The Influence of User Social Network on User Participation in ERP System Implementation

Pei-Hung Ju
National Kaohsiung University of Apply Sciences
peihung.chu@cc.kuas.edu.tw

Hsiao-Lan Wei
National Taiwan University of Science and Technology
hlwei@cs.ntust.edu.tw

Abstract

Base on the social network theory, this study attempts to investigate whether the network centrality will affect the user participation in ERP system implementation or not. In aspect of network centrality, we used degree, closeness, betweenness and eigenvector as indicators to investigate the relationships between individual network centrality and user participation. Then we further explore the impact of user participation on system success. We adopted the ERP implementation project of TSC Company as an example. The sample data has 211 questionnaires. Our empirical results show that: (1) network centrality positively affects the two dimensions of user participation; (2) hands-on activity and communication activity positively affects user satisfaction.

1. Introduction

Under the changing environment of business and rapid development of technology, enterprises are hoping to earn the competitive advantages by rapidly responding to the market when launching the ERP system, which is used for improving the business workflow and enhancing the efficiency. It is expected that the ERP system not only assists with internal daily tasks but also makes a striking change in enterprise achievement. Many researchers study the key factors of how to implement ERP system successfully [15, 16, 39, 41, 50]. These successful factors may broadly be classified as human/organizational, technical, and economic ones [13, 40, 43, 47]. While each set of factors is important, there appears to be a growing consensus among researchers that human factors, more than technical or economic, are critical to the success of ERP projects [3, 43]. Sarker and Lee (2003) [43] suggest that empowering the team-members for self-management and communication issues are seen as central to success of an ERP implementation project.

Therefore, user participation is an important factor when implementing the ERP system. User participation refers to the favorable behaviors and activities that users perform in the systems development process to promote efficient and effective implementation of ERP systems [6, 28, 32]. When organizations plan to use an ERP system, a number of user representatives participated in software package configuration and there might have a conceptual gap between developers and users [7, 31, 35]. To close the gap to ensure ERP system implementation success, it’s essential for organizations to handle user participation carefully [20, 34]. User participation can improve system quality by giving developers the information they need to produce a high-quality design [7, 11, 35]. Besides, user participation in change management activities such as planning or conducting training is much more likely to affect system acceptance and use outcomes [31, 37, 52]. ERP system is an integrated solution in an enterprise, which involves internal workflow within inter-departmental cooperation. The communication and coordination in related users are extremely important as well as the communication with consultants. With the efforts in both sides, the implementation can be ensured to correspond to the entire workflow in the enterprise.

A person’s behavior intention is influenced by his/her personal relationship network in an organization [48, 53]. This impacts the result of learning and knowledge exchange during the ERP implementing process. Therefore, a concept of social network is proposed to study the influences in different network relationship. How to use the network to achieve the enterprise target has been highly valued by the management because understanding an employee’s network relationship is beneficial to find out the key users during the process of ERP implementation. The potential users have greater influences in drawing the participation of other users and thus they indirectly enhance the possibility of successful
implementation. Many researches show that the social network has a significant influence on individual job performance [2, 46]. More and more studies reveal the behavior influence impacted by individual’s network relationship [48, 53]. The network relationship in an organization has a certain impact in user participation. Sykes et al. (2009) [48] indicated that the counseling network relationship has a significant influence in system usage. Meanwhile, the relationship influences one’s job involvement [53]. Individual’s network relationship is a key variable in one’s participation. However, past research has failed to reveal if user participation influences the success of information implementation from the perspective of an individual. This research explains the influence of user participation and the relationship of the successful ERP implementation, based on the social network theory [8, 22] and the user participation theory [4, 23].

During the implementation, the relevant users will be impacted by the social network, and the following behavior changes are key factors of successful implementation. This study intends to understand the relationship of the social network, user participation and the success of system implementation. It is expected to discover the role of social network in implementation and in the enhancement of user participation to accomplish the system implementation successfully. The measurement is by using the index of network centrality to evaluate the influence in different aspects according to the social network theory. This study applies a theory model and establishes an index in all dimensions in order to understand the influence of individual social network relationship in user participation. It is hoped to discover the influence of the characteristic of individual social network in information system implementation and the influence of implementing the information system successfully from different dimensions of user participation.

