

INFORMATION SEEKING AND COMMUNICATION BEHAVIOUR OF KENYA RAILWAYS ENGINEERS

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Abstract

The paper discusses the findings of a study which sought insight into engineer's information seeking and communication behaviour at Kenya Railways Corporation. The study employed a user centered approach to information seeking and use unlike many past studies which were system centered. It focused broadly and considered the user, his functional role, his formal and informal information seeking and communication processes, and the influence of the environment in which information seeking and communication takes place. The information seeking patterns derived from the data collected in interviews with engineers were compared in different ways in accordance with the recommendations contained in the grounded theory style of qualitative analysis. Interesting findings were found on the ways in which information needs were generated and perceived by engineers, in which the engineers select resources for information searching and also in the ways in which information was used. The study concludes that information seeking and communication behaviour of engineers should not be viewed solely from the perspective of formal documentation but should be viewed mainly from the perspective of the engineer and his work tasks which are responsible for generating information needs which can best be satisfied through personal contacts and informal documentation

1.0 Introduction

The aim of this study was to investigate the information needs of railway engineers in the work situation. The study investigated how engineers at the Kenya Railways Corporation search information, why they do so, and how they make use of the information that they obtain. It sought to identify the main information seeking patterns employed by engineers and the factors influencing their information seeking processes in their attempt to satisfy their information needs.

The study examined the relationships among use, task, information need, information source and information seeking pattern. In particular, it examined the linkage between engineers' functional role or work activities and information needs, and between functional role and information source and between information need and information source. It also examined

the connection between the information seeking patterns exhibited and the information seeking strategies, and between information seeking patterns and the level of task complexity.

The study was not intended to produce quantified data but to gather information on the knowledge and skills required to improve the communication process among engineers. It was particularly concerned with trying to unearth or reveal any discrepancies between the existing information systems and engineers' preferred information seeking practices and habits. Pinell et al. (1990) observed that there is a gap between engineers' natural methods of obtaining information and the information specialists' methods of dispensing information in many organizations.

The approach in user study research has on the whole been piecemeal and fragmentary even in the developed Western countries, and some groups have received more research attention than others. Engineers happen to be one group of professionals that has received very little attention. There are still very few studies directed exclusively and explicitly at the communication behaviour of engineers (Allen, 1977). Several studies have been conducted on scientists and erroneously taken to apply to engineers, failing to recognize the fact that the two groups of professionals are different in their information seeking and communication behaviour.

One other factor that has not helped to further our knowledge and understanding of how engineers behave when they seek information is that the few studies that have been carried out on this group of users have been characterized by defective methodology and shallow conceptualization, relying heavily on the use of self administered questionnaires in large surveys. Such studies failed to recognize the fact that reality does not exist on the surface of human affairs, offering itself for straight forward study through the use of survey questionnaires. As Garfinkel (1967) notes social reality lies deep within the network of typifications which individuals, if pressed, will summon to make sense of the situation in which they find themselves.

The small scale of user studies conducted on engineers coupled with defective methodology, shallow conceptualization and narrow focusing in the studies have combined to leave a big gap in our understanding of how engineers behave when they seek information and communicate in the work situation. There is therefore, a strong case for more empirical research employing more innovative methodology to investigate the information seeking and communication behaviour of engineers.

1.1 Background Information of Case Study Organization

The Kenya Railways Corporation

As a Corporation, the Kenya Railways came into being following the disintegration of the East African Community. The collapse of the Community meant that the East African Railways Corporation which up to 1977 had operated the railway system in the three East African countries of Kenya, Uganda and Tanzania had to break up into three separate railway systems, one for each country.

The Kenya Railways Corporation was created by an Act of Parliament on 20th January 1978. The railway system itself, however, goes back a long way to the origins of the country, and it was instrumental in the opening up and subsequent development of Kenya.

Originally built at the end of the 19th century, the modern railway system which the Corporation inherited is a network stretching over 2,700 kilometers with a main line which extends from Mombasa on the east coast to Malaba on the border with Uganda. A principal line connects Nakuru with the town of Kisumu on the shores of Lake Victoria. Other branch lines link Voi with Taveta on the border with Tanzania, Konza to Lake Magadi, the source of considerable deposits of soda ash, Nairobi to Nanyuki on the slopes of Mt. Kenya, Gilgil to Nyahururu, Rongai to Solai, Eldoret to Kitale and Kisumu with Butere.

