Chapter Four

Literature Review
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LITERATURE REVIEW

4.1 INTRODUCTION

A literature search is generally conducted to review the present status of a particular research topic. From the survey of literature, a researcher is able to know the quantum of work already done on his own research topic. The output of literature at the national or international level is searched with the help of research reports, articles, books and other materials. The major benefits of literature review are:

i. Helps the researcher in avoiding duplication of efforts on the same research topic (case study).

ii. Helps the researcher in adopting methodologies used successfully by other researchers/scientists.

iii. Suggests new approaches in planning/the investigation/research.

iv. Helps to narrow down the research problem more clearly.

v. Assists investigators to develop firmer understandings of theoretical implications of proposed inquiries.

4.2 SURVEY OF SCIENTOMETRIC / BIBLIOMETRIC STUDIES:

The studies of scientometrics/bibliometrics mainly fall into two broad groups. One group is descriptive studies dealing with the characteristics of literature and is not only concerned with representing sincerely the features available in the current literature, but also interested in the condition of past literatures. Specifically, in areas where past studies constitute an important part of the current
researches. The other group of studies examines the relationships formed between components of literature known as behavioral studies; with all its documentation relying on the information contained within previously published documents.

Numerous theoretical and empirical studies have been conducted on the subject at the international level, which have been reviewed in the following pages. This is followed by the review of Islamic/Arabic literature on the subject.

(Price, 1965)¹ had attempted to describe in the broadest outline the nature of the total output of scientific papers. Price's contribution is regarded as a key event in the development of the field of scientometrics. He tried to picture the network that's obtained by linking each published paper to the other papers directly associated with it. He has been explaining the incidence of references and incidence of citations and emphasized that the total number of citations must exactly balance the total number of references. He said that: "...it appears that the citation network shows the existence of two different literature practices and of two different needs on the part of the scientists. (i) The research front builds on recent work, and the network becomes very tight. To cope with this the scientist....in physics and molecular biology) needs an alerting service that will keep him posted, probably by citations indexing, on the work of his peer and colleagues. (ii) The random scattering of...item as if it were truly part of the eternal record of human knowledge." From preliminary and analysis, he concluded by saying: "...a very large fraction of the alleged 35,000 journals now current must be reckoned as merely distant background noise, and as very far from central or strategic in any of the knitted strips from which the cloth of science is woven" (Price, 1965, p. 515). He (1963)² had raised many fundamental questions which have led to the scientometrics study of our time (today), namely, why should we not

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turn the tools of science on science itself? Why not measure and generalize, make hypotheses, and derive conclusion?

(Moravcsik, 1977) presented review of a number of studies related to the analysis of scientometric literature. He accepted the argument that: one day the reader will say, “have the natural sciences not been quantified a long time ago?” His article aimed in one part at readership that is not actively involved in the science of science, and whose geographical location might not enable it to have access of references. He presented a kaleidoscopic overview of recent developments in the quantification of the study of science. He surveyed a variety of quantitative measures of science, namely, input measure, assumption for output as a measure, scientific authors as a measure, publication as a measure and citations as a measure. He concluded that a considerable progress has been made to produce workable indicators; and he emphasized the importance of being positive with respect to the measures. He stressed this point because “too often one sees scientific communities, particularly in countries with only a recent scientific tradition, where whatever funds are in fact spent on science are never followed up by such a functional evaluation of the quantitative measures surveyed in this article, together with various peer evaluation techniques involving, if needed, international scientific manpower, are essential for such a continual assessment of the quality of scientific work.”

(Nicholas and Ritchie, 1978) as it is well known, that bibliometricians are interested in the interaction between the literatures of various countries, languages and subjects. The wide growth of literature and rapid development of literatures generated several evolutionary research studies. Hence here, in this chapter, we are going to survey and cover the studies concerned with the literature on scientometrics / bibliometrics.
(Garfield 1979 a)\(^5\) has given a comprehensive discussion on the use of citation analysis to rate scientific performance and the controversy surrounding it. As he mentioned in his paper that the general adverse criticism that citation counts include an excessive number of negative citations, thus, the citations to incorrect results, worthy of attack, self-citations, which indicates that citations to the works of the citing authors, and citations to methodological papers are analyzed. Included are a discussion of measurement problems such as counting citations for multi-authored papers, distinguishing between more than one person with the same last name, such as, homographs, and what it is that citation analysis actually measures. He concluded that as the scientific enterprise becomes larger and more complex, and its role in society more critical, it will become more difficult, expensive and necessary to evaluate and identify the largest contributors. He indicated that, when properly used, citation analysis can introduce a useful measure of objectivity into the evaluation process at relatively low financial cost.