2. Conceptual background

2.1. Social Network

Social network can be clearly defined as a type of relationship which is made up of a series of persons, objects and events; different networks can be formed even with the same elements due to the different types of relationships. The so-called persons, objects and events are defined as actors or nodes by scholars in social network theory and the scholars are of the opinion that the relationships between actors in a structural relationship and an individual actor in a network indeed have important influence on the behavior, perception and attitude of an individual or an entire organization [33].

When a corporation introduces an IS system, network centrality is one of the crucial elements because the corporate has to put in considerable resources during the introduction which makes the transmission and control of these resources considerably important. Knowledge, intentions and behavior of using the new system will also be affected by network [48]. Network centrality is defined as “the scope of individual participation in the network which facilitates information exchange among colleagues” [46]. Knoke and Kulinski (1982) [33] is also of the opinion that interactions of many relationships exist in the process of contact between individuals; such interactions include transmission and receipt of information and the level of individual involvement can be judged by the number of relationships.

As for network centrality, scholars consider centrality an important structural attribute in the social network and the individual situated in the network center can control the flow of resources and related knowledge. The individual will not be affected by others but instead he or she will have influence on individual power in an organization as well as resource control [26, 27]. If situated at a lower level of network centrality, however, the individual must rely on others to pass on resources and knowledge and subsequently will be easily influenced and urged by the environment [22]. Therefore, the analysis of network centrality is explored in four dimensions by the scholars Freeman (1979) and Bonacich (1972) [8, 22], including degree, closeness, betweenness and eigenvector.

In view of IS research, some scholars back in 1974 had started to apply social network concepts to the technology innovation diffusion model of an organization [17] and discovered that a informal communication network within an organization is indeed able to make a new system easier to be adopted. In addition, the network is also very important to IS system implementation, as well as the transmission and transfer of related resources and knowledge in the organization. Some research indicated that structures of a social network can affect the transmission of valuable resources in an organization [9, 26]. Some work-related resources such as work counseling and strategic information can be transmitted through a social network, so can social recognition, discipline and support [48]. It is very important how the knowledge and usage methods can be transferred to users during the implementation process of an ERP system. Informal personal network plays a key role in transferring the knowledge of a new system. Hence, Sykes et al.
(2009) [48] considers it difficult to accomplish the absorption and transmission of professional knowledge about the new system within a short timeframe. But it will be easier if knowledge transfer is via people with similar training, background and work characteristics. This shows that when an organization introduces a new IS system, it will be more effective to share and transmit the usage knowledge of the new system via staff in the same department of the organization. To sum up, the social network viewpoint in IS system implementation has become a very important topic in recent years [24].

When a corporation introduces an IS system, network centrality is one of the crucial elements because the corporate has to put in considerable resources during the introduction which makes the transmission and control of these resources considerably important. Knowledge, intentions and behavior of using the new system will also be affected by network [48]. Network centrality is defined as “the scope of individual participation in the network which facilitates information exchange among colleagues” [45].

As for network centrality, scholars consider centrality an important structural attribute in the social network and the individual situated in the network center can control the flow of resources and related knowledge. The individual will not be affected by others but instead he or she will have influence on individual power in an organization as well as resource control [26, 27]. If situated at a lower level of network centrality, however, the individual must rely on others to pass on resources and knowledge and subsequently will be easily influenced and urged by the environment [22].

The analysis of network centrality is explored in four dimensions by the scholars Freeman (1979) and Bonacich (1972) [8, 22], including degree, closeness, betweenness and eigenvector. Degree centrality is the simplest and most direct core indicator. It is defined as the number of links incident upon a person and is viewed as an important indicator for communication activity. Closeness means the degree an individual can avoid of being controlled by other individuals, which measures the average shortest distance between individuals in a social network. Closeness is usually used as an indicator to measure the interdependence and efficiency between individuals. Betweenness focuses on the shortest distance between an individual and other individual pairs. It is a useful indicator to measure communications and resource flow between individuals. Eigenvector is also known as Bonacich Centrality, which is defined as the primary properties of vectors in a graphic adjoining matrix. Scholars believe it a relative score to the centrality of some nodes and the sum of all nodes in the network [8]. Through the property vector this methodology can be applied to further discover the actor who is situated in the closest center and has the strongest power.

