A model of end user attitudes and intentions toward alternative sources of support

Chittibabu Govindarajulu\textsuperscript{a,*}, Brian J. Reithel\textsuperscript{b}, Vikram Sethi\textsuperscript{c,1}

\textsuperscript{a}Management Department, LeBow College of Business, Drexel University, Philadelphia, PA 19104, USA
\textsuperscript{b}Department of Management & Marketing, School of Business, The University of Mississippi, University, MS 38677, USA
\textsuperscript{c}Computer Information Systems Department, College of Business Administration, Southwest Missouri State University, Springfield, MO 65804, USA

Received 8 October 1998; accepted 26 July 1999

Abstract

End-user computing has been the focus of research for over a decade. Recent studies on end-user computing support concluded that end users are dissatisfied with the support provided by the information center. In addition to support from an information center, end users seek help from informal sources and local MIS staff. In this study we examine why end-users prefer one source of support (e.g. information center) to another (e.g. local MIS staff). In order to understand end user preferences, we study the factors that affect end user attitude toward a support source. Attitude is an important component in determining user behavior toward using a support source. In this study, a model of end user attitudes and intentions toward the source of support is presented. Analysis of data collected from 108 middle-level managers shows that respondents preferred the use of local MIS staff to both information centers and informal support sources. The results appear to reflect an emerging trend in EUC support and implications of these results are examined in the study. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: End-user computing support; EUC support sources; Informal support; Local MIS staff; Support services perceived to be important by users; User attitude; User intention

1. Introduction

End-user computing (EUC) is defined as systems developed by end users to support their decision-making [1]. The advantages of EUC have been well documented in the literature [9,15,21,28]. Likewise, their risks have been clearly identified [3,5,36]. Concurrently, it has also been consistently identified as a major concern for IS executives in both the private and public sectors [11,31]. For example, Guimaraes and Ramanujam [22], have noted that, as the level of PC activity rises, the types and intensity of associated problems increases, among others, due to data integrity and cost. Hence, the effective management of EUC is required to minimize risks and to maximize gains from IS investments. One element of EUC
management-end-user support has been identified as key to developing better applications. For example, a recent study [17] reported that the quality of user developed applications is extremely low. They had a high frequency of errors and data integrity problems. Appropriate support can assist in reducing, if not eliminating, such problems.

Although many organizations provide this support through information centers (IC), users tend to be dissatisfied with these services. They also tend to be more receptive to support from sources such as local MIS staff and colleagues. Indeed, end users prefer informal support even when formal support is available [19]. However, it is not clear why users select a specific support source. In order to answer this question, it is important to understand users’ positive or negative attitudes toward a support source and how these affect usage of that source. Thus, the main objective of this study is to determine the factors that affect users’ attitudes toward alternative sources of support and the effect of these attitudes on user behavior.

Three support sources were considered: (1) information centers; (2) local MIS staff; and (3) friends/colleagues. These were selected for two reasons:

1. Each support source has a different approach; ICs represent the formal, centralized approach; local MIS staff represent semi-formal, decentralized approach; and friends/colleagues represent an informal, decentralized approach; and
2. These support sources constitute the major types of end-user support identified in the literature.

2. Sources of support for EUC and end-user satisfaction

2.1. The information center

The traditional approach to end-user support has been the establishment of an IC. The IC helps users help themselves by providing mentors, trainers, and technicians. IBM established the first IC in Canada in the mid-seventies. After its success, the concept became popular and organizations started to adopt this approach to provide support. Hammond [23] provides prescriptions IC support services, staffing ratios, job descriptions, control policies/procedures and organizational design guidelines. The services offered can be grouped into six categories: (1) hardware support; (2) software support; (3) data support; (4) functional support; (5) training and education; and (6) miscellaneous, such as the provision of hot-line telephone assistance, publication of a newsletter, etc. Chian et al. [12] and Wetherbe and Leitheiser [41], give similar categorizations.