(Mulchenko et-al 1979)\(^6\) have studied the comparative analysis of the information activities of leading scientists that has been carried out. This had included the five previous Soviet chemists, five foreign ones, and eight of the then Soviet physicists, specialist in low temperature physics. Within chemists there has appeared a tendency to a new form of scientific activities, namely ephemeron teams which favor the production line mode of getting new information. In physics, the traditional scheme is preserved: leading scientists publish few articles and have few co-authors. They reported that the ephemeron teams produce expanding information: new objects and processes are studied from the previously elaborated point of view. They have observed that the specific average citation rate (number of references per number of papers) is a criterion for separating the publications of the intellectual industry from the pilot studies full of novel ideas.
(Small and Crane, 1979) studied the technique of co-citation cluster analysis as applied to a special three-year (1972–1974) file of the Social Sciences Citation Index. They used an algorithm which is devised for identifying clusters that belong to a discipline based on the percentage of source documents which appear in a disciplinary journal set. Clusters in three disciplines (economics, sociology and psychology) are identified using this algorithm. Clusters in a specialty of natural science (particle physics) obtained from the 1973 Science Citation Index are compared and contrasted with the three groups of social sciences clusters. Certain common structural characteristics of the social science and natural science groups suggest that knowledge is developing in parts of the social science disciplines in a manner similar to the natural sciences.

(Haitun, 1982) have explained in his paper that the stationary distributions, namely, distributions involving no time dependence, are considered. It is shown that all these distributions in scientometrics can be approximated by the Zipf distribution at high values of variables. The sample moments appear to depend significantly on the sample size. Accordingly, the approximation of these observational data by probability distributions converging to a stable distribution different from the normal, one proves to be the only correct approximation. In conclusion, he formulated that the use of non-Gaussian statistics is necessary in the science of science and other social sciences.

(Arunachalam and Garg, 1985) their well-studied paper gives us an opportunity to the performance of a small and developing country similar to our study, in which they have explained an analysis of 258 papers published from Singapore and covered in Science Citation Index of 1979 and 1980 indicates that (i) much of Research and Development in Singapore pertains to medical research, (ii) almost all the papers are published in English language periodicals published from the western
world, (iii) nearly two-thirds of Singapore's publication output is accounted for by the University of Singapore, and (iv) by and large papers from Singapore are rarely cited, even if many of them have appeared in journals having impact factor greater than one.

(Sengupta, 1985)\(^{10}\) studied the enormous growth of biophysical literature that has created great difficulties in tracking out the significant literature of the subject. To cope with this unprecedented growth of literature, a new bibliometric technique has been applied to rank periodicals in the field based on 4228 citation data, collected from the bibliographic data base published in the source journal namely, Annual Review of Biophysics. This list is expected to reflect the impact of literature on the advancement of knowledge in the field of biophysics. A striking feature of the ranking list is the high positions occupied by multidisciplinary science journals and biochemical journals as compared to journals exclusively and specifically devoted to biophysics or any particular aspects of it. Other remarkable findings are the wide scatter of biophysics literature; dominance of the USA journals and status attained by English as the preferred medium of communications of the working biophysicists. The data are also analyzed according to subject categorization of the ranked periodicals. He has put forward the results of the present study that have been discussed in relation to Bradford's Law of Scattering and validity of the extension of the law. He has come to a conclusion that it is expected that the present ranking list will enable the working biophysicists to select journals from the viewpoint of their significance to the active areas of present-day biophysical research.

(Small et al, 1985)\(^{11}\) in their most referred paper depended on their previous attempts to map science using the co-citation clustering methodology and analyzed their shortcomings. Two enhancements of the methodology presented in Part 'I' of the paper-fractional citation
counting and variable level clustering are briefly described and a third enhancement, the clustering of clusters, is introduced. When combined, these three techniques improve our ability to generate comprehensive and representative mappings of science across the multidisciplinary science citation index database. They have drawn the results of a four step analysis of the 1979 science citation index. The resulting map at the fourth iteration is described in detail. The map shows a tightly integrated network of approximate disciplinary regions, unique in that for the first time links between mathematics and biomedical science have brought about a closure of the previously linear arrangement of disciplines. Disciplinary balance between biomedical and physical science has improved, and the appearance of less cited subject areas, such as mathematics and applied science, makes this map the most comprehensive one yet produced by the co-citation methodology. Also he had gone through the remaining problems and goals for future work which are discussed.

(Schubert and Braun, 1986), in their research paper have studied the cross-field comparison of scientometric indicators, severely hindered by the differences in publication and citation habits of science fields. However, relating publication and citation indicators to proper field-specific reference standards, relative indicators can be built which may prove rather useful in the comparative assessment of scientists groups, institutions or countries. They stressed that the use of relational charts in displaying the indicators broadens the scope of such assessments. In their findings which have mentioned that the relative indicators of chemistry research in 25 countries are presented as an illustrative example and these may help the researchers in new and also further studies.