2.2. User Participation

In the development of information systems, user participation and user involvement have been seen as essential key success factors. And, the early studies have pointed out that user participation or involvement will actually have positive effects on the success of the systems (Swanson, 1974). However, there was no clear differentiation between user participation and use involvement at the early stage. And, Ives and Olson (1984) [28] proposed that the participation was a concept which included board behavior, activities and responsibilities and all of them were completed by users or system developers. Barki and Hartwick (1994; 2001) [4, 7] define user participation as a serious of operations and activities conducted by all users or users’ representatives during the period of the system development. Compared with user participation which has shown by the external user’s behavior and activities, user involvement represents user’s inner subjective state of mind. According to early studies, user’s state of mind will indeed have effects on user’s attitudes, satisfaction and intention to use about the system. And, user participation has obvious positive influence on user involvement. Therefore, if there is actual participation through the user’s behavior or activities in the project of the system development, it may improve the “involvement” on user’s states of minds and will further affect user’s satisfaction and the extent of user’s intention to use toward the project of the system development.

Barki and Hartwick (1994) [5] define user participation as a serious of operations and activities conducted by all users or users’ representatives during the period of the system development. They also proposed four important dimensions: overall responsibility, user-IS relationship, hands-on activity, communication activity. Overall responsibility means users’ activities and works that reflect the overall leadership or the full responsibilities during the processes of the system developments. User-IS relationship is the activities of the system developments have expressed users and IT staffs’ communication and influence. Hands-on activity indicates that users have executed specific physical designs and implementation tasks. Communication activity means users have conducted the activities of
the information exchanges with other participants through formal or informal communication ways. Theses behaviors and activities are shown by users during the processes of the system developments. Some users may conduct some parts of the activities and others may conduct more than two activities. In addition, in the activities of user participation, some scholars have proposed that the participation should not only limit to the participation before the system implementation but also should include the participation after the system implementation. Before the system implementation, if the user can clearly realize the relevance between the importance of the system and himself or herself, it may increase user’s eagerness in the participation of the processes of the system developments. And, after the system implementation, we have to try to improve user’s satisfaction. Therefore, we may modify the system and its fitness through user participation in order to improve user’s satisfaction [49].

2.3. System Success

In the fast changing technological environment and the gradually improvement of the use of the information technologies, enterprises expect to improve their competitive advantage, productivity and even enhance their personal ability through the information system implementation and the effective use of the information system. But, enterprises worry that whether the system can achieve the expected results after the system implementation or not? Therefore, scholars in the fields of the information management have discussed how to promote the success of the implementation of the information systems and have also proposed many measurement frameworks about the success of the information systems [19, 28]. User satisfaction is one of the most important measures in assessing information system success [18].

User satisfaction is the responses of the usage of the information systems by the users. The integrative nature of ERP systems makes their implementation more complex than traditional IS and they require employees to exploit their capabilities for fulfilling the needs of them while interacting with the system. Furthermore, the deployment of ERP systems may induce some extent of process and organizational change to enhance greater effectiveness for the adopting organizations. Therefore, it is necessary to ensure that users are both willing and able to use ERP systems before producing organizational benefits. Accordingly, satisfied employees are more likely to be productive, especially when the use of ERP systems is mandatory [25]. As such, many researchers have used user satisfaction as a single-dimension of ERP system success to assess the effectiveness of the system [44, 51].

3. Theoretical framework and hypotheses

In this study, individuals network of relations in an enterprise as a major research point in the enterprise implements ERP system, through the observation to analysis how the participation behavior arising from personal network relationship to have the impact of enterprise systems implementation success. Degree, closeness, betweenness and eigenvector four indicators are used to define the individual within the enterprise network centrality. User participation will include the actual participation in the activities and communication activities to process the research. Finally, user satisfaction is used to discuss the success of system implementation.