The information center was rated as the most important source of support. In addition, Bergeron and Berube [6] reported that users were more satisfied with the IS environment when an IC was present. However, another study reported that there is a mismatch between services expected by users and services provided by IC [37]. Mirani and King [32], also reported differences in the support expectations of different types of end users. Consistent with these findings, Nord and Nord [35] found that a significant percentage of end users were less-than-pleased by the support provided by information centers. Thus, results are ambiguous.

2.2. Local MIS staff

A more recent form of end-user support is the local MIS staff who exclusively support end users of a specific department and often report to the functional departmental manager. A study conducted by the American Management Association found that, of the 250 organizations examined, most routine IC functions, such as installing hardware and software, were assigned to user departments [20]. In these organizations, ICs were mainly responsible for communications technology, training, and data backup and security. In addition, this study reported that 30 percent of large companies had MIS specialists on departmental budget lines to support users in that department, and 10 firms with IC were planning to phase them out, while three firms had already eliminated. Though the percentage of IC managers reporting to user departments and the percentage of user departments having MIS staff is low (30 percent of the large companies studied), these reported results seem to indicate the emergence of a trend.

Local MIS staff support may not be responsible for assisting users in application development and data acquisition. Interviews with 10 local MIS personnel in
a southern university and three southern companies about their responsibilities confirmed this.

2.3. Informal support

This consists of technical help or advice from peers, friends, and lead users (advanced users) in user development of applications. Informal support sources have received considerable attention in the EUC literature (e.g. [33,38]).

Brancheau et al. reported that users generally seem to maintain an informal network for their support needs. The study showed that only 13 percent of the users relied exclusively on the IC. Pyburn noted that the IC was not seen as a particularly useful source of training and expertise and that users gained most of their experience by learning on their own or from discussion with peers. Munro et al. found that the lead user was more efficient than the support group staff in providing support. In a study conducted by Lee, a large proportion of PC users (89 percent) reported that colleagues are their main sources of information. Bergeron and Berube, in their empirical study of the EUC environment, reported that user satisfaction with respect to microcomputing activities was negatively correlated to the level of consultation with the IS group. They also pointed out that those users who seek help from members of their own department for microcomputing activities were more satisfied. A survey by Bowman et al. [8] reported that assistance from ‘Another user’ received an average rank of 1.96, whereas assistance from ‘Computing center’ received a mean rank of 3.78 (where 1 = most important, and 9 = least important). These studies highlight the importance that end users place on informal support.

3. Development of a model of end-user attitudes toward support sources

Considerable research has been performed in social psychology about a person’s attitudes and how they may affect behavior. Specifically, Fishbein and Ajzen’s [2,18] Theory of Reasoned Action (TRA) is a widely accepted model that has been used in predicting and explaining behavior across a wide variety of domains [14]. For example, it has been used in marketing management to understand consumer beha-

![Fig. 1. Theory of reasoned action ([2,18]).](image)

vior. Sheppard et al. [39] conducted meta-analyses of past research on TRA and concluded that the predictive utility of the model remained strong. In IS research, TRA has been applied to IS settings by a few researchers [4,13]. Davis developed the Technology Acceptance Model (TAM) from TRA for user acceptance of IS. Davis et al. used TRA and TAM to study user behavior in accepting computer technology. Similarly, Jackson et al. [27] use TAM to present a holistic framework and examine the various constructs that lead to behavioral intention to use an IS.

3.1. Theory of reasoned action

According to TRA (Fig. 1), a person’s behavior intention is a function of two components, one personal in nature (attitude) and the other reflecting social influences (subjective norm). Attitude is the individual’s positive or negative evaluation of the proposed behavior. A subjective norm is the person’s perception of the social pressures put on him/her to perform or not perform the behavior in question. According to the model, attitudes are a function of behavioral beliefs.