(Ungern-Sternberg, 1995) in her paper has studied the recent discussions of library and information science (LIS) educators, reducing
heterophony, the lack of similarity between two groups or individuals, among LIS researchers and practitioners has been emphasized. Two researchers with different backgrounds, one in bibliometrics and the other in case study, have observed and discussed applications of bibliometrics and case study as used in teaching research methods. The main thrust is in providing tools for teaching these research methods so that the gap between research and practical application could be narrowed. She explained the paper of Leena Siitonen that discusses the applications in teaching case study research methods. She emphasized that the bibliometrics methods are seldom used by librarians in practical work. Still these methods grow more important when planning information provision in research libraries. New subject fields develop and the numbers of interdisciplinary publications have during the last decades grown exponentially. It is, though, difficult to organize information in new fields, when the classification systems, used ‘f’ or instance by journal services, have a discipline based structure. The needs to organize this information and help the user to identify relevant documents grows more important, and at the same time the huge amount of available documents give great possibilities to apply bibliometrics easily and in the frame of practical work. Bibliometrics provide a tool for getting the core for developing a local collection in a new field. Teaching bibliometric methods could be developed by: (i) Seminars, where the students learn the methods and also learn to interpret their results by comparing with other studies and (ii) by use of online systems which give good bases for different bibliometric methods.

(Amudhavalli, 1997) in her article deals with specific aspect of the subject area of evolution and applications of scientometrics and Informetrics. The author has pointed towards the basic and uncontested beliefs in science studies are the assumption that: “The knowledge of scientific literature has been augmented by a considerable body of
statistical research. This has been directed towards various phases of scientific communication, but has sought principally to describe the characteristics of the literature available to scientists to identify the literature required by them or to determine how they use the literature”. She referred the three terms ‘bibliometrics, scientometrics and Informetrics’ without going through their differences. She concluded that: “This historical account confirms that the contemporary approaches in ‘Scientometrics’/‘Informetrics’ are marked by extensive use of quantitative and qualitative techniques. In recent years, such quantitative methods are being extensively used for studying the structure of literature (of discipline). These techniques have been helpful in enabling the mapping of disciplines as also a study of any transition in the structure and composition of a discipline. In fact, in the last one decade a number of tools, techniques and indices for this purpose have been developed and applied to various areas”.

(Jalaja, 1997)\(^{15}\) has studied the bibliometric analysis of Journals which are related to science subjects and subsequently published in India. The objectives of this study were to identify a list of core Indian journals in Mathematics, Physics, Chemistry etc. and to study the scattered patterns of literature related to science subjects. Also to determine the authorship in these subjects and to find the similarity of earlier studies as well as to find out whether foreign authors are interested in publishing their research studies in the Indian Journal of science. The methodology of his study is based on the abstracts which are published in the secondary journals. He used document analysis. Preparations of frequent distributions and calculation of percentage, graphical representations and statistical analysis. Many major findings are drawn from his study. For further research, he has suggested the followings:
Research studies aiming at identifying core journals, prominent journals and insignificant journals in area other than science and technology should be taken up.

The data for the present study was gathered solely from Indian Science Abstracts, more comprehensive studies on the basis of data obtained from other sources should be undertaken to supplement the finding arrived at in this study.

In order to verify whether some of the deviations from the established laws of bibliometrics are noticeable in this study, similar studies need be conducted.

Studies giving more stress to the bibliometrics of patents, standards, etc. need to be carried out.

(Leydesdorff and Besselaar, 1997) in their paper explain the theory of citations, laying emphasis on the fact that should not consider cited and/or citing agents as its sole subject of study. Since one is able to study the dynamics in the networks of communications. While communicating agents, for example, authors, laboratories, journals, can be made comparable in terms of their publication and citation counts; one also would expect the communication networks not to be homogeneous. They observed that the latent structures of the network indicate different codifications that span a space of possible translations. They explained that the various sub-dynamics can be hypothesized from an evolutionary perspective. They have discussed using the network of aggregated journals and journal citations in science and technology studies as an empirical case, the operation of such sub-dynamics can be demonstrated. They concluded that the policy implications and the consequences for a theory-driven type of scientometrics will be elaborated. But Leydesdorff, in his book has identified some challenges of scientometrics and suggested that: "the state of the art of science studies is 'pre-paradigmatic': it is an
interdisciplinary area integrated only at the level of its subject matter, and an application area for various contributing discipline.” (Leydesdorff, 2001).