![Figure 1 Research model](image)

3.1. Network centrality and user participation

Research in the social network, network centrality is a very important research aspect [2, 46, 48]. According to previous research, network centrality is defined as the scope of individual participation which to help working partners to exchange information, the scope of individual participation [46]. The network centrality is measured by the number of relation connection in individual network to determine their involvement. According to the literature pointed out that if individuals within the organization’s position in the network center, which has more links the relationship between the number of representatives in the organization has a high impact capacity [22]. Scholars also believe that the degree of the network centrality will affect individual performance within the organization [2], work involvement [53] and resource control [26] etc. Brass and Burkhardt (1993) [10] believed that
employees within the organization with higher the degree of the network centrality will increase its power within the organization. In addition, scholars believe that the personal closeness network centrality can represent the power of individuals within the organization, while the power will affect other people's views and perspectives in the network [26, 27, 48], by influence of drive from the center members of the network will change the individual whether to actually participate in decision-making of the new system [48]. In addition, the scholars also believe that the network centrality have a significant positive impact to performance of individual behaviors, and the degree of participation for the related work will also enhance [53]. Through the network centrality, it can affect the actual behavior of users to pay for the process of information systems implementation. Therefore, this study proposes that:

\[ H_1: \text{Network centrality is positively associated with actual participation.} \]

Communication activities always regarded as an important part of the process of information systems implementation, through the interactive communication between related users and the project team can allow the functions of information systems to more fit with personal related daily work, according to Hartwick and Barki (2001) [23] again to further explore the various dimensions of user participation, define communication activities as an important aspects, and also defined as the user through formal or informal communication with other participants in the activities of information exchange. From this, communication activities have become a factor in information system implementation. The theory of social networks proposed the concept of degree centrality think that individuals network degree centrality within the organization's can be regarded as indicators of potential communication activities[22], through the degree of network centrality can understand the interaction relationship between individuals and other people in organizations, and also represent the degree of on behalf of individuals to participate in projects or related communication activities [2, 46], related users through its interactive network of communication within the organization's relationship to support answer the questions of information systems and assist the implementation process, so members of the high network centrality in the organization would play an important bridge to promote the other person use of the system [48] and degree of work participation [53].

Therefore, we present the following hypothesis:

\[ H_2: \text{Network centrality is positively associated with the communication activities.} \]

3.2. User participation and user satisfaction
The past, regardless of user participation in research studies or user involvement, user participation in all the information system implementation process, can improve user satisfaction with the information systems and attitudes, will also affect the decision whether to use its new system [30]. McKeen and Guimaraes (1997) [37] study pointed out that when organizations with systems development life-cycle approach in information systems implementation process, actual users participation behavior in activities for the user satisfaction has a positive influence in various stages. In addition, the scholars also believe that through users participation in system development process can improve the information system to fit organization or work, for user satisfaction enhancement have a significant influence [49]. Therefore, we present the following hypothesis:

\[ H_3: \text{Actual participation is positively associated with user satisfaction.} \]

According to previous articles, in the process of ERP system implementation, system consultants and related user's communication is crucial factor [29], through the communication activities can transmit the relevant knowledge and needs, not only can improve the quality of the system output, and also better able to meet the needs of users, Scholars also believe that communication relations between users and developers for user satisfaction have a significant influence [38]. Therefore, we present the following hypothesis:

\[ H_4: \text{Communication activities are positively associated with user satisfaction.} \]

4. Methodology
4.1. Data collection
As the subject of this study is based on personal social networks within the organization will affect the users in the information system and then implement the system successfully, therefore, a well-known domestic companies (hereinafter referred to as TSC) of the ERP system implementation project as an example, TSC self-developed a new generation of WebERP system in 2006, and implemented modules include: Distribution Module, production management module, financial modules, human resources management module, Project Management module ... so expect to build a comprehensive Web-based ERP system and integrate with business process management (BPM), expected to through this new generation of on-line
WebERP to achieve no paper work and full electronic processes, and streamline the ERP operating to improve the efficiency of the enterprise, while the ERP system implementation project is still ongoing maintenance and improvement.

