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Technical Information Management in Khuzestan Water and Power Authority

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Abstract

This study attempted to investigate the process and barriers of flow of technical information in KWPA^[1]. A survey method was used to collect the data. Interviews with some key persons were also conducted. The target population included both experts and technical managers, and the information output of technical departments. Descriptive statistics and Spearman's rank correlation coefficient were applied to analyze the data. Results showed that overall production and use of technical information are relatively satisfactory, and the respondents generally used the technical. Lack of a holistic view of information management and systematic access to information were major drawbacks. The authors suggest applying a holistic view for information management to systematize the production and use of information and reduce the costs.

Keywords: Information Management, Industrial Organizations, Information Production, Information Use, Iran, Integrated Information Systems.

Introduction

Khuzestan province is a vast area located in the southwest of Iran. Five big rivers flow in this plain which contains 33% of the total surface water resources of the country (Najafi, 2006). About 3.3 million hectare agricultural land along with the largest irrigation system of the country as well as 6 large dams in use and 13 dams under construction in this province, have caused KWPA to become an important organization responsible for planning, maintaining, developing, and using such huge resources.

Therefore, the researchers attempted to investigate the information environment of the organization in terms of production and use of technical information, as the vital element for these activities.

Definition of Problem

Despite large amount of documents available in KWPA, lack of an integrated information system has caused chaos in the information environment of the organization.

Due to lack of a formulated policy and a holistic information system, access to the required information is often difficult for the users.

The present study, thus, attempted to find out the amount of information produced in terms of subject area, format, and information elements (bibliographical information). Then, the researchers made an attempt to identify the probable barriers which users (experts and technical managers working for KWPA) encounter when looking for scientific information they need.

Literature Review

Most of the related literature is concerned with the works of academics; however, a high percentage of these are about the output of industrial organizations. The reason for this is the mutual relationships that exist between the universities and industries in many counties.

The results of considerable research showed that scholarly productions which are the result of group studies and co-authorship are more reliable (Tavasoli, 1994). However, most local studies revealed that most of studies in the Iranian organizations/institutions are conducted by individuals (Abam, 2000; Akbari, 1999; Tavasoli, 1994).

In Brazil, two researchers focused on the problems of such relationships (Machado and Oliveira, 2004), and in India, some scientists compared the scholarly publications of scientists in the field of computer in India and China (Kumar and Gary, 2005).

Knowing the results of research in other countries can help researchers use the information in macro-planning scholarly production, especially if the countries are somehow similar, such as the third world countries.

Methodology

In this part of the article, the methods used to collect the data, purposes of the study, and research questions are described.

Data Collection Tool

To collect the data, the following methods were used:

- a. Examination of the documents scattered in different departments as well as in offices of experts.
- b. Distribution of two kinds of questionnaires especially designed for experts and technical managers.
- c. Interview with some key persons in KWPA.

The validity of the questionnaires was made through the comments made by 28 experts who had more than 15 years of service to KWPA. They are familiar with the archives and research bureaus of KWPA.

To test the reliability of the questionnaires, Cronbach's alpha was applied. The results showed the figures 0.883 and 0.879 for the questionnaires designed for the experts and directors, respectively.

The response rates were 70.83% for experts, and 60.49% for managers. Thus, the overall response rate is 65.66%.

To answer the research questions, descriptive statistics as well as the Spearman's rank correlation coefficient were used to answer research questions. Information use was measured by using an index made on the views of subject specialists working for KWPA. Based on their views, a list of use of technical information in KWPA was prepared to help the researchers quantify the data

Purposes of Research

1. To investigate quantitative, subject, and bibliographic information of technical information (documents) produced in KWPA during 2001-2005.
2. To identify the barriers that KWPA experts and technical managers encounter in accessing and using technical information (documents) produced in KWPA.

Research Questions

1. How many documents, on what subjects, in which formats, and of what types were produced during 2001-2005?
2. Do KWPA experts typically access the technical information manually or electronically?
3. What task-related duties usually need the technical information produced in KWPA?
4. What barriers are there on the way of KWPA experts and technical managers in accessing/using the technical information produced in KWPA?
5. Is there any significant relationship between the amount of technical information produced in KWPA and information use in KWPA?
6. Is there any significant relationship between the barriers and production/use of technical information in KWPA?

Findings and Results

Totally, 20963 technical documents were produced in KWPA during 2001-2005. Most of these documents (4677 ones) were produced in 2002. Among 15 research areas in the organization, the number of documents produced on three top subjects is as follows:

- Water quality, water refinery, and water supply; 5,283 documents
- Buildings; 4,913 documents

- Hygrometry; 3,275 documents

These fields, respectively, had the highest rates, and the number of documents produced on *water resources & watershed management*, *disaster prevention*, and *water-soil- plants- relationships* had the lowest rates, respectively.