(Raan, 1997), in his well studied paper has analyzed the state of the art of scientometrics and characterized its application-oriented tradition. He argued that the core research activities of scientometrics fall in four interrelated areas: science and technology indicators, information systems on Science and Technology, the interaction between Science and Technology and cognitive as well as socio-organizational structures in science and technology. He has emphasized that an essential condition for the healthy development of the field is a careful balance between application and basic work, in which the applied side is the driving force. In other words; scientometrics is primarily a field of Applied Science. This means that the interaction with user is at least as important as the interaction with colleague-scientists. He states that this situation is very stimulating, it strengthens methodology and it activates basic work. He has considered an idea of scientometrics lacking theoretical content or being otherwise in a crisis-like situation groundless. He observed that scientometrics is in a typical developmental stage in which the creativity of its individual researchers, the climate and facilities of their institutional environments determine the progress in the field and, particularly, its relation with other disciplines. He has cleared discussion on these aspects also contribute substantially to the reputation of scientometrics as a research field respected by the broader scientific community. He emphasized that the latter point is important; both to let quantitative studies of science and technology take more advantage of an academic environment, as well as to keep it innovative and thus attractive in terms of applications at the longer term. He envisaged that scientometrics could benefit significantly from a greater integration with knowledge discovery and data mining.
(Rios, 2000) studied the incipient presence of the bibliometrics in the University of Argentine, Brazil, Paraguay, Uruguay (MERCOSUR countries) Bolivia and Chile. It is important to denote the circulation of specific bibliography of local authors mentioned in the catalogues of university libraries. Taking into account the available documentation, scientific research that applies the methodology and techniques of the bibliometrics is found in the field of biomedical libraries and it is scarce in the Humanities libraries. In his country (Argentine), if the tendency of using computers during the last few years continues, the quantitative treatment of the information and documentation will be easier and the bibliometrics will be a basic instrument. He concluded that besides teaching and application of the bibliometrics, it is important to develop wide and comprehensive database that was the main obstacle normalized and indexed in Spanish language and of easy access through the new telemetric technology. Otherwise, it is observed that the bibliometric investigations appear vitiated from their origin.

(García's, 2001) describe bibliographic references in Spanish nursing research papers and their evolution over a decade. He has used the method that consists of a retrospective bibliometric study of a cluster sampling of 622 research original and review papers, which were contained in the Spanish nursing journals Enfermeria Científica, Revista ROL de Enfermería, Enfermería Clínica and Enfermería Integral, and published from 1985 to 1994. The journal Nursing Research was selected for qualitative comparative purposes. A series of classic bibliometric indexes were used. The results of his study show that the mean of references per paper is 10-64 ± 10-42; this increased over time (P < 0.001). Review papers have more references (P< 0.001). Price index (percentage of references published during the last 5 years) is 44% and the Insularity (percentage of references published in same country as the article) is 55%. References to journals predominate (58-6%), with a growing tendency for references to Spanish nursing
journals, although they are still scarce (181% of the references to journals). Spanish is the language of most of the references (60-3%), the second language being English (36-1%). He concluded that the bibliographic references in Spanish nursing research papers are scarce and not very specific: this happens both in regard to Nursing Research and to publications in other national science areas. However, there is an increasing tendency of references to nursing journals in the period analyzed. He indicated that the age of the references places Spanish nursing in an intermediate position between the hard sciences and the humanities: and, according to the type of documentation used, we find it halfway between experimental and natural sciences, and technologies and social sciences. A clearly observed concluded remarks that there has been a slight increase in references in English in recent years.

(Chen et al, 2003)\(^2\) focused on issues concerning how effectively they investigate an integrated approach to scientometric studies with emphasis to the use of information visualization and animation techniques. Their study is based on bibliographic data derived from the web of science that draws upon citation and co-citation patterns derived from articles published in the journal Scientometrics (1981-2001). In their paper they shows the modeling, visualization takes an evolutionary and historical perspective. In their study, they adapted an integrated procedure of citation analysis and the design of the visualization model adapts a virtual landscape metaphor with document co-citation networks as the base map and annual citation rates as the thematic overlay. The study explains that the growth of citation rates is presented through an animation sequence of the landscape model. Issues concerning the visual-spatial design are discussed from a citation analysis point of view. Spain is one of the few European countries to have incorporated the study of nursing into the university sector. Also they mentioned that the bibliometric studies may be of a great help for the consolidation of nursing research. They concluded
that the long-term research has to continue to pursue visualization-augmented approaches to scientometrics studies.

(Wilson and Osareh, 2003)²¹ showed their concern with the classification and specially the indicators of mapping of science and technology (S and T) field in developing countries and with specific reference to Iran. They compared the funding of research and development (R and D) in Iran with the scientifically advanced countries and found that funding from private sector is negligible and the government expenditure on Research and Development is merely 0.5%. They searched the Science Citation Index using the dialog information system to obtain information on all types of publication form 1975 to 2002 from worldwide and Iran. They tried to obtain reliable and consistent Science and Technology indicators for Iran: "to provide dependable methods of measuring scientific activity in terms of the production of scientific publication....Scientometrics, the quantitative study of science and technology through its published literature, uses various Science and Technology databases to show, inter alia, a country's share of the world's total publication count". Also they mentioned the limitations of the scientometric approach as bibliometric and Informetrics data are likely to under represent the level of international collaborative research in their discussion of international collaborative research. They concluded that Iran's published output in Science and Technology reflected the turmoil and hardship the country was undergoing with sharp decline in the 1970s and 1980s. However, from 1990 to 2002, they observed that the Iranian publications have risen tenfold. In many Iranian universities, small staff numbers combined with heavy teaching responsibilities make it difficult to pursue a vigorous research agenda or to develop areas of specialization. Equipment is often a problem. Adequate as it is often inadequate for state of the art research. Under these circumstances, it is to Iran's credit that scientists have been able to gain international presence in
several field of specialization. But for Iranian scientists to attain more prominence in the future, policies must be devised not only to promote the education of talented young people but also to create broader channels of communication with the international scientific community.