Therefore, by issuing a questionnaire to all TSC relevant ERP users to process data collection, the total number of employees in the TSC is approximately 400 people. We through our contact with the relevant authorities to identify and obtain ERP system implementation project related information, initially summarized in the TSC related users for ERP system implementation projects is about 300 people, so in the time of survey was issued a total of 300, while the final recovery of a total of 243 with questionnaires return rate of 81%. Due to the open information for personal networking question and answer, some members felt that this relationship should not be disclosed, so removing the network relationship has not answered and the others unfinished or invalid answer questions and a total of 32 valid questionnaires. The total valid questionnaires is 211, the effective rate was 70.33 percent. The questionnaire in this study were issued, covering the various departments and job functions, and work more years to 1 years, means all these person with a certain degree of understanding for the ERP system implementation.(see Table 2).

Table 2 Respondents background

<table>
<thead>
<tr>
<th>Background variables</th>
<th>No. of Samples</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>123</td>
<td>58.29%</td>
</tr>
<tr>
<td>Female</td>
<td>88</td>
<td>41.71%</td>
</tr>
<tr>
<td>Seniority</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 1 y</td>
<td>15</td>
<td>7.11%</td>
</tr>
<tr>
<td>1~3 y</td>
<td>66</td>
<td>31.28%</td>
</tr>
<tr>
<td>3~5 y</td>
<td>42</td>
<td>19.91%</td>
</tr>
<tr>
<td>5~7 y</td>
<td>40</td>
<td>18.96%</td>
</tr>
<tr>
<td>7~9 y</td>
<td>10</td>
<td>4.74%</td>
</tr>
<tr>
<td>Over 9 y</td>
<td>36</td>
<td>17.06%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20~29</td>
<td>45</td>
<td>21.33%</td>
</tr>
<tr>
<td>30~39</td>
<td>116</td>
<td>54.98%</td>
</tr>
<tr>
<td>40~49</td>
<td>47</td>
<td>22.27%</td>
</tr>
<tr>
<td>50~59</td>
<td>3</td>
<td>1.42%</td>
</tr>
<tr>
<td>Job</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executives</td>
<td>18</td>
<td>8.53%</td>
</tr>
<tr>
<td>Mid. Mgr.</td>
<td>11</td>
<td>5.22%</td>
</tr>
<tr>
<td>Low Mgr.</td>
<td>48</td>
<td>22.75%</td>
</tr>
<tr>
<td>Eng.</td>
<td>33</td>
<td>15.64%</td>
</tr>
<tr>
<td>Secretary</td>
<td>34</td>
<td>16.11%</td>
</tr>
<tr>
<td>Sales</td>
<td>49</td>
<td>23.22%</td>
</tr>
<tr>
<td>IT Staff</td>
<td>17</td>
<td>8.06%</td>
</tr>
</tbody>
</table>

5. Result

This study used social network analysis and structural equation modeling analysis two technologies and the use of UCINET 6, SmartPLS and SPSS 17.0 for data analysis, this study divided analyze process into three parts, the first part analysis TSC personal network centrality; second part evaluate the the reliability, convergent validity and discriminant validity, etc for variable measurement mode; the third part evaluate an overall structural model.

5.1. Network Centrality Analysis

The study was through the consulting network when the TSC implement ERP to build personal social networks. In the TSC ERP implementation process, the high degree of network centrality were dominated by members of IT department which is responsible for important related work (such as: demand planning, database design, training ... etc.) during the information system implementation process and play as an important role in consulting relation network. Other members of non-IT departments also have high network centrality, such as members in C Business Group, D Business Group, financial department, and operating administration Department. The ERP implementation should not ignore their position in the corporate network, through their influence in the network, the related knowledge of ERP systems or operating procedures to spread to all departments within the enterprise.

