry of Education guidelines regarding courses and education standards.

1.1.4. Pharmacy Education in Iran

Universities in Iran offer Pharmacy Doctorate (Pharm D) degree course and PhD Courses in different specialties. Pharm D includes total credits of 231. 22 general and 209 courses related to pharmaceutical science. The course includes practical supervised training in pharmacy or pharmaceutical factories. At the end, by submitting a thesis they are awarded the professional Pharm D, who can practice pharmacy and if their total grade point average is above 15 can apply for PhD specialty program in different fields such as pharmacology, pharmaceutics, pharmacognosy, etc. PhD courses usually last for six years, which include theoretical and educational courses (lasting for two years), a comprehensive examination and two and half year’s practical courses and a thesis as well (52). Pharm D are offered in 13 colleges (three of which are established quite recently). PhD courses are offered in seven of these colleges. The admission to Pharm D is through National-wide Universities Entrance Examination.

1.1.5. A Review of Pharmaceutics in Iran

The beginning of modern pharmaceutics in Iran origins from one hundred years ago when Austrian, German and French pharmacists opened the first modern drugstores in Tehran. Around the same time, European academicians started holding pharmacology lectures in the Polytechnic School in Tehran (Daarul Fonoon). The authorization of the 1920 Medicine Law and also the foundation of a school of pharmacy in Tehran University in 1934, were the initial steps taken in the 20th century. By 1955, Iran's link to the world's modern pharmaceutical industry was more or less limited to the importation of a insufficient volume of manufactured pharmaceutical dosage forms from Europe and the United States. In 1955, the first supervising law on the regulations of pharmaceuticals, drinks, foods and cosmetics was passed. In the same year, first actual pharmaceutical factory in the country was established (100).
By the 1979's Islamic revolution, numerous domestic, foreign and domestic-foreign private companies were working in Iran's pharmaceutical sector. The country's pharmaceutical sector was transformed into a market that boasted a $300 million annual cash flow at that time. There were nearly 4000 kinds of pharmaceutical products available in Iran. However, 70% of which was imported and the remaining 30% was produced domestically. There was practically no investment made in the domestic production of the pharmaceutical ingredients (169). The year 1981 was the beginning of a roundup of actions aimed at adopting and applying policies to modernize the Iranian pharmaceutical sector, which continued to influence this industry up to 1994. These programs, entitled Generic Scheme, sometimes also called the Generic Concept, formed the foundation of the new pharmaceutical system in the country. There were around 40 Iranian pharmaceutical manufacturing companies at that time (211).

Obviously, executing, institutionalizing and sustaining the profound changes described above required centralized policymaking on the part of the government, as well as introducing comprehensive regulations. Owing to Iran-Iraq war, for over a decade, the exports and imports of medicines enjoyed the highest amount of support by the government (16). The obvious, inevitable implication of the said policies was an complete centralization in policy-making and decision-making all through the pharmaceutical sector. Various government organizations and institutions, viz the National Industries Organization, Ministry of Commerce, the Central Bank of Iran, etc. were concerned with the pharmaceutical sector. However, the main responsible body for pharmaceutics, was the MHTME. The MHTME was responsible for deciding, how to allocate governmental supports, particularly the foreign currency quotas due to be granted to various related industries. The government's authority had several aspects: the imposition of a single generic designation as the classification framework for goods produced by various suppliers, the creation of a government-administrated mechanism for pricing different kinds of drugs and also imposing firm profit margins on producers, importers, distributors and pharmacies (21). Currently 55 pharmaceutical
companies produce more than 96 per cent (quantitatively) of medicines on the market (65).

1.1.6. ICT and Libraries

The library is an information center for the whole college community. Traditionally, it controlled both physical and electronic resources to support teaching, learning and research at all levels and also met the needs of pupils and staff for the recreational reading. Now, the library has moved beyond its traditional role into a wider role as manager of institution-wide information, due to vast advancement in ICT. Librarians manage the academic websites, intranets and extranets and coordinate the organization of content from the whole community. This asks for handling material in a range of formats, from simple text to rich multimedia. The library has taken a primary role in making this information accessible to pupils, staff, parents and alumni according to their various needs.

