An Empirical Study on Impacts of Computer-Mediated Communication Management on Job Satisfaction

Tsuneki Mukahi, Masaaki Nakamura and Ronald D. Notestine

School of Management, Chukyo University
101-2, Yagoto Honmachi, Showa-ku, Nagoya, Japan, 466-8666

mukahi@mecl.chukyo-u.ac.jp
mnakamura@mecl.chukyo-u.ac.jp
ronald@mecl.chukyo-u.ac.jp

Abstract

Although there are many studies which have observed the overall impacts of Computer-Mediated Communication (CMC) or Information Systems, and many empirical studies which analysed specific impacts partially, there are few studies which have focused on the overall relationship between CMC management and job satisfaction. Therefore, this study aims to clarify the overall CMC impact framework: CMC management influences job satisfaction through CMC effects and organizational structure. To reveal the impacts, data gathered from CMC system users in organizations were analysed applying path analysis. The results showed that good CMC management has a positive impact on job satisfaction either directly or indirectly through CMC effects and organizational structure change. Based on the result, we may say that those organizations managing CMC well can gain CMC effects, increase employee job satisfaction, retain important human resources, and better survive in a knowledge society.

Keywords

CMC (Computer-Mediated Communication) management, job satisfaction, CMC effects, organizational structure, path analysis

Introduction

Recently, management styles applying Computer-Mediated Communication (CMC), such as Virtual Teams or Knowledge Management, have become increasingly popular within organisations. It is generally recognised that employees with skills and know-how are vital for the implementation of Virtual Teams or Knowledge Management. Therefore, in this CMC
age, organizations must pay close attention to employee job satisfaction in order to minimize employee turnover and retain vital human resources within their organization.

How do organizations retain employees? Some researchers have clarified that job satisfaction is an important indicator in predicting employee turnover (e.g. Mak and Sockel 2001). Therefore, if organizations can understand which factors have an impact on their employees’ job satisfaction, then they will be able to take action to reduce employee turnover.

How can organizations control job satisfaction within a CMC environment? CMC management may provide a hint. Many researchers have explored Information System (IS) or CMC impacts on employees and found factors such as system quality, ease of use, and user satisfaction among others (e.g. DeLeone & McClean 1992). Among these factors, IS or CMC management (training and incentive programs, and so on) must be regarded as highly important since organizations have direct control over this. Thus, if CMC management has an impact on job satisfaction, then organizations using CMC systems have an effective tool for increasing employee job satisfaction.

However, most CMC impact studies have measured those impacts applying not to job satisfaction, but direct CMC impacts such as system use or user satisfaction with the CMC system. For that reason, this study focuses on the relationship between CMC management and job satisfaction and aims to reveal that relationship.

Background

IS impacts

In the past, many researchers have conducted studies related to IS impacts; some of these studies have focused on the impact of IS on organizational structure. DeLone and MacLean (1992) summarized past IS impact studies and constructed an IS success model. In their paper, a model was constructed with six categories: system quality, information quality, information system use, user satisfaction, individual impact and organizational impact. According to them, there are many studies which clarified the direct impacts of the technology of IS on the use of IS, user satisfaction, and the impact on individual users. They point out that only measuring IS impacts on organizational performance is not enough. As for a theoretical approach, Drucker (1988) anticipated future organizations. According to Drucker, organizations in the future would change into information based organizations and the work of employees becomes more knowledge-based and professional because of the greater volume and variety of information due to IS. Savage (1990) also predicted that organizations would change into networked organizations and employees be given more authority. Markus and Robey (1988) identified three concepts of causal agency between IS
technology and organizational change. According to their conceptualization, technology can be viewed as a force very strongly influencing the behaviour of individuals within an organisation. Based on those arguments, we may say IS technology has strong impacts on organizational structure variables such as authority, autonomy, and employees' job content.

Other studies have touched on the relationship between IS and employee job satisfaction. Job satisfaction is impacted by the organizational change which occurs with the introduction of IS. This is because job satisfaction reflects the employee's work environment. That is, it reflects the organizational environment, individual autonomy, human relationships and the like. Since all of these can be directly affected by IS, IS affects job satisfaction through organizational change. Some studies actually have surveyed IS impacts on job satisfaction. There have been many studies in the past which reported that IS simplifies the work of employees, but with negative impact on job satisfaction (e.g. Johansson and Aronsson 1984, Patrickson 1986). Other studies, however, have reported different outcomes for the effect of IS on employees' job content and job satisfaction. For example, Smith et al. (1981) conducted a survey study that compared expert employees who use IS with clerical employees who also use IS. Their result showed that expert employees tend to be more satisfied their jobs than clerical employees. The conclusion drawn is that persons who use IS in a good work environment will have a greater tendency to be satisfied with their job.