It should be noted that production of documents on each subject, is not merely done in one department, but they are produced at least in 3 departments of the seven departments forming the organization. This shows interference in organizational tasks, and/or duplication of research and lack of a holistic view as well as relative balance in the number of documents. Thus, while the fields of *water resources & watershed management*, *disaster prevention*, and *water-soil- plant- relationships* are the areas of main activities of the organization, there is a dearth of research on these subjects.

Recent draughts in the region and the importance of water resources have increased the importance of management of water resources in the world. Regular seasonal floods in the country and the area are a good reason to consider prevention of disasters. Finally, since Khuzestan is a fertile province in which 6 main rivers flow, research in the field of the relationships between essential elements of water, soil, and plant, and production of technical information is inevitable. Nevertheless, the results show that these 3 subjects are among the subjects with the least number of documents produced.

Documents produced during 2001-2005 are of different types, such as: reports, maps, pictures, brochures, research projects, catalogs, pamphlets, films, databanks, and books. These types had the highest frequencies, respectively. However, a lack of balance in terms of the number of documents produced in each type is evident. For instance, more than 90 percent of documents belong to reports and maps, and less than 10 percent to other 8 types of documents.

In terms of physical format, documents are in electronic, print, and audio-visual formats. Although, most technical documents are electronic, in 4 departments of the 7 departments, printed documents (materials) are more than electronic and A/V documents. Table 1 Shows the total number of documents produced in different formats.

Table 1

Format of Documents Produced in KWPA during 2001-2005

Format	No.	Percent
Electronic	17053	81.35
Print	2848	13.58
A/V	1062	05.07
Total	20963	100

Bibliographical elements present in documents in terms of frequency were respectively as follows: place of production (department), author (creator), date of production, title, table of contents, references, and abstract.

Two elements "place of production", which implies legal authorship of the document, and "author/creator" which implies personal authorship, have had the highest frequencies among the bibliographical elements available in the documents.

Perhaps, the legal value of personal author in the production of documents in an organizational setting is the reason for high frequency of these two bibliographical elements in the documents studied. Furthermore, "date of production", and "title" of documents in such a setting are more valuable than elements such as "table of contents", "references", and "abstracts."

The results also showed that a considerable amount of the documents are written by more than 5 authors (group documents), followed by documents with several authors and single author documents. The percentage of group documents increased from 58.99% in 2001 to 81% in 2005. On the other hand, the number of single-author documents had a decreasing trend during that period.

In all cases, the percentages of 7 bibliographical elements were more than previous years during 2001-2005. This shows a general trend towards improvement in documenting the production of scientific information in KWPA. The only exception is the "abstract".

It was found that 23.41% of documents are kept in the experts' offices, and the rest of documents are scattered among 7 departments of KWPA, so that 64.40% of experts expressed their dissatisfaction because they could not locate the documents they need.

Moreover, only 6.13% of the technical information (documents) is accessible through KWPA's Library and Information Center. Table 2 shows the views of experts about how technical documents are stored (i.e., scattered) among various places in the organization:

Table 2

Distribution of Technical Documents among Departments as Reported by Experts and Technical Managers

Places where documents are held	No. of respondents	Percent
Experts and managers' own departmental archives/records	96	29.44
Other departments' archives/records	37	11.34
Library/Information Center	20	6.13
Scattered among various places in the organization	173	53.06
Total	326	100

Although there are over 1000 PCs in the main building of the organization, only slightly more than one-fourth (27.59%) of the respondents (experts and technical managers) use computers to access the Internet or the documents they need. Among these, only 7.05% use KWPA's Intranet and 6.13% use the Internet to access the required documents.

The results revealed that 99.39% of the respondents need the technical information produced by KWPA to do their task-related duties. This finding is in line with the findings of the researchers who believe that, often, 80 to 95 percent of information use in an organizational setting is obtained from the information produced in the organization itself (Ferguson, Sarrafzadeh and Hazeri, 2007).

"Preparing performance reports" (87.46), "participation in courses for job promotion" (84.09%) and "job-related conferences and seminars" (78.59%) are the three most common task-related jobs which encourage respondents to use technical information. This finding authenticates the organization's policies for human resource trainings which lead the staff to use more information, especially the relevant technical information produced by the organization.

The barriers that respondents encounter in accessing information are divided into two broad categories. 1. Organizational barriers, 2. Personal barriers. The former refers to the barriers that originate from organizational condition and setting. The latter refers to the barriers related to the knowledge and skills that a person must possess to access information successfully. In the present study, 57.55% of barriers were of type one (organizational) and 42.45% were of type two or personal.

