INFORMATION PROFESSIONAL IN THE MAKING: A REVIEW OF A U.S. SURVEY*

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Describing the salient features of the emerging post-industrial society in US, moving towards an information economy, Daniel Bell says that the 'axial principle' of this new social order is the centrality and codification of theoretical knowledge as the source of innovation and policy formation[1]. Economically this new social order is reflected by a change from goods-producing to a service economy, (services include trade, finance, transport, health, recreation, research, education and government) by the pre-eminence of scientific, managerial, professional and technocratic class. The evidence to this theory could be seen in the noted economist Fritz Machlup's landmark study 'The production and distribution of knowledge in the United States' published in 1962[2]. In this study Machlup points out that the US work force engaged in information activities constituted around 45% of the total national work force. This observation was later (1976) corroborated in an extensive study by Marc Uri Porat[3]. This figure included a wide variety of persons who were directly involved in the handling of data and information as well as those that were engaged in work that centred on information. Table 1 gives the distribution of information personnel and the three broad categories of activities.

"The first category (A) includes those workers whose output or primary activity is producing and selling knowledge. Included here are scientists, inventors, teachers, librarians, journalists and authors. The second (B) major class of workers covers those who gather and disseminate information. These workers move information within firms and within markets; they search, coordinate, plan and process market information. Included here are managers, secretaries, clerks, lawyers, brokers and typists. The last class (C) includes workers who operate the information machines and technologies that support the previous two activities. Included here are computer operators, telephone installers and television repairers"[4].

While these studies lent substantial support to the notion of service-oriented information economy of the post-industrial society, the conclusion that nearly half of the US work force is engaged in information activities, has been too gross to be accepted on the face of it. This certainly called

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for a deeper analysis and disaggregation for the following reasons:

1) Manpower planning for a continuous supply of personnel in terms of type, quality and quantity; 2) Course design and curricula development for education and training to create the manpower required; 3) Appropriate placement of qualified persons in institutions dealing directly with information as well as those centred on information; 4) Creation of new institutions for new and expanding demands for information products and services; and 5) Research and development in information studies, both basic and applied. Additionally the fact that no comprehensive research study has ever been made on information manpower from all its angles reinforces the need for a deeper analysis.

Appropriately at this point, the School of Library and Information Science, which has been on the forefront along with a few other educational institutions in the US in organizing and offering educational programmes responding to the new demands for information services, took the initiative to look into the manpower problem in a wholesome manner. In 1976 the University of Pittsburgh convened a national conference which drew experts from industry, government, the academic community and relevant professional associations to bring about a national survey of information professionals. On the recommendations of this Conference, a National Manpower Consortium for the information profession was constituted, comprising representatives from the different professional associations and organizations. The primary task of the Consortium was to advise and oversee 1) the design and implementation of a research programme for manpower survey; 2) the submission of proposals for funding, and 3) any additional support required for follow-up action. The University of Pittsburgh was entrusted with the actual responsibility of conducting the survey and to take up three separate projects:

1. Identify and estimate information professionals in US;
2. Gather profiles (personal data, education, training, career pattern, attitude to work etc.) from samples drawn from the first project; and
3. Analyze the data collected and identify gaps in professional education and training and make suggestions to fill them up and also examine changes in occupational classification for information work.

The first project funded by the National Science Foundations, was commenced in 1978. The University of Pittsburgh was assisted by King Research Inc. with a special responsibility for sample design, questionnaire design, conduct of the survey and data preparation. Donald W. King played a key role in deciding on the conceptual work for the study, analyzing the survey data and writing the report. The principal investigator was Prof. Anthony Debons of the Pittsburg University's School of Library and Information Science.

This paper highlights some of the significant findings of the survey and their implications on manpower policy and planning and other related problems, as perceived by Glynn Harmon, one of the members of the National Manpower Consortium.

Objectives of the Survey

The main objective of the survey was to identify and estimate the number of information professionals working in the United States. The study set out to determine:

1. Who are information professionals?
2. What do information professionals perform?
3. Who employs information professionals?
4. Where in their organization are information professionals located?
5. Why are information professionals performing their work?
6. How are information professionals classified in terms of job titles and education?