(Coronado et al, 2004) His study is concerned with southern European less-favored region of Andalusia that have allowed to design its own Research and Development policies that complement those implemented throughout Spain and the European Union. Recently the Regional Government passed the Third Andalucian Research Plan 2000-2003. Their paper provides deeper insight into the role played by science in driving the technological development of Andalusia. The aim of the paper was to answer five fundamental questions: how is basic science utilized by industry and Andalusia? Which sectors are the most dynamic in the employment of scientific know how? Which scientific fields are mostly in demand by industry? Which types of institution utilize scientific knowledge most profusely? What delay is there in incorporating science into technology? The methodology which they have applied for investigating the links between science and technology is based on scientific situations in patent documents (NPC). The results of their study provides relevant information about the interconnections of scientific and technology systems and thus constitute a good point of reference for the development of future Research and Development plans.

(Shabana, 2004) has studied literature on brain injury on data collected from volumes of index medicus 2001-2002, by using bibliometric techniques for eliminating low-quality literature and selected a small portion of significant, reliable and relevant high quality publications. She analyzed and interpreted the data and applied the bibliometric laws to check the validity of these laws. Her study proved that Bradford's law of scattering is significantly applicable. But she came
to conclude that: “the trends of research now a days have changed as compared to the period when Lotka’s law was formulated. At present inter-disciplinary method of research are common and most of the articles are now written in Joint authorship on the basis of analysis of the present data. It was, thus, difficult to testify the validity of Lotka’s Law”. The study also proved that Zipf’s law is valid and still used even today.

(Kretschmer and Thelwall, 2004) studied that the development of information and library sciences together with science studies will, among other things, be fashioned by the development of quantitative studies conducted in this field. The terminology thus obtained shall be perceived as a reflection of the technical, social and political backgrounds of the researchers. The technical redevelopment of methods of communication through the Internet presents a challenge for information scientists to cultivate novel quantitative methods and techniques in order to measure rates of information exchange in this new medium.

(Lars and Lilja-Karlander, 2004) identify the study designs and topics of Swedish orthodontic articles, to elucidate their international position, and to verify in which scientific journals the articles had been published in the past decade. A search of the Medline database for papers published between 1992 and 2002 was made using the medical search heading terms (orthodontics, malocclusion, cephalometry), and (facial bones and growth). Two independent reviewers selected the articles of Swedish origin and categorized each article according to research design and principal topic. Overall, 15,572 articles in orthodontic research were found, of which Swedish contribution was 1.9% with the majority of these (71.5%) being submitted by universities. Most of the Swedish articles (84.5%) had been published in ten journals and many high-quality studies with orthodontic interest were published
in non-orthodontic journals with higher impact factor scores than the orthodontic journals. Every second study was a prospective one and of these (5.2%) of all Swedish articles were randomized clinical trials. The findings of their study have come along with that neatly every third study, prospective as well as retrospective was uncontrolled. The main classification was treatment studies (51.9%), followed by development (18.6%) and diagnostic information (10.7%) studies. Thus, they have come to conclusion that the majority of the articles evaluated therapeutic interventions. However, although the randomized clinical trials are the preferred study design in evaluation studies, few used this method. In an era focused on evidence-based medicine, studies with randomized clinical trials design will be the future challenge for research in the field of orthodontics.

(Prasad and Chaturvedi, 2004)\textsuperscript{26} studied the digital divide and role of health science libraries in India. They observed that due to proliferation of electronic sources and networks, the amount of information and the complexities of information sources are more than most clinicians and students can cope with. Also the plethora of information on the Internet, much of it unorganized, unevaluated and potentially dangerous if improperly utilized, necessitates acquiring more sophisticated information handling skills and searching techniques for libraries. It is a challenge to which hospital librarians with their expertise in managing information and the awareness of their user’s need, can and must rise. Therefore, technology will continue to change, and libraries and librarians will continue to change, and libraries and librarians will use the changing technology to provide the best access and service to their clientele

