African Journal of Business Management Vol. 5(14), pp. 5833-5844, 18 July, 2011
Available online at http://www.academicjournals.org/AJBM
DOI: 10.5897/AJBM10.1367
ISSN 1993-8233 ©2011 Academic Journals

*Full Length Research Paper*

# Internet related network coordinating tools and their uses amongst different classifications of business employees

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Accepted 29 April, 2011

**Computer networks play a significant role in business management nowadays. This is especially true for Taiwanese business, which has made a considerable contribution to the global information products. Most enterprises in Taiwan rely heavily on various networking tools to coordinate the business procedures. This research adopted the viewpoints of the technology acceptance model and information richness theory: The users would experience usefulness and ease of use during the interaction process because of the abundant networking information. Due to their high network-utilization tendency, Taiwanese business employees were selected as the study sample. The purpose of this study was to categorize the types of users with different job content using networking tools as coordination media. The empirical study found four types of users: the followers and imitators, the self-confident, the technophiles, and the mediocre and conservatives. Moreover, significant differences were found across the four groups in terms of their interactions with, and cognition of, networking tools. Last, the study provided some suggestions for managerial practices according to the characteristics of these four types of users.**

**Key words:** Network, interaction, cognition, Taiwanese business.

## INTRODUCTION

According to information richness theory (Daft and Lengel, 1984), to achieve better communication performance, one should use rich media content for highly complicated tasks but poorer media content for less complicated tasks. As a result, corporations would intensely apply networking information to all types of interaction related to business procedures (Hashim et al., 2010). Coordination media, on the other hand, relies heavily on networking tools. Information exchange is made possible through various types of network connections; for example, web page communication, instant messengers, video conferencing, fax, voice messengers, text, short multi-media messages, and so on. Forman and Zahorjan (1994) indicate those networking access devices, especially the portable ones, are restricted by the immobility of the hardware, otherwise, the dependency on network in everyday lives and works would be much more significant. Hoffman and Novak (1996) consider interactions between humans and machines as much more significant than those between machines only or humans only (Alam, 2009). This is because carrying out effective dual directional comment exchanges or communication coordination is easier for a human-machine interaction. To share a collaborative performance for cross-departmental coordination, Eng (2006) notes it is necessary to establish consistent rules to promote a sense of trust between both parties. Ching (1996) considers using the information network to facilitate communication and coordination can overcome some restrictions of the physical environment. Moreover, with the mobility offered by a wireless network, the information network now offers an instantaneous decision-making coordination function (Huang and Liu, 2004). Neil (1997) and Prakash (1996) also note, besides accelerating the communication speed compared to conventional telephones, computer networks also provide more interactions than conventional face-to-face of communication. Especially under circumstances where geographic or

time-zone restrictions exist, computer network systems can reduce the cost of communication, bettering conventional communication approaches (Hagel and Singer, 1999). The results from Shih et al. (2005) also suggest electronic mail (e-mail) is the most commonly chosen coordination tool by most business corporations. Computer network has modified the content of jobs as well as the approaches from every dimension (DeSanctis and Jackson, 1994). Further, a new type of job has been formed, which mainly relies on computer network interactions. As computer networks expand, the convenience and instantaneity offered by the network have been well utilized by corporations in various business tasks; whether the task is between the individuals, the departments, or the companies. A high level of network interaction requires stable platform performance. With enhanced functions of various mobile computing devices and booming technology development in assorted wireless networks, computer network services are now available to the users at any location and time(Pan and Lee, 2003; Wahab, 2011). For corporations, computer networks have solved some problems related to special as well as time barriers. In a sense, whether or not the networking tools that offer highly efficient interactions and highly effective cognition are well utilized by a corporation significantly affects the work performance and satisfaction of the corporation. According to the technology acceptance model from Davis (1989), rich networking information allows the users to experience usefulness and ease of use during the interaction. Therefore, how to enhance the efficacy of the corporation-network interaction, adopt the best managerial approach, and adapt and adjust to the networking tools dynamically to improve a corporation's competitiveness are topics every business has to understand. Various studies have examined the impacts of information technology on corporate management (Situ et al., 1994; Hodson and Englander, 1999; Shih et al., 2005), but there are few studies analyzing circumstances where networking tools are used as coordination media by users of different job content. As a result, Taiwanese business was chosen as the target of the study to examine the interaction behaviors and cognitive attitudes of users relying on networking tools as coordination media. Moreover, suggestions for managerial practices were provided at the end of the study.