‘Information’; ‘Information Functions’; ‘Information Professional’ Working Definitions

‘Information’ is defined for the purpose of this survey in relation to an information system.

“Source-based definition: Information is a symbol or string of symbols which have potential for meaning (the commodity of information).

Receiver-based definition: Information is that which adds or changes (my) picture of the universe (the process of information)”[5].

Figure 1 in the next page shows these two concepts of information in the context of an information system.

Information functions

Applying the above definition for ‘information’ and analyzing the existing job functions under the U.S. federal government employment series, the following nine primary information functions were identified:

1. Managing information operations, programmes, services or data base
2. Preparing data and information for use by others
3. Analyzing data and information on behalf of others
4. Searching for data and information on behalf of others
5. Remaining operational information functions
INFORMATION PROFESSIONAL -- U.S.

6. Information systems analysis
7. Information system design
8. Information research and development
9. Educating and training information workers.
(The detailed functions under each of the above are given in the appendix to this paper).

Information professionals

On the basis of the criteria set out, six generic groups of information professionals were formed and the intent was to allocate each major information function, or group of functions, to one of these six categories of professionals. The six groups were representative of functions the information professionals performed, regardless of their qualifications or their job titles.

1. Managers of information
2. Information operation coordinators
3. Information system specialists
4. Information intermediaries
5. Information theorists
6. Educators and trainees of information workers

Figure 2 shows the information professionals, their overlapping characteristics and the organisation sectors in which they are employed.

Survey methodology

The survey was carried out in five stages, viz.:

1. Preparation of a classification of functions performed by information professionals and giving sample job titles of persons performing these functions.
2. Conducting a pre-test and pilot survey to test the information function descriptions, and develop an operational method for conducting the main survey.
3. Collection and processing of data on information professionals performing the functions in organisations in four U.S. employment sectors.
4. Organisation and analysis of the data on information professionals.
5. Preparation and submission of a report on the findings of the survey.

Questionnaires were mailed to organisations where information professionals were likely to be employed, performing more or less the nine different groups of functions isolated for the study. The organisations were classified in four different economic sectors: 1) Industry; 2) State and local governments; 3) Federal government; and 4) Universities and colleges. The survey was oriented towards organisations that employed information professionals and not individual information professionals. Hence the questionnaires were expected to be filled in by general managers, personnel managers and officers, institutional reporting specialists, unit supervisors and others. Out of 2,358 questionnaires sent, 1,193 were returned, the response being nearly 50 per cent.

The questionnaire was carefully designed to elicit data on the following:

1. Functions - What do the information professional actually perform on the job?
Main Findings of the Survey

In 1980, there were 1.64 million information professionals working in the four sectors in US.

1) Functions

The principal functions performed by the persons were:

1. System analysis and design 20%
2. Management of information operations, programs, services or data bases 17% 54%
3. Other operational functions 17%
4. Other functions 46%

Total 100%

These functions accounted for about half of the total number of information professionals.

Some interesting data on the functions performed at the different sectors were:

i) Contrary to expectation, education and training functions were also performed in industry. In fact the ratio between persons employed for this purpose in industries and universities and colleges was 6:1. (The distinction between education and training was not made in the survey questionnaire).

ii) Research and Development activities that included theoretical studies on foundations, laws and theories of information system, etc. were primarily performed in industry. As compared to this, “the estimate of 200 information professionals engaged in information research and development in colleges and universities was almost certainly too low.”