By the analysis of Network Centrality, we can further understand members who have important influences in the ERP system implementation process. Using UCINET 6, this study calculated degree of centrality, closeness-centrality, betweenness centrality and eigenvector centrality. Through these four values calculated by this analysis, we understand high and
low level of network centrality, and to explore its influence on user participation in ERP system implementation.

5.2. Measurement model

The psychometric properties of the scales were assessed in terms of item loadings, discriminant validity, and internal consistency. Item loadings and internal consistencies (also known as composite reliability) greater than .70 are considered acceptable [21]. From the factor analysis results, all the items loaded highly (> .70) on their respective construct. All the constructs also exhibited good internal consistency as evidenced by their composite reliability scores, which were all greater than .90. Discriminant validity was assessed by two criteria [14]: (1) items should load more highly on the construct that they are intended to measure than on other constructs (i.e. loadings should be higher than cross-loadings) and (2) the square root of the average variance extracted (AVE) should be larger than the inter-construct correlations. Cross-loadings were computed by calculating the correlations between latent variable’s component scores and the manifest indicators of other latent constructs [1, 14]. Without exception, all items loaded more highly on their own construct than on other constructs. Also, by comparing the inter-construct correlations and the square root of AVE (shaded leading diagonal) as shown in Table 2, the square root of the AVE for each construct was greater than 0.707 (i.e. AVE > 0.50) and also greater than the correlations between the construct and other constructs, indicating that all the constructs share more variance with their indicators than with other constructs. Overall, the self-report measurement instrument exhibited sufficiently strong psychometric properties to support our subsequent test of the proposed structural model.

Table 2 Correlation matrix and composite factor reliability scores

<table>
<thead>
<tr>
<th>Constructs</th>
<th>CR</th>
<th>α</th>
<th>Mean</th>
<th>STD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. NetCen</td>
<td>.94</td>
<td>.91</td>
<td>7.81</td>
<td>3.93</td>
</tr>
<tr>
<td>2. HOA</td>
<td>.97</td>
<td>.96</td>
<td>2.18</td>
<td>.99</td>
</tr>
<tr>
<td>3. COM</td>
<td>.96</td>
<td>.95</td>
<td>2.67</td>
<td>.88</td>
</tr>
<tr>
<td>4. US</td>
<td>.95</td>
<td>.95</td>
<td>3.40</td>
<td>.58</td>
</tr>
</tbody>
</table>

NetCen=Network Centrality; HOA=Hands-on Activity; COM=Communication Activity; US=User Satisfaction

4.2. Structural model

The PLS structural model and hypotheses were assessed by examining path coefficients (similar to standardized beta weights in regression analysis) and their significance levels. All of the constructs were modeled as reflective. Following Chin [14], bootstrapping (with 200 resamples) was performed to obtain the estimates of standard errors for testing the statistical significance of path coefficients using t test. Table 3 summarizes the model-testing results. As for Hypothesis 1, we find that network centrality is positively associated with hands-on activity (t = 5.19, p < 0.01). Hypothesis 2, which posits that network centrality would influence communication activity, is supported (t = 6.42, p < 0.01). As for Hypothesis 3, we find that, hands-on activity is positively associated with user satisfaction (validating H3, t = 2.78, p < 0.01). Hypothesis 4, which posits that communication activity would influence user satisfaction, is supported (t = 2.10, p < 0.05). Network centrality explains 17% and 13% of the variances in hands-on activity and communication activity respectively. Explained variances for user satisfaction are 19%.

Table 3 PLS results of path significance

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Coefficient</th>
<th>T-value</th>
<th>Sign.</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>NetCen→HOA(H1)</td>
<td>.41</td>
<td>5.19**</td>
<td>Yes</td>
<td>.17</td>
</tr>
<tr>
<td>NetCen→COM(H2)</td>
<td>.37</td>
<td>6.42**</td>
<td>Yes</td>
<td>.13</td>
</tr>
<tr>
<td>HOA→US(H3)</td>
<td>.28</td>
<td>2.78**</td>
<td>Yes</td>
<td>.13</td>
</tr>
<tr>
<td>COM→US(H4)</td>
<td>.20</td>
<td>2.10**</td>
<td>Yes</td>
<td>.19</td>
</tr>
</tbody>
</table>