3.2. The research model

Fig. 2 presents the TRA model as applied to the end-user context. There are two differences between these models and the TRA. Since the context is end-user support, behavioral beliefs in the original model (TRA) have been replaced with user evaluation of the support source. A user may evaluate a support source on many dimensions such as the degree of support received and proximity of support services. It is proposed that the user may develop a positive or negative attitude toward the source of support. Second, since this study is not longitudinal, actual beha-
behaviors (results of behavior intentions) cannot be measured. Hence, this construct was dropped.

3.2.1. User evaluation of the support source

In order to identify factors that may influence user attitude, a detailed review of the literature on user information satisfaction was made. Based on this, the important variables that influence user attitude are: (a) degree of support received on areas perceived to be important by the users, (b) proximity of services, (c) support staff quality, and (d) quality of EUC applications.

Degree of support received on areas perceived to be important by the users

In a study based on a survey of 126 ICs, Rainer and Carr [37] reported differences between their services and the needs of the users. They compared the percentage of ICs offering a service to the percentage at which end users requested the service. The service assist user in locating data ranked 17th in IC managers offering it, while end users ranked it first. Similar differences in rank of more than 10 are reported for several services offered. Mirani and King also noted a mismatch of support requirements. This may be one of the reasons for user dissatisfaction with ICs.

Due to this mismatch, it is suggested that when the level of support received is high in areas thought to be important by end users, they hold a favorable attitude toward the support group. A comprehensive list of 12 support items based on Rainer and Carr’s study was produced for this factor. This list was prepared based on end user requirements for support and includes items such as help in application maintenance, help in data transfer, and help in designing applications.

Proximity of services

Proximity of services is an important factor. Contacting a MIS person who is located in the same department is easier than contacting an IC staff member located elsewhere. Bergeron et al. [7] found a positive relationship between the proximity of services and user autonomy. Given two support sources that are equally good, an end user will prefer the source that is closer. Although users may not hold a negative attitude towards a more distant support source, close proximity may positively influence attitude. Items such as Source can be accessed with ease and Source available all the time were used to measure this construct.

Quality of support staff

Researchers have consistently identified competent staff and good communication with users as critical for the success of ICs [30]. In addition, relationships with support staff [26] and the support staff’s attitude toward end users are equally crucial. Four items representing each of the above qualities were used to measure this construct.

Quality of EUC applications

The quality of EUC applications developed by end users is an important dimension of IC success [16,29]. This factor is similar to the ‘information product’ of Ives et al. and Igbaria and Nachman [25]. Since EUC applications are the final result of EUC activities, this factor may be a major determinant of user attitude. The following items used by Ives et al. were adopted to operationalize this construct: reliability, accuracy, precision, and completeness.

3.2.2. User attitude, subjective norm, and behavior intentions

In the end-user support context, attitude is defined as the user’s evaluative judgment of the support source. The attitude may be positive or negative, depending upon evaluation of the support source. In our model, attitude and subjective norms are the major determinants of a user’s intention to use a support source. Given that informal support is popular among end users, subjective norms can be expected to have an effect on user intentions. In the model, behavioral intention refers to a user’s intention to use a specific support source.

The items used to measure these constructs were based on the guidelines of Fishbein and Ajzen. Some of these are:
The support source is Not suitable for me...Suitable for me (Attitude)
What my friends think about me is Important to me...Not important to me (Motivation-subjective norm)
My friends think I should Use the source...Not use the source (Normative belief-subjective norm)
I plan to use the support source Many times...Occasionally (Behavior intention)

3.3. Research hypotheses

The research hypotheses are:

H1: The quality of support staff is positively related to user attitude.
H2: The quality of EUC applications is positively related to user attitude.
H3: Degree of support received in areas perceived to be important by users is positively related to user attitude.
H4: Proximity of services is positively related to user attitude.
H5: User attitudes and subjective norms have a positive relationship with user intentions.

4. Operationalization of the research model

A structured questionnaire was designed, and a survey method was used for data collection. The survey instrument had two parts: the first to collect demographic data and the second to collect data for the factors hypothesized as having an effect on user attitude, subjective norms, and behavior intentions. Semantic differential scales with bi-polar evaluative end-points were used to collect responses.

