This chapter presents a rationale for the source of the study, selection criteria for the source material, collection and method of analysis of citation, a brief note on different types of dispersions, viz. author dispersion, form dispersion, subject dispersion, and geographical dispersion.

3.1 SOURCE OF THE STUDY

The source of the study is the citations or references appended at the end of each chapter and in some cases, references at the end of the theses as appendix. The source of the study is the theses submitted to Shivaji University, Kolhapur in pure sciences i.e. Physics, Mathematics and Chemistry during the period 1962-92. The footnotes in the theses have not been considered, as it was found that most were repeated in the references at the end. The source, citations for a citation study are supposed to be carriers of significant characteristics of the subject under study. Hence the selection of appropriate source for such a study is a serious issue. In deciding the source the primary consideration includes using a source having a typical research material used in the area studied. A source which reflects contemporary priorities and research interests in that area and a source which could provide a wide basis with currency of information and currency of citation in the materials. The latter point can be explained
from the fact that books get cited very late as against other carriers of published information, like journals. This is all to summarily state the problem of identifying a source which reflects the changing research trends.

3.2 RECORDING OF THE DATA

The data required for the study is the references appended with the theses of Mathematics, Physics and Chemistry from 1962-1992. The citations/references were photocopied from all the theses of Physics, Mathematics and Chemistry. The references were cut individually and were pasted on notecard of 5x9 inches. The notecards were also given the same accession number that was assigned to the respective theses at the library of Shivaji University, Kolhapur. Journals being the most widely used source of information, the details of journals like year of publication, subject, periodicity, country of publication, type of publisher viz., academic, commercial and others are recorded separately on another notecard of 5x4 inch. The above bibliographical information of journals is being collected from Ulrich's International Periodical Directory, 27th edition (1992).

3.3 ANALYSIS OF THE DATA

Citations in the doctoral dissertations are analysed with reference to authorship patterns (viz., Collaborative authors) i.e. what is the trend of authors in publishing articles, whether they publish individually or co-authored. The citations are then analysed according to bibliographic forms
viz., books, journals, proceedings, reports, patents, theses and dissertations, etc., of each individual dissertation. The data is noted on separate sheets. The data analysed from the individual theses was fed to the computers to get the total analysis of the three subjects i.e. Physics, Mathematics and Chemistry. A program/software was developed in dBase III+ for retrieving the desired results. The Main Menu of the same is appended in the Appendix no.\textsuperscript{19}. Analysis of citations as detailed in the study pertains to two facets; viz.,

1) Dispersion characteristics of: author, form, subject, and geographical.

2) Evaluation of the journal collection of the B.B.K. Library, Shivaji University, Kolhapur.

3.4 DISPERSION

Dispersion here is used to connote the level of scatter or spread of materials. Author dispersion of cited materials relates to the concentration of author in one single area indicating as subject area of thrust.

3.4.1 AUTHOR DISPERSION

The explosion of literature has resulted in an urgent need for identifying the main thrust of authorship. Further it is always interesting to identify how authors of different calibre contribute to the progress of ideas. Alfred J. Lotka studied the productivity of authors by publication frequency. The results revealed that the productivity of authors confirmed inverse square law such that for every 100 authors contributing
one article, 25 will contribute 2 articles, 11 will contribute 3 articles and 6 will contribute 4 articles and so on. In short a large number of documents are authored by a small number of writers. It also means that an author of many papers is more likely to publish again and again than an author who is less prolific. The authors influence on the document is significant and obvious. Bibliometric research has its interest in areas like author productivity, collaborative or multiauthorship, authors preference for publishing (type of publication), geographical inclination, etc. The author dispersion aims at analysis of these factors using all the citations. It is assumed that there is a small number of highly cited authors in pure sciences and that most probably citing and cited authors prefers solo research rather than collaborative research.

