A Theoretical Explanation of the Evolving Role of Users in Shaping Corporate Information Systems

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The role of users in various aspects of the corporate information systems (IS) activities has substantially changed during the short history of computer-based IS. The importance of the user role is evidenced by the mounting literature on user involvement in IS development, user satisfaction, and end-user computing. The purpose of this paper is to highlight the satisfaction literature from two disciplines, management theories and information technology, in order to provide a theoretical explanation of the changing role of users.

Among important developments in the evolution of information technology is the changing role of users in shaping the corporate information systems (Nolan, 1979; King and Kraemer 1984; Tafti, 1990). Computer and IS literacy is significantly increasing, the gap between computer professionals and users is vanishing, and the users are demanding more control over the corporate information resources. IS users are the subject of a mounting literature from a number of viewpoints: user participation in IS development (Swanson, 1974; Lucas, 1981; Ives and Olson, 1984; Tafti, 1991), user satisfaction (Bailey and Pearson, 1983; Doll and Torkzadeh, 1988), and end-user computing (Rivard and Huff, 1988; Alavi, Nelson, and Weiss 1987; Huff, Munro, and Martin, 1988). For example, as a surrogate measure of IS success in securing user needs, user satisfaction is convincingly stressed in the literature. According to Cyert and March (1965), user satisfaction is reinforced by the success of a formal system in meeting the user’s need for information. Powers and Dickson (1973) found user satisfaction to be the most critical criterion in measuring the success or failure of computer systems. Therefore, the measurement of user satisfaction as a surrogate major of IS effectiveness in meeting user needs is emphasized (Lucas, 1981; Bailey and Pearson, 1983; Ives, Olson, and Baroudi, 1983; Doll and Torkzadeh, 1988).

Why have the IS users become the center of attention by IS policy makers, practitioners, and researchers? How can the increasing influence of users on various IS-related decisions be explained? Why are the users demanding a higher role in shaping the corporate IS strategy? To what extent are the users responsible for such recent IS practices as end-user computing and downsizing?

The purpose of this paper is to present a framework that maps user satisfaction onto Maslow’s need hierarchy in order to shed some light on these questions, and provide a base for further research in this area. The following section provides an overview of Maslow’s need hierarchy. Section III derives three dimensions of IS user satisfaction from review of satisfaction literature.
The relevance of motivation theories to user satisfaction is discussed in section IV where the dimensions of user satisfaction are further explored and extended into a hierarchy of user requirements. Section V discusses practical and research implications of the proposed framework.

**Overview of Maslow’s Needs Hierarchy**

The traditional management approach which was based on Taylor’s scientific management (1912) considered wage/bonus as the primary source of workers’ motivation. This classical approach was considered a significant step toward increased productivity and efficiency in the early 1900s. However, as the factory environment and working conditions improved, this approach did not seem to be as effective as expected. Consequently the focus of research switched to the study of human behavior. In response to the changing environment, motivation theories were evolved to explain the complex nature of human motivation and satisfaction. One of the prominent authors in this area is Abraham Maslow (1964) who postulated that there is a hierarchy of needs that people strive to satisfy. As the lower-level need is met they move to fulfill another need at a higher level. Maslow’s hierarchy involves the following needs:

1. **Physiological needs** include food, water, clothing and shelter.
2. **Safety and security** concerns protection of the first-level needs.
3. **Affiliation** involves sense of belonging and friendship.
4. **Esteem** pertains to the need for achievement, success, and recognition.
5. **Self-actualization** concerns need for creativity, self-expression, integrity, and self-fulfillment.

Physiological requirements such as food and shelter are the most basic needs, and constitute the lowest level of Maslow’s hierarchy. An individual is motivated to satisfy this level of needs before striving to fulfill the next level.

**User Satisfaction**

User satisfaction is defined in the early satisfaction literature as a set of user beliefs about the relative value of an IS in terms of providing timely, accurate, and easy-to-understand information to support decision making (Swanson 1974). This definition is based upon the Cyert and March (1965) model described below. But this view of user satisfaction is somewhat limited in that it deals only with one dimension of user satisfaction: information satisfaction. Given that a user’s basic information needs have been fulfilled, user satisfaction can be enhanced beyond this level by first, improving the IS to be more flexible and user-friendly; and second, providing a support system to assist the end user. We find, therefore, that the earlier definition of user satisfaction needs to be expanded. In addition to information satisfaction, a user’s perception of the IS (system satisfaction) and his attitude toward the IS support group constitute two other dimensions of user satisfaction. An analysis of these three dimensions is presented in the following sections.