Most of the equipment and assets inherited by Kenya Railways at the break up of the community had been in a run down state due to neglect in the days preceding the collapse of the community. Putting the system back into being fully operational and viable therefore, constituted the major development effort for Kenya Railways Corporation in the early part of its existence. Some of the steps taken in this direction included the purchase of new locomotives and rolling stock, improvements of maintenance capacity and operational effectiveness.

2.0 Literature Review

The few studies that have been carried out on engineers have been criticized for employing defective methodology and shallow conceptualization like those on other groups of users. Most of the studies have not recognized the active role of the user in the process of information transfer and have not laid emphasis on information flow as required.

Past studies have not been able to explain for example, the finding that engineers prefer oral sources of information to reading the literature. Anthony et al (1969) wonder whether the engineer might have psychological traits that predispose him to solve problems by himself or with the help of colleagues rather than by finding answers in the literature.

Some of the past studies have lumped engineers together with scientists and treated them as one and the same group of professionals and have not taken into account the fact that engineers differ from basic scientists in their information seeking and communication behaviour. Most of the studies have focused on scientists and technologists in research organizations and not in work situations. A study by Allen (1964) established that whenever engineers are working on a new project information gathering is greatest in the initial time period of the project. Literature search and outside consulting make up the largest component of project work in this stage, corroborating the general belief that initially on a new project engineers conduct an extensive literature search and seek out possible supplies for ideas. Literature search quickly decreases as the projects progress, and is replaced in importance by person-to-person communication. As Michele (1986) observed, engineering information is complex and multidisciplinary and also channeled in various ways including personal contacts or exchanges, formal and informal meetings (groups), written and audio visual media, calculations and formal documents like patents and standards. This observation concurs with that of Taylor (1986) who notes that engineers prefer informal sources of information especially conversation with individuals within their organizations. They want a specific answer in terms and formats that are intelligible to them not a collection of documents that they must sift, evaluate and translate before they can apply them.

Allen and Gertsberger (1968) conducted a study on engineers in two divisions of an electronic firm which revealed that engineers ranked nine information channels on the basis of perceived accessibility, perceived technical quality and amount of previous use. The Allen – Gertsberger findings closely parallel those of Rosenberger (1967). Accessibility and ease of use were found to be stronger correlates of channel use than was technical quality. When each of the other factors was partialled out, accessibility retained its predictive power best. The same pattern appeared in predicting how often a channel would be chosen first. Experience in using channels correlated highly with channel use, but partialling on accessibility nearly cancelled the relationship. Experience was correlated with accessibility and ease of use.

Rubenstein et al (1970) studied the ways in which engineers seek specific pieces of information and developed procedures for observing their behaviour as they did so. Their programme ranged from offering special information services in order to observe the level of response, to studies of information-seeking behaviour. Many of their samples were very small, although these researchers made ingenious use of field experiments and 'real-time studies', that is studies based on data collected while the events were actually occurring. This study could not explain the frequent finding that engineers prefer oral sources of information to reading the literature, while basic scientists apparently rely on both types of sources. The study does not explain whether the engineer's aversion to the literature stems from the fact that he is often insufficiently trained to benefit from it.

3.0 Methodology

The case study approach was chosen for this study. The approach was particularly appropriate for the study because it enabled this researcher to concentrate on specific instances or situations and to identify the various interactive processes at work in engineers' information seeking and communication behaviour. Some of these processes would probably have remained hidden in a large-scale survey.

Yin (2003) argues that despite the stereotype of case studies as a weak method, case studies continue to be used extensively in social science research as well as practice-oriented fields especially in situations where investigators are capable of exercising great care in designing and doing case studies to overcome the traditional criticism of the method.

The case study method as applied in this study involved collecting relevant background information or data from the organizations' documentation and from individuals such as the Public Relations Manager, Data Processing Managers and Information Specialists about the issues involved in engineers' information seeking and communication behaviour, and putting forward provisional explanations and findings on the basis of information available at the time.