2) Sector of employment

The distribution of information professionals among the four sectors was as follows:

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<td>Industry and business</td>
<td>71%</td>
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<td>State and local governments</td>
<td>22%</td>
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<td>Federal government</td>
<td>5%</td>
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<tr>
<td>Colleges and universities</td>
<td>2%</td>
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i) About half of the information professionals in industry worked in computer and system analysis/programming units, a finding which points to a strong computer and system orientation in industry. The other half were somewhat evenly dispersed among the major functions and organisational units of management support research, information services (non-library), library services and finance. A sizeable number of information professionals was not identified with any particular organisational units, indicating that information professionals and functions in industry may be difficult to classify categorically.

ii) Of the 22% of information professionals in state and local governments, the breakdown, in contrast to industry was

- Computer field 12%
- Education and training 29%
- Library 19%
- Information services (non-library) 15%
- Management of function 10%
- Others 15%

iii) In the federal agencies employing only 5% of all information professionals, about half of these work primarily...
with computers, 15% within management support, 18% with non-library information services, 8% each in research and library work fields.

iv) Only two per cent of all information professionals were engaged by colleges and universities. They include

| Librarians | 33% |
| Education and training personnel | 27% |
| Computer personnel | 23% |

Of those engaged in education and training in this sector, only one-half held appointments in school/departments of library science, information science and computer science. The rest were distributed in other disciplines and professions, an interesting trend indicating the all-pervasive nature of information.

3) Information Subunits

The distribution of information professionals among the subunits of organisations was as follows:

- Computer operations: 33%
- System analysis/programming: 24%
- Library/Archives: 10%
- Management information system: 10%
- Others: 23%

4) Work fields

The predominant work field that employed the largest number of information professionals was the computer field (40%), followed by management support (10%), library (10%), non-library information services (10%), and others (30%).

Occupational Titles

There were around 1500 unique occupational titles reported by the 1193 respondents, representing the four different sectors. Two main findings were that occupational titles varied substantially among the sectors, even though the functions performed were the same; and that even with a relatively unambiguous function such as “Searching for data and information on behalf of others”, a wide range of titles was reported.

Other useful data

The survey presents the mass of valuable data collected, in 79 tables, some of them being elaborate and detailed. A bibliography listing 162 items, largely representing literature published between 1965 and 1980, fairly representative of work done in different parts of the globe, is given. An extremely useful list of professional associations, societies, and groups of interest to information workers is also given. A list of the principal colleges and universities in the United States and Canada with programmes of study in information is also given. The sample letter and questionnaire used in this occupational survey of information professional (1980) is appended at the end.

Implications and Conclusion

Glynn Harmon, an eminent progressive thinker in the information field and a member of the National Consortium for the Information Profession, has made a useful contribution incorporated in the first chapter of the Survey Report by focussing attention on some of the far-reaching implications of this survey. The points that he has made are summarised below:

The survey has identified a rather heterogeneous group of workers who have their separate distinctive characteristics, but are bound loosely by a thin thread of their involvement in information handling. Indeed, each of the subgroup is having its own worldwide views, parochial approaches, basic traditions, assumptions, jargons, territorial claims, propensity for Darwinian struggle - survival of the fittest. The groups represent such diverse areas as computer science, data processing, technical writing, library science, management information, command and control, research and others. Each of these occupations has a bias towards particular technologies, methods and traditions, institutions, functions, clientele, share of markets, resources, followers and political influences. Notwithstanding this heterogeneity, the survey has demonstrated that these groups share a common concern associated with concepts basic to information flow. The common basic approaches are largely determined by the paradigms such as input, processing, output, memory, small/large system, subsystems, and also communication and managerial paradigms. This conceptual unity inherent in information handling problems should harmonise the parochial interests and eventually lead them to adopt a unified approach. The further identification and promotion of new paradigms would perhaps provide additional bases for an emergent confederation of information professionals.

This may ultimately lead to a more uniform position classification and equitable salary structures for information professionals as a whole.

There are too many definitions of the term ‘information’; in fact, many thinkers have found the term too elusive to give a definition acceptable to all. ‘Information professional’ is inexorably linked with information. Therefore unless there is a rigorous definition for ‘information’, particularly for studies such as the present one, no meaningful conclusions could ever be drawn. Additionally, the unit of information and its quantitative measurement relating them to measures applied to energy, time and value would serve the task of system design and development as well as occupational classification.