**A. Information Satisfaction**

The most fundamental user requirements from an IS is information. In their book, *A Behavioral Theory of the Firm*, Cyert and March (1965), discuss a model where user satisfaction is a function of information availability through the present IS. Everytime an IS provides the information which is called for in a decision situation, user satisfaction is reinforced. On the other hand, everytime an IS fails to supply the required information, user satisfaction is undermined. If the user has to expand the search beyond the available IS, the expenditure of additional time and other resources to obtain the necessary information will result in reduction of user satisfaction.

Although the availability of information is a critical factor in enhancing user satisfaction, it is by no means the only criterion. It only constitutes a primary level of the user needs upon which a user depends in making decisions. In addition to information satisfaction, the degree to which overall user satisfaction will be affected depends also on the user perception of the quality and potential of the IS itself, as well as on the perceived attitude and behavior of the support group (Tafti, 1990). For example, if the user perceives that the system interface is satisfactory and it has potential for further enhancements—and the support group is cooperative in implementing the required changes—the user would not be as dissatisfied as he would have been if he felt that nothing could be done to improve the system. Therefore, overall user satisfaction depends also on satisfaction with the system itself as well as with the support group. Figure 1 is a dynamic framework which extends the Cyert and March model to include the dimensions of system satisfaction and support-group (SG) satisfaction.
B. System Satisfaction

When a certain level of information satisfaction is attained, the question arises as to how the overall user satisfaction can be increased beyond this point. The next step is to focus on the quality and potential of the IS itself. A system may provide the necessary information, but if it is poorly designed and the information is hard to come by, the system becomes a source of frustration to the user. This is where the importance of user-interface features comes in, particularly in end-user computing and the DSS environment.

The IS must provide the necessary flexibility and convenience so vital to end users in the planning, development, and operation of their applications. It comes as no surprise, therefore, that ease of use is considered one of the most significant determinants in the effective functioning of an application (Goodwin, 1987). System features such as proper screen design, on-line assistance, error control, and flexibility can considerably reinforce user satisfaction. Also, a clear and uncluttered screen that provides all essential information relevant to a particular task is an important feature of good interface design (Galitz, 1980). Furthermore, the utilization of icons, windows, colors, and graphs contributes greatly to system quality. In fact, screen design features should be considered as one of the major criteria in the measure-

Figure 1: A Framework for User Satisfaction with Information Systems
ment of user satisfaction (Shneiderman, 1987).

Inclusion of the proper level of on-line assistance and explanation is another factor contributing to ease of use (Houghton, Jr., 1984). Also very useful are the four major types of error control: prevention, detection, correction, and recovery of the errors (Galitz, 1980). It is important that error messages be presented in a proper and nonthreatening way (Shneiderman, 1983). Response time, another important factor, should be fast enough to match the user pace and expectation, and also consistent for the same level of command at different times (Shneiderman, 1987).

C. Support-Group Satisfaction

The extent and type of support the users receive from the IS personnel and from the information center (IC) staff constitute yet another critical dimension of user satisfaction. Users often need support in training, selection, and access to computing and software facilities, and even in developing their own system. This support is provided by the IS and IC personnel.

The IS staff generally consists of computer specialists including systems analysts, designers, and programmers whose main function includes providing the technical assistance necessary for enhancing computer applications. Of great significance in user satisfaction is how the IS department deals with the user-department requests, development schedules, chargeback methods, and availability, extent, and clarity of user documentation (Lucas, 1981). To enhance user satisfaction, the IS staff needs to have a positive relationship with users and to be enthusiastic in encouraging user involvement in IS activities.

The concept of an information center was first introduced by IBM in Canada in 1973. Many organizations have already established ICs to promote end-user computing support. IC support is different in nature from what is provided by the computer programmers and analysts in a traditional EDP environment. The IC staff provide assistance to end users in terms of training, data access and queries, applications development, generation and modification of prototypes, information regarding IC resources, and consultation. Availability of ICs and perceived competence and attitude of IC staff are crucial in an end-user computing environment and can considerably affect the level of user satisfaction.

Corresponding User Satisfaction with Motivation Theories

As discussed in the previous section, fulfillment of a user’s need for information constitutes only one dimension of IS user satisfaction. Users expect more than mere information from a system the same way human needs extend beyond consumption of food. Also, all dimensions of user satisfaction do not necessarily receive the same priority by a user during different periods of the system utilization. For example, in an environment where computer applications have just been introduced, and the organization’s IS experience as well as the user’s IS literacy is relatively low, the user’s focus is on the information needs. As information needs are satisfied, more attention is paid to such systems features as user interface, error handling, and system flexibility. Therefore, a hierarchy of user requirements appears to exist which starts with the basic information needs. Maslow’s framework is utilized to identify and illustrate this hierarchy in the following sections.