4.1. The pretest

The questionnaire was mailed to a randomly selected group of 400 faculty and staff at a southern US university. The sample population was divided into three equal groups and each was asked to give responses about a specific support source-their IC, local MIS staff, or informal support. The university setting was ideal, as these three support sources are all present in the educational environment. A total of 57 useful responses were received (response rate 14.3 percent). After analysis, two changes were made to the survey instrument. First, the scales were reversed. This was found necessary since respondents prefer to give high scores if they are in agreement with certain items. Second, some of the construct items were reworded to avoid ambiguity.

4.2. Final data collection

Respondents for the survey were a randomly selected group of 1000 non-IS middle-level managers from various industries throughout the US Middle-level managers were selected because Benson, in prior research, had found that over 50 percent of the end-user population are in that category. The mailing list of addresses was purchased from a commercial mailing list firm in California. Only firms with more than 150 employees were selected for the study. It was assumed that such firms would have some form of support source. Middle-level managers were given a choice between responding to one of the three support sources: IC, local MIS staff, and friends/colleagues. The reason for this choice is that one of the support sources might be absent in the respondent’s firm. To improve the response rate, one reminder was sent out within a week of mailing the survey.

5. Data analysis

A total of 115 responses were received (11.5 percent response rate). Out of these, seven were not usable, since the responses were incomplete, giving a final response rate of 10.8 percent. Due to incorrect addresses, 17 mailings were returned (1.7 percent). Excluding them, the adjusted final response rate was 11 percent. Although this response rate is low, it is not abnormal for mail surveys [24]. Since the sample population consisted of only middle-level managers, there are no strong reasons to believe that the respondents differ from the nonrespondents. Thus, nonresponse bias was not considered as a threat in this study.
5.1. Respondent information

Out of the 108 respondents, 64 percent belong to the service industry and 26 percent to manufacturing. Table 1 presents a breakdown of the responses for each support source.

When asked to identify which support sources were available, 74.4 percent of respondents noted friends/colleagues while 72.4 percent indicated the availability of an IC. Approximately 62 percent of the respondents reported the presence of local MIS staff. Surprisingly, 50 percent mentioned the availability of vendor support. A small percentage (8 percent) of the respondents reported that outside support sources, such as MIS staff from another department and family members were available to them (Table 2).

Respondents’ preferences for support sources are tabulated in Table 3. Of the 98 respondents who gave their preferences, approximately 39 percent ranked local MIS staff as their first preference while 26.5 percent ranked friends/colleagues as their first preference. Only 19 percent ranked their IC as their preference.

5.2. Instrument validity and reliability

The survey instrument was tested for its strength by measuring convergent validity and by performing reliability analysis. The convergent validity shows the extent to which the measure correlates with alternative measures of the same construct. High inter-item correlations within each construct were construed as indications of convergent validity. With the exception of one pair of items (correlation coefficient $\hat{0.56}$) of the construct, quality of support staff, all other factor item correlations were above 0.6, with most above 0.8. All of the correlations were found significant. The reliability of each factor was evaluated by the means of Cronbach’s alpha coefficient. Table 4 presents the Cronbach’s alpha (reliability analysis) for the constructs of the instrument for each support source. The alpha values lend support to the strong scale reliability of the instrument.

5.3. Analysis of the proposed relationships

Regression analysis was performed to test the relationships between the constructs of the model. Table 5 summarizes the results of the analysis of relationships between ‘user evaluation of the support source’ and user attitude. All the variables were related to attitude, explaining 73 percent of the variance. For a complete
analysis, the data for these variables was tested for the presence of multicollinearity. An investigation of collinearity showed low variation inflation factor (VIF) values for these variables; this indicates that multicollinearity was not a concern.