The results of the survey have far-reaching and penetrating implications for education and training of information...
professionals. Presently educational programmes are offered by a variety of schools/departments such as library science, information science, computer science, communication, education, business and public administration, industrial and electrical engineering, mathematics, philosophy and so on. “Information professionals and users alike should not be excessively tied to any single cultural outlook or world view (humanities), technology (data bases), institutions (library), function (indexing). Information professionals and users often work jointly to bring inter-disciplinary world views, subject knowledge and information resources to bear on the resolution of problems. Perspectives can be inappropriately sacrificed to the intensity of specialisation.”[6] Glynn Harmon feels that a fresh approach is necessary for evolving a new school - department that would reflect a broader system orientation not tied to a specific institution or technology. This should facilitate greater mobility and flexibility of information professionals to transfer job experience from one technology or organisation to another.

A review of the curriculum structure of basic educational programmes has become essential, perhaps urgent, in the context of the expanding dimensions of information.

Inferring from the survey results, Glynn Harmon suggests that a core curriculum would have to begin with a set of concentric circles starting around system sciences and expanding to include selected basic concerns of management and management decision support, theory and methods of research, library science, education and learning, finance and so on. Specialisation in institutions, technology, subject area, and functions could come after the basic exposure to the core areas. Perhaps special attention should be given to the information systems for industry and business which absorbs a substantial proportion of information workers and to develop managers of information resources.

While universities and colleges should concentrate primarily on professional education aspects to give a broad perspective of the field, its philosophy and overall development of the ramifications of the subject including operational skills and management. Training and imparting specific skills in different operations should be performed within industry and government. Industrial organisations are in a good position to offer on-the-job training to their personnel in the development of use of up-to-date, on-site technology and to incorporate such training into efforts like system conversion and project management. Such facilities are not normally available in educational institutions.

Another important implication of the survey concerning specifically the library community is that the role of librarians in the broad field of the information profession appears to be shrinking. Only 10 per cent of 6.4 million of information professionals were identified as librarians; only 7 per cent of the information professionals constitute librarians in industry; 19 per cent State and local governments and 8 per cent in the Federal government. These clearly indicate the smaller market for librarians particularly in the expanding sector of industry.

As information gathering and use are fundamental to all individuals, Glynn Harmon stresses the importance of providing instructions in the use of information right from the elementary school onwards to higher levels. The instructions should also relate to basic knowledge of using information tools and techniques on the part of the general public.

Some general observations with particular reference to India

Although the situation obtaining in US is not certainly analogous to that in India, the survey should serve as a catalyst to initiate action on manpower studies in the information field in India, assuming that thinking on this important area has already commenced. The heterogeneous variety of groups of information professionals in US identified by this survey, is slowly emerging in India perhaps with magnified prejudices, inadequacies, parochial interests and political influences. If Glynn Harmon’s observation clearly brings out the desirability of unifying these disparate forces in US, if only to bring about a greater measure of harmony among them, there appears as much need in India also to evolve a confederation of information professionals with a common ideal. As we in this country are at the initial stages, it will be in the interest of all concerned and to the basic problems of information handling that a National Manpower Consortium for the information profession is formed at the quickest possible time. Institutions like INSDOC, PID, NISTADS, Manpower Division of CSIR, DRTC, NIC, NISSAT, some of the University Schools of Library and Information Science, Management Institutions, Professional Associations, National Institute for Applied Manpower Research, etc. should be represented in the Consortium. A unified approach could evolve from the very beginning and could lead to the formulation and sponsoring of research projects on manpower studies. Eventually these measures could be expected to lead to the setting up of an institute for advanced studies, research and development in information studies.

References


6. -- p.15.

APPENDIX

1. Managing Information Operations, Programs, Services, or Databases. Includes planning, directing, or administering information operations, programs, services, or databases; establishing budgets, funding, and financial control; planning and controlling resource-sharing or net-working activities; establishing and implementing security standards for information systems; forming and implementing corporate information policies; integrating information operations, programs, services or databases with mission of parent organization; surveying users to establish information needs; promoting information products and services. Sample occupational titles: Administrative Director, Chief Programmer, Comptroller, Database Manager, Director of Information Center, Library Administrator, Library Director, Manager of Publishing Unit, Management Analyst, Media Manager, Vice-President for Information, etc.