## Networking tools as coordination media

Departmental collaboration is an important aspect of corporate management. A corporation in the developmental phase usually has a significant need for coordination efficacy, and as a result, the dependency on work specialization is often exceedingly high (Alam et al., 2010). Nonetheless, it is no longer easy for the conventional coordination approach to fit into this scenario. Fan (1999) found significant cognitive differences between the marketing and the manufacturing departments on issues related to distribution and production quantities. Due to cognitive discrepancies between two departments, collisions frequently occur during the interaction process. To solve this case, a coordination mechanism is definitely required to reduce their conflicts and improve the performance of the corporation. For corporations, establishing a network coordination activity to improve the satisfaction level of the business interaction is crucial for successful business performance. In Hsiech and Hsu (2004), the authors analyzed the organization and the system of the network environment and found network information interaction has already become an indispensable part of corporate communication. Davidow and Malone (1992) also considered treating information as the focus has been the trend for organizational renovation. Fundamentally, to stand out from a competitive market, different corporate entities have to rely on a network platform to collaborate with one another, connect and integrate the internal as well as the external corporate information, share the value chain, and realize complement of competitive resources (Alam et al., 2010). Chen et al. (2006) suggested a corporation could enhance the communication and interactions among its collaborators by fully utilizing the network system. Applegate and Coagan (1995) and Applegate (1995) explained using network technology could add some value to a cross-organizational business procedure and promote the development of business transformation (Tapscott, 1997; Grenier and Metes, 1995; Leifer, 1988). Moreover, Tang et al. (2006) indicated various influences from network technology, such as overcoming those time and space restrictions, providing channels for communication and coordination, and improving information quality. Seemingly, network technology acts like a base that facilitates the realization of electronicized corporation (Tang and Chen, 2002). Nonetheless, in some cases where the organizational structure is not clearly defined, there is frequently a blurry interface among the departments as well as a multi-dimensional cross-organizational job. As a result, more connections to networking tools are required for the external corporate information to be correctly and rapidly delivered to the intended location. There is a flourishing development of the network environment. Corporations should make good use of the networking tools on communication and coordination because it profoundly affects job performance and satisfaction (Cockburn and Wilson, 1996).

## Technology acceptance model

According to the technology acceptance model (Davis, 1989), when users experience usefulness and ease of use from a new technology, they will be encouraged to keep on trying or to accept this new technology. The term "networking tools" in this study refers to the networking

software and hardware used to carry out communications without the communicators being face-to-face, such as casually meeting in business (Chuang et al., 2011). When there is a continuous innovation in networking tools and the users recognize the beneficial features, that is, usefulness and ease of use, then those networking tools can accelerate and facilitate business conduction as well as enhance the performance related to coordination. Some basic attributes of networking tools include the networking environment, the system platform, wireless or not, communication software, networking speed, and interface-related factors. These attributes have a crucial impact on determining whether the users would adopt networking tools as coordination media. The telephone and the Internet are both major communication tools, which are now converging with the advancement of communication technology. These tools' service attributes are very similar, such as the price, added value services, and communication quality (limi, 2005; Kim et al., 2004). There are two major types of network platforms available on the market: the Internet and the telecommunication networks (Chuang et al., 2011). The term Internet is mainly used for the communication process that relies on a computer network platform. The term telecommunication network, on the other hand, refers to mobile phone services or mobile personal digital assistants (PDA), which provide web browsing and phone services. There are also other factors related to the type of software and the application programs provided by hardware development dealers, such as speed, content, capacity, and institution, which may affect a corporation in selecting the networking tools.

**Information richness theory**

In addition, the job content type of the users is another key factor influencing the selection of networking tools. According to information richness theory, rich information content can provide practical aids to areas such as communication, coordination, collaboration, and information sharing. This is especially true for those jobs with a highly complicated content. In other words, when a user's working environment is highly complicated, then the user would require support from content offering more information. Alternatively, if the working environment is less complicated, then less information should be given to improve work performance. Many discussions on job content in the past literature are based on Job Content Questionnaire ver1.5 (JCQ) (Hurrell et al., 1998) to assess the psychological working environment. The questionnaire has mostly been used to evaluate the quality of job content or the level of physical or psychological stress by assuming a high level of psychological demand and a relatively lower level of stress at work (Karasek and Theorell, 1990; Schnall et al., 1994; Fenster et al., 1995; Cheng et al., 2000; Jiang and Ma, 2003). Nevertheless, the questionnaire is also an effective assessment tool for distinguishing various collaborative phenomena among the employees. For example, the results from Chen et al. (2003) suggest five main categories: job control, psychological demands, supervisor support, coworker support, and job satisfaction. As a result, this research presents the following hypothesis:

$H_1$: Depending on the type of the job content, there are significant differences when using networking tools as coordination media.