Recent advances in computer and communication technology have increased the sophistication of current IS. These more advanced IS have had a positive effect on organizational structure and the intellectual content of employee jobs, as was predicted by Drucker and by Savage. So, it may be that, in the present situation, employees using IS in a good work environment, as produced by advanced IS, will be satisfied with their jobs. In other words, organizational structure is a mediator between IS and job satisfaction.

However, it is probable that IS also directly impacts job satisfaction. Lee et al. (1995) analysed data gathered from IS users and clarified that users' IS satisfaction enhances job satisfaction. Based on their study, they proposed that managers provide more relevant IS and training programs in order to increase employee job satisfaction. It can be supposed, therefore, that current advanced and user-friendly IS has direct and positive impacts on job satisfaction. Thus, we can see from these past studies that IS influences job satisfaction not only indirectly through organizational structure, but directly as well.

In addition, IS management is one of the most important factors in considering IS impacts. DeLone and MacLean (2003) updated their IS success model, mentioned above, based on the relevant studies during the last ten years, adding a service quality dimension to the new model in consideration of the importance of IS support. This means that, if there is to be IS benefit, organizations which introduce IS have significant responsibility for providing support for IS users. In other words, the manner in which IS is implemented and managed by an organization is as important as the technology itself.
CMC Impacts

CMC systems allow employees to exchange and share important information, thus accelerating the knowledge-based content of organisations and enhancing the intellectual and skill content of the work of the users. For this reason, we can expect that such advanced CMC environments will ultimately enhance job satisfaction.

Sproul and Kiesler (1991) observed many organisations which introduced CMC systems, and summarized many CMC studies. They conceptualized CMC impacts as consisting of first-level effects and second-level effects. First-level effects impact efficiency gain or productivity gains, and second-level effects impact social and organizational structures. Additionally, they argued that employees using CMC increased their commitment to organizations. Therefore, combining their study with the IS impact studies mentioned above, we can say that CMC use influences efficiency and productivity, that this influence changes organizational structure, and, finally, that the changed structure influences employee job satisfaction.

Which are the controlling factors for CMC use? CMC management is certainly one of the most important factors. Trevino and Webster (1992) conducted an empirical study to clarify CMC impacts, and analysed data gathered from CMC users in a health care firm. They revealed that management support positively correlated with the ease of use and the attitude toward the systems. Lipnack and Stamps (1997) observed some virtual teams applying CMC and reported some examples of how CMC management accelerated diffusion of CMC. For example, in Buckman Labs, managers coordinated CMC training, allowed employees to use CMC for informal communication and exercised leadership in order to ensure the success of the virtual teams. Because of this support, no less than 1200 employees located around the world joined the virtual teams in the end. Sproul and Kiesler (1991) also argued for the importance of CMC management and, based on their observation, recommended informal communication through CMC as highly beneficial for long-term performance. Lucas (1997) summarized past CMC impact studies and he concluded that the growing management challenge of CMC was not technical but motivating individual employees.

It is also reported that CMC management is important in the relatively new field of Knowledge Management. Reading many reports of successful cases of Knowledge Management, we find that executive leadership and incentive systems for the use of CMC (such as rewards for the use of CMC and allowing informal communication using CMC) appears to have contributed greatly to CMC use and to knowledge sharing (e.g. Quinn et al. 1996, Botkin 1999).

For the reasons given above, we can set a wide framework for the impact of CMC: CMC management influences job satisfaction through CMC use, CMC effects and organizational structure. Although there are many theoretical studies which observed overall CMC or IT
impacts and many empirical studies which analysed the impacts partially, there are few studies which focused on the overall relationship between CMC management and job satisfaction, as mentioned above.