(Senthikumaran and Amudhavalli, 2004)\textsuperscript{27} presented a comparative report on India and Japan in terms of their publication output, the priorities they have assigned to different fields in Spices
research during the last three-decade using Hort-CD Database. They concluded that Asia is not only a major continent in the world, but also is found to be one actively engaged and has been expanding in R&D output over the years as there has been a steady increase in its productivity pattern in Spices Research. Hence, Asian countries are the major producers, marketers, and consumers of spices in the world. India being one of the ancient and acclaimed Asian countries in spices and hailed as the “Home or Land of Spices”. India’s output of research in the field of Spices Research is found to be considerably more than the Japanese output. However, qualitative analysis indicates that Japan (101%) publishes more papers in the field in relation to its total output than average in the field of Spices that India (94%). Attempt to establish the priorities for R and D on Spices by these two countries reveals that both India and Japan publishes more on the ‘MAJOR’ category of spices. It is inferred that India needs to review its performance in the Spices R&D. The difference in the AI factor through is very marginal – 4%. It is also to be noted that India’s AI has a gradual declining status, which has to be taken seriously by the policy-makers and researchers in this field. Spices research Institutes in the country has to reconsider its aims and roles.

(Aguillo and Krestchmer, 2005)\(^2\) demonstrated the manual analysis of hyperlink network between personal homepages of the German society for psychology and on the one hand the number of personal and institutional web pages is increasing enormously during the last two decades but on the other our knowledge about the background is low. The present paper comments about creation of personal web pages in academia and research as well as about linking between these pages. In this connection, different methods of sampling personal and institutional web pages as also link analysis vis a vis manual analysis.
The paper is concerned with a scientometric evaluation. Of the outputs of PADCT (Program de Apoioao Desenvolvimento Cientifico e Tecnologico) and stimulate scientists, policy-makers generally as to how reliable are scientific investments made by developing countries on long-term basis? He highlighted the experience of developing countries, particularly, in Latin America that successful scientific initiative may be discontinued due to political influence. His study discussed the scientific strategies and results of a scientometric evaluation of the Brazilian PADCT as a case study. He used the sample methods to postulate the possibility of evaluating science and technology (S and T) programme by the performance of the researches funded by the programme and compare the output with the performance of researchers from other countries. He used methodology for bibliometric analysis for a scientific field for the future use by the Brazilian Ministry of Science and Technology. In other studies, a data set includes the following elements: (i) a full bibliographic listing for papers (ii) all addresses information appearing with the publication, (iii) a scientific field classification for each article based on a system devised by ISI and based on the journal publication (iv) records of all citations to each Brazilian paper by the year of citation, and (v) records of expected number of citations to each Brazilian paper. The results of his study presented that 44 out of 49 fields show an up trend in the last final three to five yea. He concluded that: “Scientific Indicators data presented in this article shows that Brazil increased significantly its overall performance in Science...scientists funded by PADCT II, achieved high levels of scientific performance during the period of 1992-1996, compared to previous periods when funds of PADCT were not available. This method can be applied to qualitatively evaluate scientific outputs of programs and institutions, and will be useful particularly for developing countries”.

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(Nicholson, 2005) this paper looks at the integration of data mining in digital library services. First, bibliomining, or the combination of bibliometrics and data mining techniques to understand library services, is defined and the concept explored. Second, the conceptual frameworks for bibliomining from the viewpoint of the library decision-maker and the library researcher are presented and compared. Finally, a research agenda to resolve many of the common bibliomining issues and to move the field forward in a mindful manner is developed. The result of his study is not only a roadmap for understanding the integration of data mining in digital library services, but also a template for other cross-discipline data mining researchers to follow for systematic exploration in their own subject domains.

(Yue and Zeyuan, 2005) showed that the collaboration in scientific study plays an important role in science and humanity. The object of the study is to correlate collaboration in China with Management Science. Based on the Chinese Journals Full text Database (CJFD), we conducted a quantitative analysis of the authorship rate with the published time, the age group and address sources of the authors. The analytical results indicate that the scholars and younger scholars of the age group of 30 years are the new blood. Chinese cities could be categorized to different grades according to the analytical results of the address sources of the authors. Beijing and Shanghai are the first grade cities, which mean that they are the national centers in Management Science; Xi’an, Wuhan, Nanjing, Tianjin, Hangzhou and Shenyang are the second grade cities, which are the mid-collaboration level cities and the regional centers in management science; the rest are placed in third grade.

(Bollen and Vande Sompel, 2006) have stated that Science has traditionally been mapped on the basis of authorship and citation data. Due to publication and citation delays such data represents the
structure of science as it existed in the past. They proposed to map science by proxy of journal relationships derived from usage data to determine research trends as they presently occur. Their paper states that mapping is performed by applying a principal component analysis superimposed with a k-means cluster analysis on networks of journal relationships derived from a large set of article usage data collected for the Los Alamos National Laboratory research community. The Results of their study indicate that meaningful maps of the interests of a local scientific community can be derived from usage data. Subject groupings in the mappings correspond to Thomson ISI subject categories. A comparison to maps resulting from the analysis of data reveals interesting differences between the features of local usage and global citation data.