**Interaction by networking tools**

Past literature on corporate interaction mostly focused on departmental interactions (Fang, 1999; Crittenden, 1992; Ruekert and Walker, 1987). There are also reports on personal interactions. Meng (2002) examined network interactions from a communication perspective and found network interactions play a significant role in interpersonal communications, individual development, and social progress. Chen (2002) also indicated that Internet is the new spiritual communication approach that differs from the conventional mass media. Specifically, it differs from conventional face-to-face interaction approach which is influenced by social authority. Interaction behavior originates from the user's inner motivation. Interaction behavior via the Internet is more natural and removes the hierarchy of authority. Moreover, compared to the mass media, Internet interaction is more localized and globalized. Generally, a highly interactive network requires a steady power from the information platform. Using enhanced functions of assorted mobile computing devices and a flourishing wireless Internet technology, Internet services are available at any time and at any location. A rich information exchange can be carried out by connections with a multi-dimensional computer network. This is the reason corporations have to work on maintaining a stable network communication platform to achieve a good operation. The network acts like a vector that the users can freely interact with at relatively little cost and a high level of privacy (Li, 2005). Further, separating binary network characteristics into two dimensions—Internet platform and Internet information—Tang et al. (2006) examined managerial activity design for organizations based on these two dimensions using the interaction achieved through the Internet platform as the study variable. They point out organization members participating in coordination activities should frequently and extensively use the Internet platform connection system. For both sides, because of the goal of the organization, they should keep in touch with each other using the Internet platform for assorted value activities. Chang (2002) indicates several uncontrollable confounding factors: a limited number of computers with Internet access,

time restriction, and a reshuffle of the Internet management personnel. For Internet users in general, their level of satisfaction significantly depends on the following factors related to the Internet information: richness, instantaneous, interactions, and convenience. In other words, a higher interaction level is determined by a greater amount of exchanges in forms of message posting frequency, e-mail quantity, click-through rate of the web page, and computer fax exchanges. It is also true when offering different types of Internet connections, a greater number of information exchange interface also suggests a higher level of interaction. As a result, networking tool interaction behavior is defined as: Exchanging messages among members of an organization, people rely on networking tools such as web page posting, e-mails, computer fax, and short messages to complete the task. For problems encountered during the message exchange process, relevant data were collected and integrated for making decisions such as “cannot be adopted”, “references only”, “taken into consideration”, “can be frequently used”, or “definitely adopted”. As a result, this study proposes the following hypothesis:

$H_2$: Depending on the types of users taking networking tools as coordination media, there are significant differences in their interaction behaviors.

## Cognition of networking tools

Cognition is an integrated habitual characteristic expressed by an individual in forms of explicit behaviors following some mental process such as perception, thinking, memory, and problem-solving when the individual has experienced a specific context. It is an individual-specific and long-lasting memory that is stable and consistent. Rao (1994) considers the basic human cognition process is a sensory effect generated by external stimulation. The stimulated sensory organ then went through selective attention and recognition to generate perception and finally move to memory. When an individual receives a message, depending on the environment, the mood, and social as well as physiological variations, various types of cognition can be generated (Dunn and Dunn, 1978). Lin (1988) considers cognition an abstract concept because during the interaction process between two individuals, there are inconsistent viewpoints between the two individual regarding people, events, and matters of the external world. In other words, cognition can be further considered an expression of an individual’s characteristics (Hsu, 2000). There are many uncertainties and cognitive discrepancies in the Internet environment. Using personal interview surveys and the Q-sort method, Tang (2008) chose college students as the example to examine cognition types of users who took network communication tools as coordination media. The author found the interviewed college students’ cognition on Internet coordinating tools could be categorized into five types: emotional dependent, trend followers, practical application, economical orientation, and special functions. To improve and enhance the quality and satisfaction level of the communication tools, the business should design network communication tools according to the cognition types of the Internet coordination tools. There are many studies related to cognition (Tai, 1994; Zhou and Yang, 2003). For networking tools, the effects of cognition on the development of the coordination attitude and on the post-event behaviors of an individual can provide some valuable information. In fact, discrepancy exists among researchers regarding the concept and analytical levels of cognition types. Some suggest different habitual characteristics are generated by psychological processes, that is, perception, thinking, memory, and problem solving, that an individual experiences in a specific context and are expressed in forms of explicit behaviors. Others suggest, as an individual is stimulated externally, this stimulation, depending on the individual’s habits, awareness, and preferences, is reflected through the explicit behaviors. For the process of Internet use, the main purpose is information delivery. Through the process of information exchange, different opinions are generated depending on the preferences, habits, context at that specific moment, and various combinations of these factors of the individual who is at the receiving end of this information exchange. In other words, some feelings or impressions generated from the consumption of the information content can indirectly cause different viewpoints on the Internet through the decision-making process during consumption. As a result, networking tool cognitive attitude was defined as: For organization members, they acquire official as well as unofficial messages through interactions. Therefore, during the business coordination process, different reactions and attitudes are generated toward Internet information, such as “communication convenience”, “uniqueness”, “job requirements”, “trend following”, and “peer influences”, depending on the user capacity, awareness, preferences, problem-solving skills and various mental processes. As a result, this study proposes the following hypothesis:

$H_3$: Depending on the type of the user taking networking tools as coordination media, there are significant differences in their cognitive attitudes.