As more data from transcriptions of interviews with engineers became available, the provisional explanations of findings were carefully examined and those which could not stand up to rigorous critical examination were rejected. New provisional findings/explanations were formulated and examined or tested as more data became available from subsequent interviews, and the results guided the search for further additional evidence or the collection of more data.

A qualitative analytical approach was chosen for this study due to the suitability of the methods for exploring human behaviour. Such methods are capable of focusing closely on users and investigating human behaviour in relation to information seeking. A qualitative interpretation of data provides for broad understanding of a phenomenon by focusing on unique cases, but at the same time taking into account all the themes that are involved. As Flick (2002) observes, the subjectivities of the researcher and of those being studied are part of the research process.

Johnson (1975) explained that qualitative research affords us an in-depth, detailed descriptive account of social actions occurring at a specific place and time. Qualitative approach is inductive in the sense that it requires that abstract constructs, such as hypotheses, models, theories, be developed during a study, not conceived a priori. As a result, both the method of enquiry and the abstract construct are dynamic, evolving as the study progresses. Typically, data analysis, which guides data collection involves clustering like things together and the overall structure of the construct emerges as the analysis progresses. Thus, flexible design, the use of multiple methods, and coding data are needed for inductive analysis to take place.

The development of theories of information seeking and communication behaviour of engineers was conducted on the basis of repeated observations of the field of action. All the parts of each theory had to be carefully described and everything that came into play accounted for to ensure that the theories were conceptually dense and valid.

Information seeking behaviour, like many other social phenomena, is a complex phenomenon. Its study therefore requires a conceptually dense theory that is capable of accounting for a great deal of variation in the phenomena studied. In this study therefore, this researcher was concerned with finding a style of qualitative analysis that would allow investigation of the variables that are most likely to influence the kind of information that an engineer chooses to pursue, and what information sources to search, and the variables that influence the engineer's interaction with the information sources.

From the literature, grounded theory approach was identified as the most suitable and most appropriate technique of qualitative analysis for this study, in view of the chosen case study approach and the objectives of the study with which it was intricably tied.

According to Glaser (1978) and Stauss (1987) who expounded the grounded theory, is a style of qualitative analysis that focuses on

generating theory and grounding that theory in data. The method of analysis employed in developing grounded theory is the constant comparison method. This has four aspects: comparing incidents applicable to each category, integrating categories and their properties, delimiting the theory, and writing the theory.

The grounded theory style of analysis is based on the premise that theory at various levels of generality is indispensable for deeper knowledge of social phenomena, and such theory ought to be developed in intimate relationship with data. The analysis thus involves a grounding in data and is not purely speculative.

The analysis of data was based on the interpretive paradigm. The decision to opt for a research paradigm which attempts to understand and explain the social world primarily from the point of view of the actors directly involved in the social process was made when qualitative methodological approach modelled on grounded theory was chosen as the preferred research methodology.

According to Burrell and Morgan (1979) the interpretive paradigm rejects any view which attributes to the social world a reality which is independent of the minds of men. It emphasizes that the social world is no more than the subjective construction of individual human beings who, through the development and use of common language and the interactions of everyday life, may create and sustain a social world of intersubjectively shared meaning.

According to Corbetta (2003) constructivism is one element of interpretativism. Constructivism here refers to the form of research based on the belief that the knowable world is that of the meaning attributed by individuals. This view 'accepts that research findings are themselves partly the construction of the research process' (Budd, 2001).

Several tours were made to various departments/sections of the organization to conduct a general inspection of information systems including the company library, records centres, design offices and some workshops.

Relevant documentation about the organization was carefully studied and notes made on it, and those which could be taken away were collected for further scrutiny as indicated above. The documents collected included annual reports, organizational charts, corporate plans and their update reports, Rail bulletins and their supplements.

The main research instrument, however, consisted of a semi-structured interview schedule which was administered to engineers in tape-recorded interviews ranging from 45 minutes to two hours in length.