The library extranet is in access anytime, anywhere, via the internet. It also includes reviews, reading lists and other book-related news through an online catalogue. Its portal of web site links is accessed all around the world. The library is pioneering the use of emerging web technologies for cooperative working and communication, including the use of blogs and news feeds. The library staffs play a significant part in libraries with the introduction of new ICT by supporting colleagues and pupils in their use of ICT. They should be able to supply expertise in managing information, act as facilitators, use and publish electronic information with confidence.

Through the use of ICT, libraries are enabled to carry a lot of affairs. They can quickly satisfy the needs of users by the rapid process they make on the information. They can employ similar software in vast areas to minimize the shortcomings and faults. There could be professional strong support for their software and hardware systems. They can reduce the cost sharply through the shared use of resources. Efficiency is heightened and flexibility is promoted.

ICT in the view of users means: more various choices, better decision, convenience and easy access. In the view of producers, ICT means: reduction of
cost, better opportunities to appear in the world academic environment and more adjustment to user’s interest. Therefore, it can be assumed that ICT has made an unprecedented revolution in ICLs’ services.

ICLs efficiency is closely connected to their capability in utilizing advanced technologies of information and communication. In the same light of thought, Coogan, et al. (36, 1998) emphasize the vital role of ICT in ICLs due to the rush of various users to these centers to use vast produced information in different fields. They state that if ICLs can not cope with the ever changing demand of their users, they can not survive the situation. They should know the users’ needs and should be competent enough to provide the required information as quick as possible.

1.2. Design of the Study

The research design of the study undertaken is outlined in this section. It describes statement of the problem, significance of the study, objectives, hypotheses, scope and limitations and definition of major terms that has been used to examine the use of ICT in pharmacology and allied sciences' ICLs (Pharm ICLs) in Iran.

1.2.1. Statement of the Problem

Information and communication have been considered as important features of economic, medical and industrial developments in societies. ICT has gained international importance since one of the items of Information Society of World Conference has been completely devoted to it. Item 51 says that the use of ICT should be in a way to provide facilities in all aspects of life (44). Its application in government services, medical and health information, education, employment, reservation, etc. has important values (164). ICT development in Iran is not at desirable extent as in other developed and developing countries. However, it has gained such an importance that the name of one of Iran’s ministry changed from Ministry of Post, Telegraph and Telephone to Ministry of Communication and Technology of Information in 2003. The present study can be so fruitful in Iranian context and the results can be utilized in other societies as well. Consequently, it is
basically an important issue and need of the time in the development of Iran as whole and pharmacology and allied sciences' ICLs particularly.

1.2.2. Significance of the Study

The reasons to justify the significance and need of the research carried out are as what follows:

(I) **Firstly**, there are number of studies conducted to measure the impact of ICT on ICLs in almost all branches of science throughout the world, however there is no direct study particularly in pharmacology ICLs and impact of ICT on it in Iran. Therefore, this study attempted to analyze and evaluate ICT influence on this particular field of study in Iran to satisfy the need of scholars and scientists involved. The results could be beneficial to other academic and research societies as well.

(II) **Secondly**, academicians, scientists in the process of making knowledge require up-to-date information and ICT plays an important and powerful means of transferring information. Iran, as a developing country, has made a lot of improvements especially in the field of pharmacology through the use of information sources made available and accessible by ICT. Pharmacy sciences students, instructors and researchers utilize different resources to get the needed information among, who use ICT to help them quickly and easily. Therefore, an analysis of the exiting patterns of ICT in pharmacological ICLs can act as an evaluating data leading to the development and expansion of the services in Iran.

(III) **Thirdly**, the present study has also compared Iran's ICT scenario and trend in Pharm ICLs, its weaknesses and strengths to find out tricks and techniques for future improvements.

It is expected that results of the study will lead for Iranian Government support of ICT to utilize in ICLs in general and pharmacology ICL in particular. It is also expected that suggestions and recommendations based on and development of information sources and services in Iran will improve. Consequently, the contemporary problem of much interest to library and information science experts, entitled, "*Use of Information Communication Technologies in Pharmacology*"
and Allied Sciences Libraries and Information Centers of Iran" was selected for the study.