## METHODOLOGY

The initial draft of the survey questionnaire was designed based on information acquired from past research. The content was then revised by instructors with PhDs. in areas related to management. The questionnaire was pre-tested twice on 12 graduate students at the school and 7 full-time instructors, respectively, and their alpha reliability were both greater than 0.8. There were three sections to the questionnaire. Items in the first section were for measuring the attributes, feelings, and attitudes from using networking tools. The included attributes were the network connection, operating system, connection framework, communication software, memory capacity,

and network interface. As for the attitudes, the focuses were on the job content of the communication using networking tools, the experiences of "communication convenience", "uniqueness", "job requirements", "trend following", and "peer influences". In addition, various decision-making attitudes derived from network information such as "cannot be adopted", "references only", "taken into consideration", "can be frequently used", or "definitely adopted" were included. The second section focused on measuring the job content type of the interviewees (Hurrell et al., 1998; Cheng et al., 2003). Question items were adopted from JCQ. The reason for choosing JCQ for this part of the questionnaire was many studies on the psychological aspect of the working environment were JCQ-based. The third section of the questionnaire was for collecting the interviewees' basic personal information (that is, demographic variables) including gender, age, education, years of work experience, department, job title, and rank. In the questionnaire, the ranks of interviewees in their company were classified into four levels: high-level managers, medium-level managers, basic-level managers, and non-managerial positions. The study also proposes the following hypothesis:

$H_4$: Depending on the type of users taking networking tools as coordination media, there are significant differences in the demographic variables.

According to Babbie (1998), stratified random sampling is a more systematic approach than random sampling, and also, this approach can reduce errors during the sampling procedure. The study samples were companies registered in the Travel Agent Association of R.O.C., Taiwan, and they were randomly selected according to the stratified ratio. There were 2872 members in Taiwan at July 31, 2008, and they were randomly sampled according to the stratified ratio. All the information and questionnaires from the study samples were collected by mail. A total of 589 questionnaires were mailed the first time, but the return rate after four weeks and after 1 month was poor. Questionnaire follow-up was conducted through telephone calls, and questionnaires were mailed again to samples that had not participated in the first round. Questionnaires were mailed three times. At the end, 321 questionnaires were returned with a return rate of 27.25%. There were 98 invalid questionnaires, such as having exactly the same answer for all the questions, having answers filled in a zigzag style, having missing answers, or having extra answers. These were eliminated by the questionnaire coding personnel. In the end, there were 223 valid questionnaires with a return rate of 18.93%. Basic information were collected by the survey questionnaire approach and analyzed by SPSS statistic software for (1) descriptive statistics, (2) factor analysis, (3) cluster analysis, (4) Chi-Square test, (5) one-way analysis of variance ( one-way ANOVA), and (6) correlation analysis.

## RESULTS AND DISCUSSION

### Job content type analysis

The result from the Barlett's test of sphericity suggested the existence of common factors in the correlation matrix of the population because the approximation of Chi-Square was 2487.109 (P = 0.000). The value of KMO (Kaiser-Meyer-Olkin) was 0.714, indicating the random sampling effect of this study was significant. It was also suggested the study results could be used for factor analysis because a KMO value greater than 0.6 indicates many common factors among the variables. For factor analysis, Kaiser (1974) noted a KMO greater than 0.7 has a medium number of factors and is acceptable, whereas a KMO greater than 0.9 is excellent. Step 2 reduced the number of variables to extract a fewer numbers of factors to make the analysis easier. Maximum likelihood is the best. It can also reduce the variance within the factor to the minimum level and therefore, obtain the factor construction for the job content type. Varimas Orthogonal Rotation was conducted to obtain the factor loading matrix to facilitate explaining the factors. According to Joseph et al. (1987), an absolute value of factor loading greater than 0.3 is considered significant; an absolute value greater than 0.4 is considered more significant; and an absolute value greater than 0.5 is considered very significant. Zaltaman and Burger (1975) also suggested for a suitable method—sampling by extracting the Eigenvalue greater than 1, the loading of each variable is greater than 0.3, and the accumulated explained variance is greater than 40%. Using the principle axis factoring method and the Varimas Orthogonal Rotation to conduct the analysis, the factor loading after the rotation has to be greater than 0.3. For the selection criteria, researchers can also establish their own criteria according to the real condition or their experiences. Integrating the comments from the abovementioned researchers, this study selected the variables where the absolute value of factor loading was greater than 0.35 as the reference for factor labeling. From the rotation analysis, six factors were found after the rotation using eigenvalues greater than 1. Because there were too many factors, the eigenvalues obtained after the rotation were listed in order: 3.080, 2.467, 2.213, 2.137, 2.012, and 1.809. Only six eigenvalues after the rotation were greater than 1 because the seventh eigenvalue was 0.714. In addition, the factor's cumulated explained variance was 50.812%. As a result, no question item was eliminated in the later analysis. Last, according to Guielford (1965) and Nunnally (1978), a Cronbach's α greater than 0.7 suggests good reliability; a Cronbach's between 0.7 and 0.35 suggests acceptable reliability; a Cronbach's alpha less than 0.35 suggests unacceptable reliability. George and Mallery (2003) also provided some evaluation criteria. This research used the abovementioned reliability as the evaluation criteria for measuring the job content type. Moreover, because all the Cronbach's α of the factors were greater than 0.7, the reliability was acceptable. As a result, from the factor analysis of the job content type scale, this study took eigenvalues greater than 1 and therefore obtained six factors for labeling the job content type. From sorting the eigenvalues, the explained variances, all the question items in the factor analysis, the factor structures, and the factor loadings, this classification was found to be similar to the finding of Cheng et al. (2003). As shown in Table 1, the factors were labeled as autonomous skills (AS), job satisfaction (JS), inner demands (ID), peer support (PS), hierarchical decision-making (HD), and superior