**Hypotheses**

Trevino and Webster (1992) clarified that management support for CMC enhances ease of use, and Lipnack and Stamps (1997) reported CMC management was effective in CMC diffusion. Therefore, good CMC management probably enhances CMC use and causes CMC effects. For that reason, it is hypothesized that:

**Hypothesis 1:** Good CMC management has a positive impact on CMC effects

According to Sproul and Kiesler (1991), first-level effects of CMC such as efficiency or performance bring second-level effects on social and organizational structure. As for IS impact studies, in general, advanced IS have positive impacts on organizational structure variables such as authority, autonomy or employees' jobs (Drucker 1988, Savage 1990). Furthermore job satisfaction reflects organizational structure, so it is supposed that job satisfaction is enhanced by the resultant structure change. Therefore it is hypothesized that:

**Hypothesis 2:** CMC effects have a positive impact on organizational structure

**Hypothesis 3:** Positive organizational structure change (of hypothesis 2) has a positive impact on job satisfaction.

**Hypothesis 4:** Good CMC management has a positive impact on job satisfaction through CMC effects and organizational structure change.

According to Markus and Robey's conceptualization (1988), one causal agency of IS is that designers' purpose and information processing needs determine organizational structure. The purpose and the needs are reflected in CMC management because organizations manage CMC according to their purpose and needs. Therefore it is hypothesized that:

**Hypothesis 5:** Good CMC management has a positive impact on organizational structure.

CMC management also encompasses the work environment for employees, and this environment is reflected in job satisfaction. Therefore, it is supposed that good CMC management enhances employees' job satisfaction.

**Hypothesis 6:** Good CMC management has a positive impact on employees' job satisfaction.

Figure 1 shows these hypotheses.

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Figure 1. Research hypotheses

Methods

Samples

To examine these hypotheses, a questionnaire was used to survey users of CMC systems in actual organizations (Mukahi et al. 2002). Five Japanese companies employing CMC systems cooperated in this investigation. Two of them are system development companies, another two of them are manufacturers, and the remaining one is a transport company.

Questionnaires asking about CMC systems conditions were prepared. The scales of the questions ranged from 1 to 5 (1 = disagree 2 = slightly disagree, 3 = neutral, 4 = slightly agree, 5 = agree). In the questionnaire, CMC systems were defined as an e-mail and/or electronic bulletin board based on groupware, an Intranet or the Internet.

The questionnaire was distributed to CMC system users within the five companies, and 335 were completed and returned. Unfortunately, as the questionnaire was widely distributed electronically through CMC systems at two of the companies, with responses also delivered through the same system, no meaningful response rate can be given.

The profile of the 335 useable questionnaires is shown as Table 1. When asked in the questionnaire whether CMC systems are used actively, 212 (63.3%) replied “agree” and 95 (28.4%) replied “slightly agree”. Therefore, 307 of those responding are taken to be using CMC systems actively.

<table>
<thead>
<tr>
<th>System Developing company</th>
<th>Manufacturer</th>
<th>Transport Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>Company B</td>
<td>Company C</td>
</tr>
<tr>
<td>140</td>
<td>48</td>
<td>47</td>
</tr>
<tr>
<td>Company D</td>
<td>Company E</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>42</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Profile of the Samples
Measure

To examine the hypotheses, questions were grouped into the categories CMC management, CMC effects, organizational structure and job satisfaction. In each question group, reliability was tested and those questions testing as sufficiently reliable were chosen for analysis (see Appendix).

CMC management

Questions in this group are related to what CMC managers can control. In general, according to the research background discussed above, management support (i.e. CMC training, availability of advice or help for users of the CMC system), incentive for CMC use (i.e. giving weight to the use of CMC in employee evaluations, allowing CMC use for informal communication) and management leadership are highly important variables. CMC managers have a responsibility for developing and introducing user friendly CMC systems, so ease of use is also a variable in the CMC management category. Six questions were selected for this group and the total of the responses to all six questions was defined as the measure (Cronbach’s alpha = 0.69).

CMC effects

Five questions were prepared to measure general CMC effects (i.e. activating communication, speedy approval, increase achievement, knowledge sharing, revealing individual ability). Although the amount of CMC use for the purpose of discussion and information exchange is thought of as a cause of CMC effects, in the overall view this can be understood as a result of CMC management. Chronbach’s alpha, the measure of the reliability of the CMC effects, increases from 0.76 to 0.80 when the three questions on CMC use (using CMC actively, using the CMC for discussion, using the CMC for exchanging information) are added to this group. Therefore, the CMC effects measure for this study is composed of general CMC effects and amount of CMC use effects.