1.2.3. Objectives of the Study

The general objective of this study is evaluating ICT facilities existing in pharmacological ICLs in Iran. The major objectives of the study are:

i) To carry out a state-of-art of the latest ICT existing scenario in pharmacological ICLs in Iran.

ii) To identify and critically evaluate different aspects of ICT facilities available in pharmacological ICLs in Iran.

iii) To determine the use and awareness of various ICT among users.

iv) To clarify the ever changing role of Pharm ICLs and the challenges that the librarians and users encounter due to these changes.

v) To find out the Government of Iran's policies related to ICT promotion and its implementation: problems and solutions and also training facilities available to the users.

vi) To recommend the possible model system of ICT based ICL services, particularly to pharmacology in Iran.

1.2.4. Hypotheses

The following hypotheses are proposed and have been verified based on findings:

I. The first hypothesis is connected to the application of ICT by library staff: It is assumed that more than half of Pharm ICLs' staff are familiar with ICT and are capable of using these facilities.

II. The second hypothesis accounted for the users of pharmacology ICLs. It is assumed that more than half of Pharm ICLs' users use all ICT facilities and services in their ICLs in and around them.

III. The third hypothesis relates to the gap (use and awareness of ICT) between ICL staff (information provider) and users. It is assumed that there is a gap (use and awareness of ICT) between ICLs' staff and users in Pharm ICLs.
1.2.5. Scope and Limitations of the Study

The immediate scope of the study is limited to the objectives and settings of the study mentioned in the previous parts. The present study is restricted to Pharmacology ICLs, ICL staff and their users in Iran's Universities. There are thirteen pharmaceutical universities, however only following nine responded against total ten taken for sample survey. 1) Public Universities (pharmacology colleges): Tehran Medical University, Shahid Beheshti Medical University, Shiraz Medical University, Isfahan Medical University, Kerman Medical University, Tabriz Medical University, Ahvaz Medical University and Sari Medical University and 2) Islamic Azad University: Pharmacology College of Tehran Azad University.

One of these ICLs, Mashhad Medical University, did not let the investigator to distribute user’s questionnaire among the students due to administrative reasons.

1.2.6. Definition of Major Terms

Information and Communication Technology (ICT): Information and communication Technology refers to those technologies that are used in creation, gathering, processing, storage, manipulating, presenting and communication of Information. These Technologies include hardware devices; software applications; and connectivity. In this study, ICT defines as new technologies like: Computers, computer networks, information networks, the Internet, Intranet, LAN, WAN, online and offline databases, CDs and DVDs, telephone lines, mobiles, faxes, modems, printers, scanners, satellite and microfilm associated with utilization and communication of information.

Pharmacology and Allied Sciences’ Information Center and Libraries (Pharm ICLs): Pharm ICLs provide, process, store, sort the information related to health and pharmacy sciences. Also they make the information accessible to their users through various means. Pharm ICLs in this study are pharmacy college ICLs in Iran as follows: Tehran Medical University, Shahid Beheshti Medical University, Mashhad Medical University, Shiraz Medical University, Isfahan Medical University, Kerman Medical University, Tabriz Medical University, Ahvaz Medical University,
Sari Medical University and Tehran Azad University. To have an illustrative view of Iranian Pharm ICLs, **Figure-1.1** is presented.

**Figure-1.1: Iran’s Map: Province and Pharm ICL Wise**

**Iran:** The Islamic Republic of Iran is situated in the Middle East (West Asia), bordered by Armenia, Azerbaijan, Turkmenistan (the former Soviet Union) and the Caspian sea to the north, by Turkey and Iraq to the west, by the Persian Gulf and the Gulf of Oman to the south and by Pakistan and Afghanistan to the east. It has an area of 1,648,195 square Kilometers, with a population of 70,472,846 million.
1.3. Conclusion

ICT as an ever-increasing entity deserves much of investigators attention. In this era of rapid growth and evolving ICT, ICLs have to adapt themselves with the same speed the information is produced and distributed. The amazing increase of scientific researches in science and technology, industry, medicine and other fields has put a great demand on libraries as information centers to provide pinpointed, prompt and comprehensive information to the proper user at proper time, in any form and in any geographical location. Pharm ICLs as one of these major university ICLs demand a comprehensive study, since the existing scenario of ICT in Pharm ICLs has not been investigated before. The results of the study would undoubtedly reveal the present status and shortcomings of ICT facilities in these centers. Consequently, the authorities and the decision makers could be benefited from the findings if attempt to promote Pharm ICLs to satisfy the users' needs.