**Table 1.** The factorial structure distribution for the job content type.

| Factor naming | Alpha | Eigenvalue | Explained variance% |
|---|---|---|---|
| autonomous skills (AS) | 0.851 | 3.080 | 11.4 |
| job satisfaction (JS) | 0.803 | 2.467 | 9.1 |
| inner demands (ID) | 0.721 | 2.213 | 8.2 |
| peer support (PS) | 0.779 | 2.137 | 7.9 |
| hierarchical decision-making (HD) | 0.745 | 2.012 | 7.5 |
| superior authorization (SA) | 0.732 | 1.809 | 6.7 |

authorization (SA). The total variance was 50.812%, suggesting it had reached a significant level and could be used for later analysis.

## Cluster analysis

According to the cluster principle, step 1 used the well-known Ward's method from the Hierarchical methods to obtain a suitable number for the cluster utilizing the factors of job content type as the variables. Then in step 2, the K-mean method, a cluster method that is non-phasic, was used for cluster analysis. A most important step for hierarchical method analysis is to determine the cluster number; nonetheless, there are few objective literatures or rules for ensuring the appropriateness of this number. During a common continuous analysis process, group distance is often used as the indicator. That is, when the distance exceeds a certain cut-off point or the distance changes significantly during the process of continuous analysis, then one should stop increasing the cluster number immediately. Another commonly used method is to use the within-group variance as the indicator for cases having many clusters. If reducing the cluster number and carrying out a merge can cause a significant trend of increase of the within-group variance, then the merge should be given up and the previous cluster number should be used as the standard. As for the aspect of the number of each cluster's members, according to Ward's method, the number of members within each single cluster should be more than 20. From the abovementioned, this study adopted the within-group variance as the indicator. The within-group variance for each cluster number was calculated first. The cluster number showed a significant percentage increase when the cluster number was merged from five to four. As a result, this study selected four as the cluster number for Ward's method.

Next, the K-mean method was used for cluster analysis and comparison. The results from SPSS suggested the grouping result from Ward's method slightly differed from that by the K-mean method. Therefore, the grouping result from the K-means method was treated as a grouping variable for the discriminant analysis of the six variables obtained from the Maximum Likelihood method. The purpose was to assess the precision of grouping by the discriminant function. The higher the precision, the better the grouping results were. From the analysis, the Wilks' Lambda was 0.57, Chi-Square was 122.098, the degree of freedom was 4, and the significant α was 0.000 (< 0.05). This finding suggested good discrimination power. After confirming the cluster number, the following step was to label each cluster, as shown in Table 2:

1. Cluster A: The Followers and imitators (FI): Networking tool users from this cluster emphasized hierarchical decision-making (0.44), followed by autonomous skills (0.42), and peer support (0.32). They put less emphasis on inner demands (-1.35), job satisfaction (-0.48), and superior authorization (-0.26). In other words, users in this cluster did not actively become the first ones to use the networking tools. Rather, they got involved as spectators by observing the user experiences of their colleagues. When they experienced positive feedback, they would approve the tools immediately and fully adopt the tools. As a result, this cluster was referred to as the followers and imitators (FI).
2. Cluster B: The Self-confident (SC): Networking tool users in this cluster put more emphasis on peer support (0.58), followed by inner demands (0.34), and job satisfaction (0.27). What they emphasized less were autonomous skills (-0.25), hierarchical decision-making (-1.38), and superior authorization (-0.09). In other words, users in this cluster possessed more self-awareness at work, and were usually quite confident in terms of self-performance, especially for applying networking tools to their everyday work. They also considered ideas from their colleagues, but they did not approve of overly restrictive managerial strategies. Therefore, this cluster was referred to as self-confident (SC).
3. Cluster C: The Technophiles (TP): Networking tool users in this cluster emphasized job satisfaction (0.67), followed by hierarchical decision-making (0.45), inner demands (0.23), and superior authorization (0.15). They put less emphasis on autonomous skills (-0.37) and peer support (-0.21). In other words, users in this cluster preferred novel technology tools and were quite capable of solving the problems by themselves. Support from peers, however, was limited or treated as a reference only. As a result, this cluster was referred to as the technophiles (TP).
4. Cluster D: T he Mediocre and conservatives (MC):