(Sangam et al, 2006) portrayed a scientometric study of Professor Ramachandran who worked in various fields in anomalous scattering, and the phase problem, the analysis of the structure of fibres, and the conformational analysis of macromolecular structures. They stated that, Ramachandran is considered to be one of the founders of the rapidly developing field of molecular biophysics; his contributions are mainly to the theory of molecular structure of biopolymers in relation to their biological activities. In his 49 years of productive life, he has collaborated with 81 colleagues and students and has published 304 papers during 1942-1990. The highest collaboration coefficient is 0.86. He has the highest collaboration with Sasisekharan (18) and Srinivasan (15). The core journals, which published his papers were: Proceedings of the Indian Academy of Sciences, Acta Crystolographica, Current Science, Nature and Biopolymers. They concluded that Ramachandran was undoubtedly one of the most outstanding scientists of post-Independence India and truly a jewel in the crown of India’s science.
(Albert et al, 2007)\textsuperscript{34} have studied the evaluation of the Spanish CSIC performance in Biotechnology, as compared with those of the French CNRS and the Italian CNR. It has been carried out to determine the balance between the generation of scientific knowledge and the transfer of technology. Their study shows a high scientific productivity mostly in journals with moderate impact factor, a low generation of patents and an insufficient transfer of knowledge to the Spanish companies. Other indicators confirm the existence of competitive human resources in biotechnological research producing scientific knowledge of interest for the development of patents and that cooperates successfully at European level.

(Gian Singh, Rekha Mittal & Moin Ahmad, 2007)\textsuperscript{35} have undertaken this study to find out the growth and characteristics of digital library literature. They approached over 1,000 articles for the period 1998-2004 from LISA Plus and these article were analyzed to study authorship patterns authors productivity and prominent contributors, language-wise and year-wise distribution of articles, country-wise distribution of journals, core journals in the subject area, and indexing term frequency.

(Gupta and Dhawan, 2007)\textsuperscript{36} investigated role and contribution of various performing sectors in Indian physics out put. The objective of their paper is to study and analyze the overall performance of four major performing sectors, namely universities and colleges, mission oriented Research and Development, institutes of national importance, and industry, in physics research in India during 1993-2001 in terms of publication growth and output and publication impact, using a number of quantitative indicators. The second part of the paper provides data on comparative analysis of the performance of various sectors participating in physics research in India.
(Kretschmer and Kretschmer, 2007)\(^{37}\) presented that a fairly large number of publications in sociology, in computer science or in information sciences, as well as in studies of collaboration in science deal with the studies of social networks with unweighted ties because measures involving unweighted ties are easier to calculate. A few studies on networks with weighted ties have been conducted. Such studies not only need more complex formulas but also a process of quantification especially when quantitative empirical data are not directly available. The later are, however, directly available under the condition of using bibliometric or webometric data. Consequently, new complex measures of the degree centrality are introduced including weighted ties possible for use of the analysis of co-authorship or citation networks. Both co-authorship relations and citations are well-quantified data.

(Looy et al, 2007)\(^{38}\) in their paper, which is one of the latest well-studied work in the field of scientometrics in which they investigate, at a country level, the relationship between the science intensity of patents and technological productivity, taking into account differences in terms of scientific productivity. They observed that the number of non-patent references in patents is considered as an approximation of the science intensity of technology whereas a country's technological and scientific performance is measured in terms of productivity (namely, number of patents and publications per capita). In their paper, they have used USPTO patent-data pertaining to biotechnology from twenty countries, covering the time period 1992–1999. The findings of their study reveal mutual positive relationships between scientific and technological productivity for the respective countries involved. At the same time technological productivity is associated positively with the patients. They have done their investigation and confirmed these results when introducing time effects, they have informed that these observations corroborate the construct validity of science intensity as a distinctive
indicator. They suggested its usefulness for assessing science and technology dynamics, in today's most complicated practical life of science and technology.

4.3 ARABIC LITERATURE REVIEW:

(Al-Samaraee, 1995) utilized intellectual output to get the reality of the Iraqi intellectual output and performs a bibliometrics analysis of the literature in the field of media for the period from 1968 to 1988 through countless and formal analysis, objective timetable to identify features and stages of growth and productivity analysis weakness and composed to identify the most productive field. The study reported steady growth of media literature in Arabic language related to Iraq in a number of periodical titles. She applied the bibliometrics laws to the published output. The results of her well-studied research showed that the media literature grew tremendously during the Iraq-Iran war (1980-1988) due to the war propaganda, there was increase in media during the war period. She shows the output of her study results as follows: (i) inventory subject distributed among 264 books, 514 articles and 44 theses, (ii) resulting in turns intellectual upward and (ii) superiority of media in the number of what had been written followed by press, so as to the importance. Her study encouragement entrusts the joint formation between the authors and necessity releasing his of winner scientific specialized in the domain, added him to encouragement of the product the translator for the custom from during him on cultures of the people.