4.0 Results of the Case Study

This study has revealed some findings which have important implications for information practitioners who deal with engineers and for policy makers responsible for developing information systems for engineers especially in railway transport industries. The study has revealed that engineers in the work situation in a railway transport industry regularly perceive a wide range of information needs generated by the work activities and make attempts to satisfy the information needs by devising information seeking strategies. However, not many sophisticated strategies were identified among the Kenya Railways engineers.

The research has identified and underlined some key issues in the information seeking and communication behaviour of engineers which have important implications for the provision of information services to engineers. Some of the major factors which merit attention by information workers who deal with engineers and policy makers responsible for developing information systems for engineers are discussed below.

4.1 Assessment of information needs of engineers

Information seeking behaviour of engineers results from their recognition of some information needs generated by their functional needs or work activities. However, it was found that even engineers themselves, most of the time had difficulty in clearly defining or describing their information needs. The study recognizes the fact that ascertaining information needs is not a simple matter, and that personal interviews involving innovative and vigorous data collection methods be employed in carrying out any information needs analysis.

Engineers' information needs were indivisible with their work activities, and in fact the two were so closely intertwined that unless an information worker charged with the responsibility of offering an information service to engineers had some knowledge of the nature of work that the engineers dealt with he or she would find it very difficult to serve them effectively. As Pickard and Dixon (2004) advise, service providers and systems designers need contextual information concerning their users in order to design and provide systems and services that will function effectively and efficiently within those contexts.

4.2 Paying attention to information seeking and communication processes

Engineers were found to be heavily dependent on informal oral channels of communication with informal documentation of the organization consisting of unpublished records and manuals as the other preferred sources of information. Given that informal oral communications are so important to engineers, the management of their organizations should create the necessary conditions for friendships and acquaintances to develop. People must first meet in order to become acquainted. Management does, to a very great extent, control the processes by which people in an organization come to meet one another. It is regrettable that the case study organization had not made sufficient effort to increase acquaintances among engineers.

The use of informal documentation of the organization should not be discouraged. Information seeking behaviour of engineers should not be viewed solely from the perspective of formal documentation but should be viewed mainly from the perspective of the engineer who does not see formal documentation in libraries, for example, as a useful potential provider of information needed in his work compared with informal documentation and oral communications through personal contacts. In actual fact, engineers were found to have a very strong aversion to the use of books and journals in their organizational libraries. Many of the engineers had never even visited the libraries to search for work related information and a good number of them did not even know about the existence of the library. There was a complete mismatch between books centred information services provided by the library at the Kenya Railways and the engineers' information seeking and communication behaviour centred on oral communications and informal documentation of their own organization.

4.3. The influence of the characteristics of the organization

A number of environmental factors which influence the information seeking and communication behaviour of the engineers were identified at the case study organization. These factors relating to organizational characteristics have some important implications for the provision of information services to engineers. The formality that prevails at the organization, for example, means that the use of established formal procedures of communication will continue to play an important role in engineers' information seeking and communication practices. Although engineers seem to prefer informal channels of communication, the current practice of transferring information on standard forms and through the use

of computerized wagon control systems is, and will remain important so long as formality still prevails. There should be no attempt to try and get rid of these established formal procedures of communication unless there is a good reason for doing so.

The use of technical jargon by engineers in their information seeking and communication was also identified in this study. Unless information workers at the organization make some effort to understand the technical jargon commonly used by engineers they (information practitioners) may not be able to assist them effectively in their regular attempts to satisfy their information needs.

4.4. Factors influencing the selection of information sources

In the selection of sources for information searching there was a strong relation and unequivocal link between accessibility of source and frequency of use, a finding which was discerned in the data on a wide scale. This finding has important implications for the provision of information services to engineers at the Kenya Railways Corporation in view of the fact that there had been no attempt by information workers at the organization to address the issue of engineers' preference for most accessible sources. Engineers based in far away stations like Mombasa for example, more than 500 kilometers from the headquarters in Nairobi were expected to use technical records at the headquarters for information searching.