1. Information Needs: The primary objective of developing computer-based information systems is to provide decision-makers with the necessary information required to make decisions. As illustrated in Figure 1, each time a decision situation is encountered, the first question is whether the IS can deliver the required information. Information requirements concern availability, timeliness, accuracy, conciseness, precision, reliability, and completeness of information (Bailey and Pearson, 1983). This level of user needs corresponds with the Maslow’s physiological needs, and is the most fundamental requirement which must be met to enable the user in performing his/her organizational tasks.

2. System Needs: System needs involve those features that ensure convenient access to information and facilitate effective user-system interaction. These features include data and system security, screen design, ease of use, on-line assistance, error control facilities, response time, and system flexibility (Shneiderman, 1987). Upon satisfaction of information requirements, users are likely to shift their attention to these system needs and demand more user-friendly features than they had previously. This level of user needs compares to the second level of Maslow’s need hierarchy, that of safety and security.

3. Need for Active Involvement: The need for more
involvement and active roles in various IS activities becomes more pressing as the information and systems needs are satisfied. At this level, the user demands a role beyond answering questionnaires and passive involvement in systems activities. The user becomes an active participant and a partner (Rivard and Huff, 1985). The subject of user participation in IS development activities has been enthusiastically discussed throughout the literature (Ives and Olson, 1984; Tafti, 1991). However, the user’s desire for a meaningful participation and active involvement in various IS activities as well as a sound relationship with the IS staff manifests a great deal after the user information and system requirements are fairly satisfied. This level of user needs corresponds to the third level of Maslow’s need hierarchy, the need for affiliation.

Therefore, at this level not only the user information requirements and system needs must be satisfied, but also a proper organizational setting that facilitates further user participation is conducive to achieving a higher level of user satisfaction.

4. **End-User Needs**: As it is the case in many other IS related concepts and issues, there is little agreement in defining end-user computing (EUC). According to Davis and Olson (1985, p.421), “the capability of users to have direct control of their own computing needs has come to be referred to as end-user computing”. Cotterman and Kumar (1989) define an end user as any person who has an interaction with IS as a “consumer or producer/consumer” of information, and EUC as the producer activities of the end user.

At this level which corresponds to Maslow’s concept of esteem, users have gained some familiarity with various aspect of their computing activities in order to have more role in controlling their computing functions. They are not as dependent on the IS staff as they used to be in the development and operation of their systems. The advancements in forth-generation languages and CASE tools have facilitated the achievement of this level (Rivard and Huff, 1988). However, they may still need a considerable level of assistance from the information center and/or IS staff.

5. **Super-User Needs**: Ultimately, upon satisfaction of the lower-level needs, the user has gained adequate knowledge of, and experience in, both the functional...
area and technical aspects of IS to exert substantial influence. The user is not only an active participant, but also demands significant authority in major IS decisions and management of the corporate information resources. Such a user is not an ordinary user who is at the mercy of IS and IC support staff, but a “superuser” who can, and does, control the major IS activities from planning to implementation. At this level, “the superuser may become the center of an entire new department designed around him in recognition of his value” (Hargrove, 1989, p. 21). Figure 2 shows the five levels of user requirements hierarchy.

2. A user’s propensity to involve in IS activities appears to be a function of the extent of his satisfaction with IS. As the users’ information and systems needs are fulfilled, they tend to desire a higher level of involvement in various IS-related decisions.

3. Higher levels of user involvement, the proliferation of end user computing, and the resulting surge for downsizing lead to a higher level of users’ propensity to gain more control over the corporate information resources and IS strategy.

Conclusion

The focus of the literature regarding user satisfaction with IS has so far been on its measurement. There is a general void in the literature to study changes in the relative importance of the individual components of user satisfaction. Since user satisfaction with IS is considered a significant determinant of IS effectiveness in fulfilling user needs, it is essential to establish a framework which facilitates the study of its individual elements. In order to improve user services and allocate computing resources more efficiently, we need a better understanding of the nature and relative significance of satisfaction components.

The framework proposed in this paper provides a base for the analysis of various elements of user satisfaction, and of the relative importance of each element during different periods of systems utilization. Specifically, it provides a context within which the following propositions may be investigated:

1. The users’ needs and priorities during the course of systems utilization is dynamic and changing. As their needs for information are further satisfied, they become more demanding on IS features. The preliminary results of a study by the author indicates that the users with a higher level of information satisfaction tend to allocate more resources on enhancing systems features than those with less information satisfaction. On the other hand, the users with a lower level of information satisfaction are likely to allocate more on enhancing their system to provide better information in terms of accuracy, relevance, etc. A user’s preference to allocate resources for future systems improvement may, therefore, depend on the extent to which the user’s present needs for various IS features are satisfied.

References


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