NetCen=Network Centrality; HOA=Hands-on Activity; COM=Communication Activity; US=User Satisfaction

Note: ** indicates significant at p<0.05

6. Conclusion

The result of this research analysis indicates that network centrality has significant and positive effects to user participation in both hands-on activity and communication activity. Past references suggested that high degree of network centrality meant stronger power and such power was able to control the resource flow of the organization [9, 26, 27] as well as affected an individual’s willingness to participate in the IS system implementation. In addition, when an IS system is implemented to the organization, the power an individual possesses in allocating and controlling the resources stands for the overall responsibility he or she bears for the project. Higher
degree of network centrality means stronger connections between him and others; such connection can become an effective communication channel during the IS system implementation [2, 46]. As a result, this research believes that the higher degree of network centrality is, the closer the relationship it has with others, and this can effectively change and improve the behaviors of other people in the surrounding environment brought about by the IS system implementation and subsequently promote their willingness to actually participate in the implementation. Also, because the members with higher network centrality are able to effectively control the knowledge and resources in need during the IS system implementation, the related knowledge can be disseminated and transferred through these members’ communication activities. Therefore, this research believes that network centrality can substantially facilitate user participation during the process of IS system implementation. Furthermore, the result of this research analysis also suggests that hands-on activities and communication activities have considerable and positive effects on user satisfaction. Some documents indicate that user participation and communications in various stages of the system implementation could not only familiarize the users with the related knowledge about the system but also facilitate the improvement of system quality [37, 49]. Also, users will not truly understand the relevance and importance of the system in relation to themselves without actually participating and communicating in the process [12], which in turn will promote their motivation to actually use the system. Hence the result of this research analysis is consistent with the previous research, holding the opinion that hands-on participation and communications of the associated users in an organization can effectively increase the chance of user satisfaction. In order to improve business process and work efficiency to create strategically competitive advantages, many corporations have started to implement ERP to assist with their daily business activities. But according to related research, as much as 90% of the IS projects could not be completed to the standard or within the timeframe the corporations had expected, particularly the introduction of an ERP system [36]. IS system implementation might change the original business processes or organizational structures of a company, and as a result it is prone to resistance of associated users which will lead to failure of the introduction. It is hence very important to ease user resistance and promote user participation in the IS system implementation. The result of this research analysis explains that personal networks in an organization could affect individuals’ decision making on whether to participate in IS system implementation. Users in the network center play an important role as a communication bridge in the organization and they possess more knowledge and power related to the system introduction. Therefore, corporations must value the users with high degree of network centrality and use their status in the personal networks to disseminate the knowledge and strengths regarding the ERP system. Other users can be influenced and will change their attitudes or behaviors towards the ERP system, which can not only improve the participation of associated users but promote the chance of system success. Besides, corporations can generalize the users who have high influence in the personal networks based on the result of social network analysis then educate or train them to become key users in the ERP implementation. This can solve the problems of other users during the system introduction as well as effectively expand the knowledge and system usage methods to other associated users, which in turn will make other users willing to accept and use the system. Therefore, this research suggests that corporations should effectively manage the personal network in an organization and use that network to enhance the degree of user participation during ERP system implementation. During the process of exploring user participation, we found that many research had indicated that user participation behavior was a crucial element in the IS system implementation [4, 30, 37, 42]. Thus this research suggests that corporations must be able to improve associated users’ attitudes and opinions of the ERP system during the implementation, and promote users’ motivation to participate in the implementation. Communications can only be done effectively through the participation of associated users and such participation can enhance the effects of the optimal use of the new system and the daily work in an organization. IS system implementation must be done through continuous communication and coordination among the project team and associated users, and only in this way can an ERP system that’s truly fit with the corporate processes be created. Moreover, the increase of aptness will enhance users’ willingness to use the system and in turn ease their resistance. If corporations want to increase the chance of system success, they must value the degree of user participation and the opinions raised by the users after their participation.
7. References