**Table 2.** ANOVA (analysis of variance) for different clusters.

| Cluster → / Job content type↓ | FI | SC | TP | MC | ANOVA / Scheffe F | p |
|---|---|---|---|---|---|---|
| 1. AS | 0.4238[1] | -0.2532[3] | -0.3704 | 0.0058[2] | 13.912 | 0.000* |
| | | | | | FI > SC, p=.003 | |
| | | | | | FI > TP, p=.000 | |
| | | | | | MC > TP, p=.046 | |
| 2. JS | -0.4872[3] | 0.2737[2] | 0.6656[1] | -0.5436 | 42.983 | 0.000* |
| | | | | | SC > FI, p=.000 | |
| | | | | | TP > FI, p=.000 | |
| | | | | | TP > SC, p=.038 | |
| | | | | | SC > MC, p=.001 | |
| | | | | | TP > MC, p=.000 | |
| 3. ID | -1.3480 | 0.3413[1] | 0.2325[2] | -0.5709[3] | 8.138 | 0.000* |
| | | | | | SC > MC, p=.000 | |
| | | | | | TP > MC, p=.001 | |
| 4. PS | 0.3215[2] | 0.5761[1] | -0.2105[3] | -1.0510 | 32.269 | 0.000* |
| | | | | | FI > TP, p=.025 | |
| | | | | | FI > MC, p=.000 | |
| | | | | | SC > TP, p=.004 | |
| | | | | | SC > MC, p=.000 | |
| | | | | | TP > MC, p=.000 | |
| 5. HD | 0.4391[2] | -1.3862 | 0.4543[1] | -0.6350[3] | 106.075 | 0.000* |
| | | | | | FI > SC, p=.000 | |
| | | | | | FI > MC, p=.000 | |
| | | | | | TP > SC, p=.000 | |
| | | | | | MC > SC, p=.000 | |
| | | | | | TP > MC, p=.000 | |
| 6. SA | -0.2664 | -0.0894[3] | 0.1518[2] | 0.4732[1] | 7.388 | 0.000* |
| | | | | | TP > FI, p=.002 | |
| | | | | | MC > FI, p=.004 | |

[1]It was the highest average factor score from the cross-sectional comparison; [2] It was the second highest average factor score from the cross-sectional comparison; the shaded sections in the table indicated significance from the single factor ANOVA ($p < 0.05$).
FI: Followers and imitators; SC: Self-confident; TP: Technophiles; MC: Mediocre and conservatives); Autonomous skills (AS), job satisfaction (JS), inner demands (ID), peer support (PS), hierarchical decision-making (HD), and superior authorization (SA)

Networking tool users in this cluster emphasized superior authorization (0.47) and autonomous skills (0.01). They put less emphasis on job satisfaction (-0.54), inner demands (-0.57), peer support (-1.05), and hierarchical decision-making (-0.63). In other words, users in this cluster were mostly spectators: they did what others did and they were highly passive. They acted only because the boss had asked them to. They were neither interested in the novel technology nor the networking tools. They had weak motivation. This cluster was therefore referred to as the mediocre and conservatives (MC).

## Hypotheses analyses

### *Hypothesis 1*

For the ANOVA, four clusters were treated as independent variables and six factors were treated as dependent variables. With alpha = 0.05, Hypothesis 1 cannot be rejected. In other words, when using networking tools, the interviewees demonstrated significant differences in terms of different types of job content. According to this variation, the post-hoc Sheffe test was conducted.

1) Autonomous skills (AS): For the average factor number in the cluster, the followers and imitators were the highest; the mediocre and conservatives were the second highest; and the self-confident was the third highest. For the significant level, there were significant differences across the clusters. The results from the post-hoc Sheffe test revealed the follower and imitators > the self-confident ($p = 0.03$); the followers and imitators > the technophiles ($p = 0.000$); and the mediocre and conservatives > the technophiles ($p = 0.046$).
2) Job satisfaction (JS): For the average factor number in the cluster, the technophiles were the highest; the self-confident was the second highest, and the followers and imitators were the third highest. For the significant level, there were significant differences across the clusters. The results from the post-hoc Sheffe test revealed the self-confident > the followers and imitators and the technophiles > the followers and imitators ($p = 0.000$); the technophiles > the self-confident ($p = 0.038$); the self-confident > the mediocre and conservatives ($p = 0.001$); and the technophiles > the mediocre and conservatives (($p = 0.000$).
3) Inner demands (ID): For the average factor number in the cluster, the self-confident was the highest, the technophiles were the second highest, and the mediocre and conservatives were the third highest. For the significant level, there were significant differences across the clusters. The results from the post-hoc Sheffe test revealed the self-confident > the mediocre and conservatives ($p = 0.000$) and the technophiles > the mediocre and conservatives ($p = 0.001$).
4) Peer support (PS): For the average factor number in the cluster, the self-confident was the highest, the followers and imitators were the second highest, and the technophiles were the third highest. For the significant level, there were significant differences across the clusters. The results from the post-hoc Sheffe test revealed the followers and imitators > the technophiles ($p = 0.025$), the followers and imitators > the mediocre and conservatives ($p = 0.000$), the self-confident > the technophiles ($p = 0.004$), the self-confident > the mediocre and conservatives ($p = 0.000$), and the technophiles > the mediocre and conservatives ($p = 0.000$).
5) Hierarchical decision-making (HD): For the average factor number in the cluster, the technophiles were the highest, the followers and imitators were the second highest, and the mediocre and conservatives were the third highest. For the significant level, there were significant differences across the clusters. The results from the post-hoc Sheffe test revealed the followers and imitators > the self-confident, the followers and imitators > the mediocre and conservatives, the technophiles > the self-confident, the mediocre and conservatives > the self-confident, and the technophiles > the mediocre and conservatives (all the above had $p = 0.000$).
6) Superior authorization (SA): For the average factor number in the cluster, the mediocre and conservatives were the highest, the technophiles were the second highest, and the self-confident was the third highest. For the significant level, there were significant differences across the clusters. The results from the post-hoc Sheffe test revealed the technophiles > the followers and imitators ($p = 0.002$) and the mediocre and conservatives > the followers and imitators ($p = 0.004$).