Organizational structure

In this study, the measure of organizational structure is defined using those job characteristics and aspects of the work environment which are due to organizational change. We do this because it is difficult to measure organizational structure itself from the employee’s viewpoint. In the end, six of the questions prepared for this measure, and included in the questionnaire, were chosen for inclusion in the study. The questions chosen were those about organizational policies, authority, routine, autonomy, negotiation and decision making. The measure had a reliability (Cronbach's alpha) of 0.65.
Job satisfaction

Questions for the job satisfaction measure were prepared according to Multi-Motivation Theory (Murasugi and Miki 1990), which was developed in Japan based on Maslow's (Maslow 1954) and Herzberg's (Herzberg et al. 1968) work motivation theories. Multi-Motivation Theory argues that employees are motivated by four factors (i.e. working conditions, interpersonal relations, satisfaction with job content, and company policy). Therefore, eight questions based on those four factors were applied for this measure. However, one of the questions (perception of accomplishment) made the reliability lower, so the question was eliminated. In the end, seven questions were used for this measure (Cronbach's alpha = 0.82).

Analysis

To examine these hypotheses, path analysis was applied to the causal model illustrated in Figure 1, measuring the indirect effect of CMC Management on Job Satisfaction (H1 through H5) as well as the direct effect (H6). In fact, in this analysis, measures for all paths between all variables were calculated, so the causal model is the so-called perfect recursive model. Amos 4.0, produced by SPSS, is used.

Results

Figure 2 shows the result of the path analysis. According to this result, hypothesis 1, 2, 3, 5 and 6 were supported. Therefore, CMC management has an impact on job satisfaction either directly or indirectly through CMC effects and organizational structure. Thus, hypothesis 4 is also supported. We couldn't find a significant relationship for the path between CMC effects and job satisfaction (which was not hypothesized), so this study shows no evidence for an impact of CMC effects on job satisfaction. Then, after eliminating this path, path analysis was applied again and direct effects and indirect effects between each variable were calculated (Table 2). CMC management strongly affected both CMC effects and Job satisfaction, both directly and indirectly. Based on those results, we may say that CMC management is highly important for employees individually as well as for the performance of the organization.
Figure 2. Result of path analysis.

<table>
<thead>
<tr>
<th>From CMC management to:</th>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMC effects</td>
<td>0.513</td>
<td></td>
<td>0.513</td>
</tr>
<tr>
<td>Organizational structure</td>
<td>0.159</td>
<td>0.114</td>
<td>0.274</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>0.316</td>
<td>0.096</td>
<td>0.412</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From CMC effects to:</th>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational structure</td>
<td>0.223</td>
<td></td>
<td>0.223</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>0.078</td>
<td></td>
<td>0.078</td>
</tr>
</tbody>
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<thead>
<tr>
<th>From Organizational structure to:</th>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job satisfaction</td>
<td>0.351</td>
<td></td>
<td>0.351</td>
</tr>
</tbody>
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Table 2. Values of effects

Discussion

Sproul and Kiesler (1991) argued that organization must pay attention not only to the short-term effects but also to the long-term effects as capacity-building strategy. This study has clarified that if an organization manages CMC carefully, the organization can gain strong CMC effects in the short-term and increase employees’ job satisfaction in the long-term. We discuss in general terms the importance of CMC management in enabling organizations to receive benefits such as increased productivity, information and knowledge sharing, and so on. This study supports these arguments. Good CMC management, such as good education service, good incentive systems, taking strong leadership and introducing useful CMC, enhances work performance both as a direct and as a short-term effect. In addition, this result also implies that good CMC management increases job satisfaction directly and indirectly.
Therefore it can be said that if an organization introduces and manages IS carefully, it can automatically accrue both long-term and short-term benefit.

An organization which pays careful attention to CMC management is likely to possess a long-term perspective. In this study, the measures of CMC management, such as education, incentive, leadership, and so on are related to an organization's consideration not only for its utilization of CMC, but also for its employees. This means that an organization which pays attention to this sort of CMC management will naturally give consideration to its employees. Therefore, it is possible that employees use CMC because of the attentive consideration they receive from the organization, and they feel satisfied with their working conditions because of this consideration.

In today's knowledge society, job satisfaction has become even more important than before because of the need to retain capable employees and the knowledge those employees possess. Until now, CMC management has been considered as just one of many factors for work performance, albeit an important one, and organizations have been more interested in the short-term performance than in such long-term performance factors as job satisfaction.

It has been particularly true in Japan, where this data was gathered, that many employees stayed with the same organization for most or all of their working life (Abegglen 1973). This can be attributed in large measure to the traditional wage seniority system. However, the recent economic recession and upheavals have caused many of those same employers to institute wage systems based on evaluations, with a resultant increase in job mobility. It is increasingly becoming easier, and more socially acceptable, to change jobs. Since this true for all employees, including the highly valued ones, job satisfaction is becoming an increasingly important factor for Japanese organizations.