In order to see if there is any relationship between production of technical information and use of technical information in KWPA, Spearman's rank correlation coefficient was applied. It was found that although there is a positive correlation between the two variables, it was not significant at $\alpha=0.01$ level ($r=.474$, $p=.283$).

However, there was a significant negative correlation between use of technical information and the barriers in accessing the information at $\alpha=0.01$ level ($r=-.904$, $p=.005$). It was also found that there was a negative correlation between the barriers in accessing information and production of technical information in the organization, although the relationship was not significant at $\alpha=0.01$ level ($r=-0.531$, $p=0.220$).

Discussion and Conclusion

Production of technical information in KWPA is reasonable. Production of 4,192 technical documents in a year, during the 5 years by a population of 501 experts and technical managers shows that the Organization has practically utilized its potential to "produce" data.

About 70.39% of these documents are produced through the collaboration of more than 5 experts, while only 13.34% of the documents are single-authored. This is a point of strength for KWPA in producing technical information. There is a growing tendency to provide bibliographical elements for each document, although the "abstract" is an exception.

Another point of strength is the production of 81.34% of document in the electronic format which shows how well new technologies are applied to the information cycle in this organization. Furthermore, over 1000 PCs available in KWPA make it possible for users to access the documents easily. Variation in the subjects of the documents is also important. Except for "sewerage", at least 100 documents are produced on each subject.

Although experts encounter problems to access information, use of information in KWPA is relatively satisfactory. 99.39% of experts offered their comments on use of documents, and more than fifty percent of them reported that they use these documents in their task-related duties.

However, the present researchers found evidence which shows a serious disturbance in information management in KWPA. In a simple model of information cycle, what comes between production and use of information, and vice-versa, is of great importance because:

1. Organization and harmony of the elements in this stage (between production and use of information), such as easy access to information through methods and means for organizing information, passing laws/regulations for easy flow of information, etc. facilitate use of information and reduce the costs.

2. As mentioned earlier, despite producing a wide range of documents in considerable numbers, three vital subjects have been neglected. This indicates a lack of proper management in directing production of information in KWPA.

3. Access to information is in a bad condition, both in terms of the place where documents are kept and the method of access. 53.06% of experts said that documents they need are scattered in different departments, and 43.55% of them believed that there is no systematic way to access these documents.

Besides, there are more than 1000 Pentium PCs available in KWPA while only 27.6% of experts use computers and 13.18% of them use the KWPA Intranet to access the documents they need. These are good reasons for weakness of information management in KWPA.

- Lack of clear and official guidelines to dictate how to produce documents in terms of the physical appearance of documents and bibliographical elements shows that the minimum standards are not applied in producing documents in KWPA.

- Considerable number of barriers mentioned by experts could not be disregarded. Among 17 barriers, 9 barriers are not personal. They are caused by the Organizational conditions and settings.

- Archival and information services are not satisfactory, so that only 6.13% of respondents said that the documents they need are held in the “Library and Information Center”, the official unit responsible for the flow of information in KWPA. This shows the minor role that this unit plays in the information cycle in KWPA. Also, 54.40% of experts believed that library services are poor, 50.45% found librarians and archivists without necessary skills, and 92.09% of respondents were not satisfied with the trend they are informed about the information produced.

Suggestions

Based on the findings of the study, the following suggestions are offered:

1. To establish a working group at the highest level under the supervision of the Manager General to formulate macro-level policies in the field of flow of information in KWPA.

2. To improve the existing "organizational culture". At present, individuals severely insist on the ownership of documents. The need for re-engineering the information cycle in KWPA is obvious to increase the managers and other employees' awareness about the value of collective use of the information produced in the Organization as an organizational and national asset.

3. Due to archival nature of most documents and because they are often not published widely, it is necessary to collect the documents scattered in different departments as well as in offices and build a centralized collection of the documents.

4. To provide a union catalog of all documents produced in KWPA and facilitate and manage access to documents regarding the level of access for each group/individual. This is especially true for the documents relating to local and international contractors to supervise their performance.

5. Due to the organizational goals and objectives of the population, producing more information (i.e., documents) in three areas of “*disaster prevention*”, “*water-resources and watershed management*”, and “*water-soil-plant- relationships*” is recommended. Production of information must be balanced and in line with the needs in all aspects and fields.

6. To establish a unit to control the projects so that the unit must manage and study projects and programs and prevent parallel and/or duplicate projects. This will save a considerable amount of budget, time and energy.

Note

1. KWPA stands for Khuzestan Water & Power Authority which is one the largest

industrial organizations in the Khuzestan state in Iran.

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