Hypothesis 5 states that ‘User attitudes and subjective norms have a positive relationship with user intentions’ (to use a specific support source). Table 6 summarizes the results of the regression analysis conducted to study the relationship between user attitudes, subjective norms, and behavior intentions. The variables attitude and subjective norm were both significant and explained 64 percent of the variance in user attitude. Thus, Hypothesis 5 was not rejected. Results of hypotheses testing are shown in Table 7.

6. Discussion of results

Although the majority of the respondents (75 percent) reported the presence of informal support sources, approximately 62 percent of the respondents reported the presence of local MIS staff in their departments. In addition, respondents ranked local staff as their first preference for support. The following factors might have led to the respondents’ selection of local MIS staff:

1. It is more convenient.
2. Since the local MIS staff supports only users of a specific department, they can spend more time with them and thus help more than IC staff whose time is shared among departments.

<p>| Table 5 |
| Analysis of the relationship between user attitude and user evaluation of the support source |</p>
<table>
<thead>
<tr>
<th>Model</th>
<th>( R^2 )</th>
<th>Beta</th>
<th>VIF</th>
<th>SE Beta</th>
<th>( T )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude = staff quality + appl. quality + support + proximity</td>
<td>0.730(^a) (( N = 99 ))</td>
<td>0.342(^a)</td>
<td>2.60</td>
<td>0.116</td>
<td>2.951</td>
</tr>
<tr>
<td>Staff quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appl. quality</td>
<td>0.294(^b)</td>
<td>2.48</td>
<td>0.104</td>
<td>2.831</td>
<td></td>
</tr>
<tr>
<td>Support</td>
<td>0.079(^b)</td>
<td>2.59</td>
<td>0.036</td>
<td>2.191</td>
<td></td>
</tr>
<tr>
<td>Proximity</td>
<td>0.404(^a)</td>
<td>2.22</td>
<td>0.107</td>
<td>3.781</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) \text{p}<0.005. \quad \(^b\) \text{p}<0.05.

<p>| Table 6 |
| Analysis of the relationships between user intentions and user attitude and subjective norm for each support source |</p>
<table>
<thead>
<tr>
<th>Model</th>
<th>( R^2 )</th>
<th>Beta</th>
<th>SE Beta</th>
<th>( T )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior intention = attitude + subjective norm</td>
<td>0.545(^b) (( N = 85 ))</td>
<td>0.392(^b)</td>
<td>0.092</td>
<td>4.270</td>
</tr>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective norm</td>
<td>0.042(^a)</td>
<td>0.017</td>
<td>2.490</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) \text{p}<0.05. \quad \(^b\) \text{p}<0.005.

<p>| Table 7 |
| Summary of results of hypotheses testing |</p>
<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Results of analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>( H1: ) Quality of support staff is positively related to user attitude</td>
<td>Supported(^b)</td>
</tr>
<tr>
<td>( H2: ) Quality of EUC applications is positively related to user attitude</td>
<td>Supported(^a)</td>
</tr>
<tr>
<td>( H3: ) Degree of Support received in areas perceived to be important by users is positively related to user attitude</td>
<td>Supported(^a)</td>
</tr>
<tr>
<td>( H4: ) Proximity of Services is positively related to user attitude</td>
<td>Supported(^b)</td>
</tr>
<tr>
<td>( H5: ) User attitudes and subjective norms have a positive relationship with user behavior Intentions</td>
<td>Supported(^{a,b})</td>
</tr>
</tbody>
</table>

\(^a\) \text{p}<0.05. \quad \(^b\) \text{p}<0.005.
3. Local MIS staff can be expected to have a better understanding of a department’s business functions and needs. IC staff may not have a complete understanding of the business [34].

The results seem to indicate that local MIS staff support is gaining popularity among respondents. To confirm this, the means of behavior intentions across support sources were tested (Table 8). As predicted, the mean values of behavior intentions varied significantly. Respondents tend to use local MIS staff support. Similarly, respondents intend to use the IC rather than to seek help from friends and colleagues. The difference is not, however, very large, though it may be significant.