There may be another reason that job satisfaction increases knowledge. This study showed that CMC effects (CMC use, knowledge sharing and so on) produced high job satisfaction. Sproul and Kiesler (1991) argued that employees who had been committed to their organizations were not motivated to use CMC, while employees using CMC increased their commitment to organizations. Some Knowledge Management studies, however, suggest that satisfied people or committed people are motivated to contribute to their organization by using CMC. Von Krogh et al. (2000) made a thorough study of knowledge enablers and insisted that care in the organization (such as mutual trust, active empathy, access to help, lenience in judgement, etc.) was an essential prerequisite for knowledge enablers to be effective. Without being satisfied with work conditions (such as interpersonal relations, satisfaction with job content and company policy) employees couldn't possibly trust and empathize with their colleagues and organizations. Without this trust and empathy, they couldn't contribute to their organizations by sharing knowledge. Massey et al. (2002) observed one company's Knowledge Management case and they built a model for the success of Knowledge Management. In their study, they introduced the case of a particular company.
where the company's attention to the needs of the knowledge workers led to a successful implementation of a Knowledge Management system. They point out that this sort of attention to the needs of the knowledge workers is crucial to motivating these workers, which is, in turn, necessary for the successful implementation of a Knowledge Management program. Thus, it is supposed that satisfied employees or committed employees are motivated to use CMC for knowledge sharing, which may bring about a virtuous circle of CMC effects and job satisfaction. This circle should be examined in future studies.

In comparison with CMC effects and job satisfaction, organizational structure was less affected by CMC management. The questions in the group measuring organizational structure asked only about job characteristics or environment. So, this group measure was probably influenced by other factors in addition to CMC management and CMC effects. But, this measure is a mediator between job satisfaction and both CMC management and CMC effects. Therefore, if a manager were to observe organizational structure under a CMC environment, the manager could estimate the level of job satisfaction.

Conclusion

Although this study revealed a significant relationship, the study does have some limitations. First, the study model is too abstract for detailed discussion of CMC impacts. For example, it is not clear which kind of CMC management is most effective for job satisfaction. Second, the reliability of some measures is low. In particular, Cronbach's alpha for the organizational structure is 0.65. The concept of organizational structure is wide and complex, so many questions must be left for future studies. Third, the data for this study were gathered from Japanese organizations and employees. There are distinct organizational and cultural differences from Western organizations which require cross-cultural studies for elaboration.

In spite of these limitations, this study has produced some useful insights for CMC management and for future studies. Based on this study, we can say that those organizations that manage CMC well can increase productivity, increase employee job satisfaction, better retain their most valued personnel, and better survive in today's knowledge society.

References

Abegglen CJ (1973), Management and Worker: The Japanese Solution, Sophia University, Tokyo.


**Appendix**

**Questions of CMC management**

- The present CMC system is easy to use.
- The act of sending using the CMC to send information is highly regarded in my workplace.
- There is a general feeling in my workplace that it is okay to use the CMC for sending personal information.
- The computer training and education support in my workplace is substantial.
- In my workplace, there are many people around me of whom I can ask for help concerning computers.
- My supervisors exercise leadership in spreading the use of the CMC system in my workplace.

**Questions of CMC effects**

- The CMC system is being used actively in my workplace.
- Communication within my workplace has increased because of the CMC system.
• Plans and proposals are approved more quickly because of the CMC system.
• I have achieved success in my work through the use of the CMC system.
• Knowledge is being accumulated and utilized by using the CMC system.
• The CMC system has made it clear who is doing a good job.
• I often have in-depth business discussion through the CMC system.
• I often use the CMC system for contacting colleagues and sending reports at my workplace.

Questions of organizational structure

• At my workplace, policies and objectives are always clear.
• I am given enough personal authority at my workplace.
• My work is often repetitive or routine.
• I am often able to decide myself how my job should be accomplished.
• At my workplace, there is a great deal of negotiation and consensus-building before a decision is made.
• I often make the final decision at my workplace.

Questions of job satisfaction

• My workplace is a well-equipped and pleasant place to work.
• My workplace is well-equipped with systems and equipment for accomplishing work.
• There is no tension at my workplace, and the workers there get along well with one another.
• There is good teamwork at my workplace.
• I can give full play to my ability in my present work.
• The company policy matches my interests and expectations.
• I can think of the future of the company as my own.