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8.1 Introduction

Technology has been hailed as a harbinger of societal development in the twentieth century and the oncoming twenty first. The basic feature of such impact of technology is not only the rate of innovations in technology but also the speed at which they were converted to socio-economic utilities. The effective process in this conversion is the mode of transfer of information and skills from the point of generation to the point of use. It has given to fascinating studies in the field of information science.

Among the developments in twentieth century, semiconductor device technology has contributed tremendously to the human development. It has been the building block for the information processing machine called computer and it has also been the bridger of distances in providing basic components for communication technology, satellite technology and the television and video developments.

The developments in this field of semiconductor device technology, particularly on its research front is fascinating. It has shown a fast rate of invention and
innovation and consequential rates of obsolescence. For information science, particularly in the formal communication mode, documents form a good indicator for assessing the speed of research as well as the creative inputs and development process in the field of semiconductor technology. It is to understand this interactive process of document production in semiconductor device technology, the researcher planned to analyse a set of documents published during the recent years.

8.2 Issues studied and analysed

The main objective of the study was to identify the basic characteristics of documents as indicators for information transfer and their influence on the promotion of knowledge. In particular, this thesis aimed to analyse the characteristics associated with the interactors in the production of documents in the field of semiconductor device technology. The characteristics analysed were those associated with the author(s), the institutions sponsored, the publication status of different countries in respect of semiconductor device technology. This principal aim is set in the background of the consolidated approach to the development of the field of semiconductor device technology.
8.3 Methodology

Methodology developed for the study was to identify a set of documents. The samples chosen for the study were from the publication of Electrical and Electronics Abstracts, Vol. 83 (No. 985 - 996) 1980 (January - December) published by INSPEC, England. And next step was to identify the characteristics associated with document production, namely - authors, origin of authors, sponsoring institutions, country of origin of institutions, geographical distribution of documents, language of documents, seepage of information and inter-disciplinary nature of documents.

8.4 Results obtained and Suggestions

The study of the scope of semiconductor device technology shows that it is a field pursued by many countries on a priority scale from being a small laboratory technology to a technology which acts as an indicator of national and international development. Semiconductor device technology has grown in variety of environments to a vide set of applications. In the process semiconductor devices have inter-twinned themselves, as building blocks of technology in chemical sciences, physical sciences, computer sciences, mathematical sciences, material sciences, earth sciences, medical sciences, and even
space sciences. In fact semiconductors have become synonymous with communication and information technologies. This survey shows that semiconductor device technology is a result of interdisciplinary interaction and multidisciplinary connections. The documentary inter-relations evidenced in this survey indicate that the field of semiconductor devices has a vast scatter of literature subject-wise, application-wise, and development-wise. In other words, the idea plane structure as well as the literary survey structure more or less show compatible trend.

The author associations in semiconductor device technology indicate a kind of professional profile of specialists in the field. We find that the authors have a very wide geographic background. It is spread all over the world. However, the high technology countries such as USA, Japan and some Western European countries have a high incidence of contributors. Multiple authors association is also vibrant in the field. The development indicates that the semiconductor device technology has a versatile group of contributors who have a high order of mobility country-wise, institution-wise, and as well as discipline-wise.
Institutions sponsoring research also provide good indication of the environment in which the technology permeates. The analysis shows that the semiconductor device technology is one of the model field in which the institution building phenomena has shown its utility in relation to generation, distribution, and dissemination of knowledge. The large number of institutions and their varieties show an interlinking process in the transfer of technology. The functional overlap in information transfer between the institutions indicates a spectrum of roles in providing a forum for knowledge development, its transfer and consumption. The study of institutional development in this field is a kind of resource development for high technologies.

The bibliometric profile of semiconductor device technology indicates that the articles in periodicals, technical papers in symposia and conference proceedings and technical reports form the core in documents communication. However, the field also reflects a tendency towards information analysis and consolidation in the form of books and reference books. The census of documents indicates that there is high density of information in developed countries, such as United States, Japan, and Great Britain. It also reflects that information
is primarily encapsulated in English language. It shall also be seen that the documents scatter in a wide variety of subject fields, from semiconductor device technology and engineering to communication engineering, computer science, medicine, and other fields. The document contents reflect the innovative features, adoption and adaptation processes.

The technology transfer profile of semiconductor device technology indicates the current trends in national and international economy. It shows an optimal use of all innovative resources available in the industrialized nations. It is found that it is not only the development of innovation but also the transfer mechanism for utilization that plays an important role in the societal development. Thus, innovation life-cycle becomes an important aspect of economics and politics. Therefore, there is an increasing effect on the development of new transfer mechanisms which would carry efficiently the information about topical problems of industry in society into university and research institutions. It also integrates scientific and technological research as a development input to society. It brings home in communication process that the use of information carrier, mechanisms to stimulate innovations and their adoptions. Thus information input should act as a device
for multi lateral effect for the development of society. Semiconductor device technology and production engineering should go hand in hand to promote technology oriented programmes. Such an implication calls for an establishment of information infra-structure to support technology transfer from the point of generation to the point of use. The analysis laid down the following suggestions:

i) We should improve the access to available information by establishing specialised information centres, databanks and the information agencies.

ii) There is a need for continuous development of industrial technology consultancy services, such as firms of technology consultancy, consumer marketing consultancy.

iii) Universities and research institutions must continuously endeavour to orient their resources and capabilities to demands in industry to intensify the co-operation with industries.

iv) Efforts should be made to develop a base for technology innovation and absorption process even in the educational systems of a nation. It should be capable of producing a technology absorption society. Such an education should have built in capacity for filtering, processing, condensing and assimilating information for the betterment of society.
The studies on information flow pattern and information seeking behaviour in the field of science and technology show that the information environment lies between the seeker of information and the user of information. Such an environment is beset with a complexity set by several barriers, such as, discipline-oriented, mission-oriented, language-oriented, politics-oriented barriers. The design of information system should be able to identify these problems in a helpful manner and present an infra-structure which props up a progressive national economy.

8.5 Conclusion

This thesis presents in a nutshell that documents are effective carriers of information in a formal mode of communication. The interaction involved in the production of documents provide a basis for the analysis to get a biblioprofile view of the state of art of the field of knowledge, such as Semiconductor technology. Set in the broader background of socio-economic profile of technology, the biblioprofile provides clues to the flexible nature of technology development and the role of scientific, technical and societal aspects of information generation, packaging, storage, retrieval and dissemination.