Approximately 72 percent reported the presence of ICs/help desks. This shows that ICs are still one of the predominant forms of support. Although they are widespread, respondents ranked local MIS staff support as their first preference. This is in direct contrast to earlier studies, which reported that the users favored other support sources. In fact, middle-level managers ranked friends/colleagues as their last preference in our study.

All study hypotheses were supported. Earlier research has identified support staff characteristics and the quality of user-developed applications as crucial for a support source’s (IC) success. Also, proximity of services was identified as important in EUC context. Finally, degree of support received in areas perceived to be important by end users, as we suspected was found to be related to user attitude. However, low beta values (0.079) suggest that this may not be a crucial variable here, at least for managerial end users. In general, this study’s findings agree with earlier research results.

Although the use of local MIS staff appears to be gaining popularity now, the concept of distributed end-user computing support has been consistently mentioned in the literature (e.g. [10]). Hammond’s conditions for distributed support are notable. They are (1) not enough usage to justify an IC; (2) a small development staff; (3) highly diversified user groups with little overlap between their software packages; and (4) highly specialized user functions with good skill levels. If one or more of these conditions are not satisfied, the presence of local MIS staff in all departments may lead to redundant support efforts. Since local MIS support is popular among end users, management should exercise proper controls use this source. A study revealed that 50 percent of the information centers surveyed develop applications for users [40]. It is important that local MIS staff should focus on their primary function-helping users help themselves-rather than developing applications for users.

Though subjective norm has a significant effect on user attitude, the low beta value (0.042) seems to support Davis et al.’s findings, which suggested that subjective norms have no effect on user attitude.

7. Conclusions

A significant percentage of respondents reported the presence of departmental IS staff to support user computing needs. This may be an emerging trend in EUC support. Respondents prefer local IS staff support and IC support (in that order) to informal sources. This is an unexpected finding, since previous researchers have consistently reported users’ preference for informal support. Based on the empirical evidence, it is concluded that support staff characteristics, quality of end user applications, level of support received in areas important to users and proximity of services have a significant effect on user attitude. However, results show that level of support received by a user has less influence on user attitude than other constructs and proximity was the construct most closely related to user attitude. There is a positive relationship between attitude and subjective norm with respect
to user behavior intentions. In the EUC support context, results suggest that attitude determines user intentions to use a support source to a greater degree than user subjective norm. Possibly, in the EUC context attitudes of a user toward a support source may be more important than subjective norms.

References


Chittibabu Govindarajulu Dr. Govindarajulu is an Assistant Professor of MIS in the Management Department at Drexel University. Dr. Govindarajulu has published several articles on end-user computing support and group decision support systems in journals such as Information and Management, Journal of Database Management, and Journal of End-User Computing. His current research interests include end-user computing management, ERP and Group Decision Support Systems. He received his Bachelors in Mechanical Engineering and MBA from Anna University and Bharathiar University in India, respectively. In 1996, he received his Ph.D. from the University of Mississippi.

Brian J. Reithel Dr. Brian Reithel’s teaching and research experience in the field of information technology spans more than 15 years. His research interests revolve around systems development, both by information systems professionals and end users, particularly in the area of strategic information systems. His teaching experience encompasses both Management Information Systems and Computer Science courses at the undergraduate, masters, and doctoral levels. He is the author of more than 50 articles and papers that have appeared in numerous journals and proceedings. He is actively involved in several academic and professional organizations related to the information technology field. Dr. Reithel currently serves on the faculty of the School of Business Administration at The University of Mississippi as the Area Coordinator for MIS/POM and as Associate Professor of MIS.

Vikram Sethi Dr. Vikram Sethi is an associate professor in the information systems area at Southwest Missouri State University, Springfield, Missouri, USA. His areas of interest include global information systems development, the training and development of information systems personnel, socialization practices, and role adjustment of information systems employees. His articles have appeared in journals such as ISR, the Journal of Management Information Systems, Omega, Journal of Information Technology, and the Journal of High Technology Management Research.