Engineers tended to prefer selecting as first sources those sources which they had used previously for information searching. There was a strong loyalty to tried and true information sources. This implies that if information workers wish to encourage engineers to use any given information sources, they must make sure that they (engineers) attain some degree of experience with the sources before they can get into the habit of using the sources. One way of making engineers to start using the sources is to make them aware of the existence of their information sources, and of course, to make the sources as accessible as possible, since as observed above, increased accessibility leads to a higher frequency of use. Moreover, a higher frequency of usage might make engineers to modify or change their perception and begin to see the sources as being more accessible which will in turn lead to even greater usage of the information sources. Increasing engineers' awareness of the existence of information sources will, however, require the injection of marketing strategies into the use of information resources, and information workers ought to be prepared to offer that kind of service.

4.5 Documentation of Available Information Resources

This study has underlined the need to improve engineers' awareness of information resources that are available within their organization. As mentioned above, marketing of the information resources would play an important role in increasing engineers' awareness of the existence of the resources. One other way of doing so is by making sure that all available information resources are properly documented and that newly received information resources are accessioned and lists distributed to engineers. It would be useful to include current awareness and selective dissemination of information services as well. Regrettably, such services are currently lacking at the two case study organizations. A Selective Dissemination of Information Service (SDI) is a procedure whereby individual items of information are called to the attention of persons or groups periodically on the basis of their previously declared fields of interest. An SDI service is commonly associated with computerized information services in which the computer is fed with details relating to the specific interests of an individual user. A profile of the individual user's interest is thus created enabling the computer to match the terms which identify the individual user's interests with the terms and descriptions attached to the documents.

While written material is less used, and less useful as a source of information than person to person contacts, some sort of written material needs to be produced to describe the information that is available from individuals and from departments. Moreover, those engineers seeking information need some way of verifying that the person whom they are contacting can provide information that is appropriate to their problem and that is sufficiently tested to meet their needs. Both of these potential difficulties can be ameliorated through appropriate "packaging" of information, a service which would have to be offered by the organization's information worker.

4.6 Recognition of the role of technological gatekeepers in the communication process

Policy makers and information workers at the organization cannot afford to ignore the role played by technological "gatekeepers" in the communication process if they hope to improve information systems for engineers. It was encouraging to note during the field research that "technological gatekeepers" could be identified so easily by their engineer colleagues. These "Communication starts" can be relied upon to disseminate information especially that emanating from outside their own organization to their colleagues with introspective information seeking habits, who had failed to form any "invisible colleges" with their

counterparts in other organizations. The “technological gatekeepers” ought to be assisted in this regard by information practitioners through the provision of current awareness and Selective Dissemination of Information (SDI) services to them.

4.7 Paying attention to the dynamic nature of information seeking process and structures

To be able to provide an effective information service to engineers, the information system designed for them must adequately understand the dynamic nature of the information needs, information seeking processes and of the environment in which information seeking and communication takes place. It is important for information workers at the organization to bear in mind that whenever change is recognized good communication is essential and that they (information workers) should always try to get on the ground floor of change. They should be present or informed at the onset of the planning for any change affecting engineers’ communications.

5.0 Conclusion

Although this research has not provided any quantifiable data, which was not one of its intentions, it has at least answered the main questions set out in the study, that is, why engineers seek information and communicate in the work situation, how they do it, and how they make use of the information that they obtain. It has helped to illuminate the complex phenomenon of information seeking and communication behaviour of engineers, and succeeded in gathering information on the knowledge required to improve the communication process among engineers in railway transport industries. These findings have very important implications for information practitioners who deal with engineers or policy makers responsible for designing information systems for engineers in a railway transport industry.

While the study would not recommend a complete overhaul of the existing information subsystems at the case study organizations, it has identified and underlined some key issues concerning engineers’ communication process which merit attention. It has for example, identified some degree of mismatch or discrepancy between the existing information subsystems and engineers’ information seeking and communication behaviour as discussed in this paper. Some of the current ways of providing information services to engineers at the two case study organizations need to be re-examined in the light of the findings of this study in order to improve on the effectiveness of the existing information systems.

It is however, important for information workers and policy makers responsible for developing information systems for engineers to realize that the ultimate value of the redesigned or the modified information systems should be thought of in terms of the uses that are made of the information that they provide to engineers and the subsequent impact of the information on engineers' technical activities.

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