3.4.2 FORM DISPERSION

The significance of any form of publication lies in its representation/description of a particular information need. In academic and research institutions journals tend to be most preferred form, followed by books. In areas which involve policy matters and government, the preferred form is that of reports and documents. In short, a variety of forms do exist and there are overlapping in these forms. The term dispersion or scatter here refers to the wide variety of information carriers. Form dispersion describes the vehicle of communication used/preferred by the cited authors. The choice of form for a writer is not easy, nor it is based on the writers selection. A number of reasons force the writer to use any possible or available
carriers of information. The explosion phenomenon forces even the publishing industry to restrict the acceptance of documents, as well as to open other venues for dissemination of knowledge and ideas. The problem under question is what are the preferred forms in literature under study. One may presume that books are the most preferred form. If writers select serials the assumption is that there exists a core list of highly cited serials.

3.4.3 SUBJECT DISPERSION

Here an attempt is made to examine the subject dispersion patterns in pure science theses submitted to Shivaji University, Kolhapur, during 1962-1992. An analysis of subject of citation, subject of journals, subject and countrywise journal production is made here. The main concern is to look at whether pure science subject is an interdisciplinary subject. It is assumed that the literature in the field of pure science encompasses a variety of disciplines reflecting cross currents related to different subject fields. The assumption is that the pure science has a great orientation towards science and technology. The assumption is therefore, the pure sciences are interdisciplinary. Subject scatter is defined by Harrod (1984) as the "appearance of an article on one subject in a periodical devoted to a totally different subject." That is to say, it is subject scatter or dispersion or the spread over of the articles of pure science in journals of other subjects/fields. Break-ups of each of these subjects can highlight emerging trends, in pure sciences. It will also throw light of new shifts in emphasis,
topics of continual interest and development of ideas from their beginning to their more complex as well as fully developed states. A subject which is inter and multi disciplinary by its very definition is inevitable to obtain material from several subject areas. The study of this subject dispersion provides interestingly, information concerning the degree to which other subjects contribute to its literature. In other words, study of this subject dispersion reveals the following:

a) The degree to which the researchers in pure sciences make use of materials from other disciplines, and

b) The degree to which the researchers in other disciplines contribute to pure sciences.

If an article is primarily concerned with pure sciences, one is justified to expect that the source cited there in. If a subject does not deal exclusively with its contents and borrows ideas to retain its identity then we are entering into an arena which we call inter-disciplinary.

3.4.4 GEOGRAPHICAL DISPERSION

The geographical dispersion identifies and discusses the countries from where the journals on pure sciences are published. It attempts to analyse the general pattern of geographical dispersion.

It hypothesises the following:

1) A sizeable number of countries is taking part in the journal production in pure sciences;

2) Only a small number of countries is responsible for high rate of journal production.
It is assumed that journal production is not independent of the following influencing factors in its production:

i) Population of the country.

ii) Language and literacy.

iii) Recent history; and

iv) Political and economic conditions.

The literature in pure sciences emerged from U.S. and Europe received its momentum from other lands also, in a short span of time. The rise of scientific and political scene and their growing developments were contributive factors in the acquisition of knowledge and the production of literature. As a result there came into being a large number of generators and contributors of human information. Simultaneously emerged producers and publishers who were both commercial and non-commercial which resulted in growth of voluminous production of materials. Here, general patterns of geographical dispersion and geographical subject correlation are analysed. An attempt is also made to study, in-depth, the reason underlying the geographical dispersion of journals.

3.5 COLLECTION EVALUATION

Collection evaluation is discussed in the study in terms of locating the cited journals in the B.B.K. Library of Shivaji University, Kolhapur. This method of collection evaluation has its own merits. Each cited journal is matched with the journal available at the B.B.K. Library of Shivaji University, Kolhapur, at present. The utility of such an exercise lies in the fact
that it would reflect on the strength and weakness of the collection. It would also throw light on usage of the documents, thereby providing a criterion to decide the future continuation, renewal of the journals and for the collection development.

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