### *Hypothesis 2*

The results from Pearson $\alpha^2$ test (significant at $\alpha = 0.05$, $df = 18$, Chi-Square = 29.109, and $p = 0.047 < 0.05$) revealed Hypothesis 2 cannot be rejected. In other words, networking tool users of different clusters demonstrated significantly different interactive behavior. As shown in Table 3, most of the interviewees in the sample considered interactive behavior as “communication conveniences” (132 / 223 = 60%). There were also some interviewees considering interactive behavior as “job requirements”. The fewest interviewees considered interaction behavior as “trend followers” (8 / 223 = 3.5%).

### *Hypothesis 3*

The results from Pearson $\alpha^2$ test (significant at $\alpha = 0.05$, $df = 18$, Chi-Square = 30.886, and $p = 0.030 < 0.05$) revealed Hypothesis 3 cannot be rejected. In other words, networking tool users of different clusters demonstrated significantly different cognitive attitudes. As shown in Table 3, “can be frequently used” was most commonly

**Table 3.** Interaction behavior and cognitive attitude (including the number of counts in each cluster).

| Variable | | FL | SC | TP | MC |
|---|---|---|---|---|---|
| | Communication convenience | 44 | 24 | 44 | 20 |
| | Uniqueness | 8 | 3 | 3 | 8 |
| | Job requirements | 9 | 8 | 15 | 4 |
| Interaction behavior | Trend followers | 1 | 1 | 3 | 3 |
| | Peer influences | 10 | 2l | 3 | 2 |
| | Other reasons | 1 | 1 | 3 | 1 |
| | No experience | 0 | 2 | 0 | 0 |
| | Cannot be adopted | 3 | 3 | 0 | 2 |
| | References only | 11 | 4 | 18 | 8 |
| | Taken into consideration | 21 | 9 | 22 | 9 |
| Cognition attitude | Can be frequently used | 21 | 16 | 26 | 13 |
| | Definitely adopted | 10 | 8 | 4 | 6 |
| | Other reasons | 7 | 0 | 1 | 0 |
| | No experience | 0 | 1 | 0 | 0 |

(FI: Followers and imitators; SC: Self-confident; TP: Technophiles; MC: Mediocre and conservatives)

chosen cognitive attitude by the interviewees (76 / 223 = 34%), the next common cognitive attitude was “taken into consideration.” The fewest interviewees chose “cannot be adopted” (8/223 = 4%).

### *Hypothesis 4*

Pearson $\alpha^2$ was used to examine differences across the cluster in terms of demographic variables (including gender, age, education, years of work experiences, department, job title and rank). It was found at the $\alpha = 0.05$ significant level, first, there was no significant difference between the genders of the employees using networking tools (df = 3, Chi-Square = 0.359, p = 0.949 > 0.05, female = 73, male = 150); second, there was no significant difference across the age groups of the employees using the networking tools (df = 12, Chi-square = 12.176, p = 0.432 > 0.05, 27% of the networking users were between 30-49 y.o., indicating the age distribution of the networking users in this study was mostly at younger ages; third, there were significant differences among employees of different education levels in using networking tools (df = 12, Chi-Square = 27.051, p = 0.008 < 0.05, most of the networking tool users had a college degree (colleges of technology; 56/223 = 25%), the fewest users had education higher than graduate school (56/223 = 25%)}; fourth, there was no significant difference among employees of different years of work experience (df = 15, Chi-Square = 17.468, p = 0.292 > 0.05, most of the networking tool users had less than 10 years of work experience, 147/223 = 66%, and the fewest networking users had more than 20 years of work experience, 13/233 = 6%); fifth, there was no significant differences among employees of different departments using networking tools (df = 21, Chi-Square = 21.300, p = 0.441 > 0.05, most of the networking tool users were in sales-related departments , 67/223 = 30%, the next highest was in human resource- and finance-related departments); and last, there was no significant difference among employees of different job title or rank using networking tools (df = 12, Chi-Square = 21.300, p = 0.441 > 0.05, most of the networking tool users were in non-managerial positions, 121/223 = 54%, and the next highest were in basic-level managerial positions. Fewer networking tool users were medium- and high-level managers, 42/223 = 19%).