2. Preparing Data and Information for Use by Others. Includes technical writing (but not public relations promotions), editing, or other scientific publishing activities involving journals, technical reports, manuals, instructions, etc.; translating business, scientific, or technical works from one language to another; preparing abstracts, indexes, or catalogs; compiling bibliographies, reference materials, or referral materials; preparing lists or directories of people, buildings, events, etc.; establishing a computer numeric or textual data input requirement; transforming data into forms required by a computer (or other automated system), operational system, or library; preparing other information materials, such as audiovisual or cartographic materials. Sample occupational titles: Abstractor, Archivist, Bibliographer, Cataloger, Classifier, Librarian (Research), Librarian (Special Collections), Medical Records Specialist, Science Editor, Survey Data Editor, Technical Editor, Technical Writer, and Translator.

3. Analyzing Data and Information on Behalf of Others. Includes researching and analyzing (but not full use) of data and information from a library, computer file, or other database; analysis of data and information that goes beyond (but which may include) such activities as abstracting, or simple summarization of previously-written materials, computer system output, or library materials. Sample occupational titles: Analyst Specialist, Information Counselor, Operations Analyst, Research Assistant, and subject specialists (e.g., Economic Analyst, Financial Analyst, Management Analyst, User Consultant, etc.)

4. Searching for Data and Information on Behalf of Others. Includes diagnosing user needs for information, identifying data sources, and developing search strategies; accessing databases either manually (library shelves) or electronically (automated system); evaluating yield of data searches (but not performing analysis of data); referring users to other sources of data and information. Sample occupational titles: Information Counselor, Reference Librarian, Reference Specialist, Researcher, Technical Information Specialist, etc.

5. Remaining Operational Information Functions. Includes supervising the running of a library or automated information system; controlling and facilitating access procedures; developing and implementing procedures for data input to systems (including library acquisitions), developing and implementing software packages for computer systems; designing applications programs to fit user needs. Sample occupational titles: Applications Programmer, Archivist, Audiovisual Specialist, Librarian (Acquisitions), Librarian (Medical Records), Librarian (Special Collections), etc.

6. Information Systems Analysis. Includes analyzing existing work processes; determining the feasibility of system automation; determining output product and form; selecting data or information for inclusion in the system; recommending design alternatives; evaluating information systems, products or services. Sample occupational titles: Computer Systems Analyst, Chief Programmer, Data Processing Systems Analyst, Operations Researcher, Senior Programmer, Software Specialist, Systems Analyst, Word Processing Systems Analyst, etc.

7. Information Systems Design. Includes designing new systems or modifying existing systems; establishing procedures for carrying out work processes; implementing system design; evaluating system output to ensure that it meets user requirements; documenting the procedures for use of the system, both for system personnel and for users. Sample occupational titles: Computer Systems Planner, Database Designer, Methods Analyst, Operations Designer, Senior Programmer, Systems Designer, Systems Project Planner, Word Processing Systems Planner, etc.

8. Information Research and Development. Includes studying the foundations, laws, theories, and postulates related to information and information systems, operations, programs, services, or databases; performing research on new forms of information systems, operations, products, processes, and services; developing models of information systems or operations; designing, collecting, and analyzing secondary and primary data in information research; research on the use of information systems, products, or services; research on information user behavior and characteristics. Sample occupational titles: Communications Researcher, Computer Scientist, Information Scientist, Library Scientist, persons with methods expertise (e.g., in Operations Research, Psychology, Statistics, Systems Analysis, etc.) and persons with subject expertise (e.g., in Behavioral Science, Engineering, Mathematics, Philosophy, etc.).

9. Educating and Training Information Workers. Includes teaching courses on information subjects to undergraduate or graduate students; training information professionals or other workers on the job, or in workshops or seminars; planning information education programs; developing information curricula, research on information education. Sample occupational titles: Faculty Member (College or University), Instructor, Lecturer, Training Officer, etc.