(Al-Zubaidi, 1995) examined the scientific literature in Library and Information Science by analyzing citation patterns of many journals and books. In his study, he sorted out citations based on the subject category of referencing and systematically reviewed cases in many journals and books. The results of his study showed that it is only after the opening the department of studies in Library and Information
Science in 1978, the number of post graduate candidates increased, and which calculated in increasing the published output on the subject in Iraq also observed that more and more intellectual output of publication took place during the war time (1980-1988) observed that only few bibliometric works were investigated in separate fields in the early years. No study had been conducted on the Iraqi literature that encompassing in library and information science.

(Abdul-Lateef, Muna, 1998)\(^1\) has done a bibliometric study on the Saudi Arabian agricultural research. The objective of her paper was to analyze the citation references of the Arab researchers in the field of Agriculture published in the magazine of the Agricultural Science issued by King Saud University, cover up a period from 1989 to 1994. The concerned magazine has so published 12 volumes and carries 206 research articles. In this well-studied paper, she has applied statistical techniques. She adopted an integrated procedure of citation references analysis of Arabic literature. The results showed that out of a total of 2991 references 535 cited Arabic references 18.18 per cent as against 2,456 81.82 per cent in English and a few in French, German and others. That means the Arab researchers mostly prefer to cite in foreign languages than in Arabic.

(Ghunaiyem, 1998)\(^2\) in his paper study is the Egyptian intellectual output in the filed of Education in Arabic as well as in other languages. The material included translated or authored books, periodical articles, research papers or thesis covering a period from 1950 to 1990. In the four decades, lot of Scientific researches in the field of Education and Psychology were conducted in Egypt. He has selected 22 sections for investigation. The method of his bibliometrics study is a descriptive explanation of data and then analyzing them; and he applied the quantitative techniques, taking Bradford’s law for analyzing the citations references.
studied and analyzed statistically the status of book publishing movement in Jordan during the period (1980-2000) as controlled by the Jordan national Bibliography of that period. It also aims at answering several questions related to the number of books published during that period, their languages, place of publishing, nature of responsibility (author, translator, editor, etc.) editions, and number of pages. The results of the study show that 1,173 books were published in Jordan during that period, with an average of (558.6) book annually. The number of books published yearly ranged from 221 books in 1980 to 737 books in 2000, 94 per cent of total books were published in Arabic. The majority to the books were in Social Sciences (24.68 per cent), followed by Literature (22.57 per cent) then Islamic Religion (13.7 per cent). The least number of books were in Fine Arts (2.39 per cent), Philosophy and Psychology (1.46 per cent). The majority of the books were published outside Jordan 94.95 per cent of the books were issued in one edition. The results show that 18.7 per cent of the published books were issued in less than 100 pages, and 37.2 per cent exceed 200 pages, and 7.8 per cent exceed 400 pages. The study ends with some recommendations that may help in developing book publishing movement in Jordan.

in his investigation to the published output of Sana’a University (Yemen) during 1976-2002, has used statistical techniques for the bibliometric analysis. The source literature included books, Scientific Periodicals and Research works (dissertation, thesis and papers). The objective of this study was to answer many questions, such as, how many intellectual outputs were conducted during the 34 years? What is percentage of annual growth? What are the most important subjects in which researches were done and finally published? What is ratio of books, published in English and in Arabic? What sorts of problems are faced by the university with regard to publications and other students related research work, he used many
methods of study in his research paper for bibliographical analysis. It included descriptive measures and also for quantitative analysis empirical laws. He highlighted the reasons behind the less number of authors/researchers from Sana’a University. The results of his study show the share of the university publication is very poor and without any planning or scope of view point towards the scientific research due to recruiting of the government administrators is the biggest impact and drawback that put the university in the step of backward and darkness, specifically for the scientific publication purposes and they never care about the position of the library lastly, the discouraging atmosphere to teaching staff on scientific research work in his study’s solution and recommendation, he put forward that the university should take care and concentrate in the educational and academic needs and achieving its goals and ambition among them the scientific research and university publication. Also he highlights that university should encourage the faculty staff members, students and researchers through better remuneration.

4.4 CONCLUDING REMARKS:

The foregoing review of related literature is not an exhaustive survey of the literature and findings of empirical work that has gone into this area. However, it does provide analytical framework for enabling us to undertake the present study.
REFERENCES:


30. Nicholson, Scott (2005): “The Basis for Biblioming: Frameworks for Bringing Together Usage-Based Data Mining and Bibliometrics through Data Warehousing in Digital Library Services.”, Accepted for Publication in Information and Management.