## DISCUSSION

It was found, depending on the job content type, differences existed in using networking tools as coordination media. The study results revealed among different networking using clusters, there was a significant difference in the user’s interaction behavior and cognitive attitude. In addition, in terms of demographic variables, there was a significant variation in the education level among different networking using clusters, but there was no significant variation in gender, age, years of work experience, department, and job title and rank. When using the networking tools, the higher the interaction level, the higher the tendency, in terms of cognition, to use networking tools for coordination jobs. If the within-group variation is excluded, the interviewees all positively used networking tools for business purposes. It was therefore revealed, in the future, network use will be more intense and the dependency on network equipments will

be greater. According to the individual factors of each cluster, practical suggestions are provided as follows:

1) The followers and imitators (FI): This type of user is more aware of the services provided by networking tools and whether the tools could become a part of their work and life. Besides learning how to use new technology from colleagues who possess better knowledge related to the information network, this type of user also heavily relies on the tools to communicate with colleagues, and they often spend lots of time wandering in the cyber world. Undoubtedly, a company should provide software to the employees, but at the same time, the company should also put some limits on employees in using the Internet for non-work related affairs. As a result, this study suggests:

First, learn about Internet use restriction from other companies in the same business. Second, properly expand the computer network and invest in the facilities. Last, invest in smaller networking tool software.

2) The self-confident (SF): Users in this cluster believe networking tools can make the job interesting. It is important, they consider, for networking developers to consider user's convenience and flexibility. They are not very sensitive to the special functions provided by networking tools, but they highlight their individualized network image. They expect networking tools to bring convenience to them and give them a better quality of life. For business owners, they should make good use of the user's self-confidence by establishing a list of positive or negative networking conducts for the business operating environment. That is, which Internet behavior should be promoted and which behaviors should be banned. For example, could instant messenger be used for communicating with clients? Could instant messenger be used for sending sensitive information within the company? Because users of this type have a stronger professional esteem, one should avoid, under inappropriate circumstances, publically stopping those behaviors that have not yet been officially listed as negative conducts. On the other hand, those positive conducts that have not yet been officially listed should still be praised publically. As a result, this study suggests:

i. First, make a list of Internet conducts that are considered negative.
ii. Second, clarify network coordination and communication entities.
iii. Last, enhance the information security management policy.

3) The technophiles (TP): The users in this group enjoy novel technology in their everyday lives; as a result, they are quite capable of keeping themselves updated on the new trends in technology. Because of their interests in technology, they require very little training from the company or from elsewhere, which saves their company some training expenses. Nonetheless, everything is a double-edged sword. That is, if a company provides no restriction on the use of networking tools, then it may soon face a difficult or even embarrassing situation when the company's trade secrets appear.

Therefore, the business owners should enhance the information security management of the networking platform and find a balance between the privacy of the employees and the confidentiality of the network system. It is also important to think about establishing corporate policies for information security, designing appropriate managerial regulations, or even applying for ISMS (Information Security Management System, ISO 27001:2005) certification. This study suggests:

i. First, make a list of Internet conducts that are considered positive.
ii. Second, evaluate the use of networking tools with justification.
iii. Last, encourage employees to share their Internet-related knowledge with others.

4) The mediocre and conservatives (MC): Because the users in this group are more conservative, they may resist new technology and are not interested in using new technology. People in this group often become a hindrance when a new technology is introduced into the company. Although new technology can improve their productivity at work, users in this cluster would rather find every possible way to escape it, for example, look for alternatives, or modify the existing tools, approaches or routines, instead of adopting the new technology. Although the company could reduce their fears of new technology by providing education and training, the core of the problem lies in multi-dimensional psychological issues. For the business owners, they may worry about job-hopping when investing too much money in those employees.

In this case, the study suggests the business owners prepare some response measures such as penalties and fines; otherwise, without a consistent corporate standard, some serious managerial problems may be develop in the long run. This study therefore, suggests:

i. First, improve the capacity for network connection of the corporation.
ii. Secondly, provide training courses related to network use.
iii. Last, transfer the communication from the platform to the network.

## LIMITATION AND SUGGESTIONS

This research adopted the questionnaire interviews toinvestigate the use of networking tools as coordination media in corporations in terms of the types of users and the users' interaction behaviors as well as cognitive attitudes. Nonetheless, there are some shortcomings due

to limited resources and staff. For instance, the study subjects were personnel (including managers) in the tourist business, but for each company, there might be very different backgrounds or different computer network constructions. As a result, variations may arise when filling out the questionnaire, depending on the companies and their situations. To achieve a general effect, this study strictly followed the scientific principle—the stratified random sampling method—when distributing the questionnaires to the study samples, that is, those business owners that have registered their company on the government's record. Four clusters were found in this study, and the study provided some suggestions to corporate managers on managerial practices. In recent years, due to the greatly enhanced convenience of network communication tools, competition in this market has become intense. All the companies in the networking field keep on updating their products or integrating the products with mobile commerce. By understanding the interaction behaviors and cognitive attitudes from the networking tool users, the business owners could facilitate the establishment of a model for correct network use. They could also use the information provided here as a reference for developing coordination tools in the future.

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