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A Study of Competences and Indicators for Electronic Commerce Professional Managers

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ABSTRACT

The objective of this research is to investigate the managerial competences for Electronic Commerce professional managers. Three research approaches have been adopted here: Focus Group, Fuzzy Delphi Method. The results indicated that professional skills and leadership competence are more important than other competences such as administrative skills and motivation. Comparing the competences of traditional managers and EC managers shows that the main difference is the emphasis on EC managers' professional skills.

Keywords: Competence of Electronic Commerce, Fuzzy Delphi Method

1. INTRODUCTION

While there have been quite a lot of studies on electronic business related issues, there are still very few researches on the competences of Electronic Commerce professional managers. The earliest research on competence was in late 1960s, which focused on the study of personality. Recent studies on competence, however, have changed the direction from the conventional understanding of competence as the quality, knowledge and skills one possesses to the notion that competence means not only the qualities one possesses but also those one does not own and therefore needs to learn. Murakami (1988) suggested that competence lies in the concrete performance one provides in the profession, which reflects on his/her substantial ability of achievement. Spencer & Spencer (1993) affirmed that competence is the "underlying characteristic" one has. They went further that the underlying characteristic is not only related to one's profession and position at work, but predictably or even actually affects his/her behaviors and performance. Yeung (1996) also indicated that the critical key to improve one's working performance is competence, which means the specific basic quality in a person. In addition, Ritter and Gemunden (2004) stated that both network competence and technological competence have a significant positive impact on a company's innovation success. Mansfield (1996) added that competence is the description of accuracy, skillfulness, and specific behaviors, which needs to be studied by the staff, so that they will have good performances and better achievements at work. Besides, as pointed out by Tseng (1998), competence is the crucial factor of achievements. Therefore, in spite of the fact that scholars from each school have had different definitions on competence, most scholars tended to agree that competence is closely related to one's profession, which is also the crucial key to one's performance and achievement at work.

The contribution of our study is to provide an insight into the competences of EC professional managers. It will offer the companies and industries a clear direction for training and hiring managers, which will also promote the managers' outstanding achievements. Besides, the indicators for EC professional managers can be adopted as the indicators for enterprises to evaluate the competences of their managers. Accordingly, this study proposed to achieve the following goals: 1. To examine the constitution of professional competence possessed by successful EC professional managers. 2. To find the indicators of competences for EC professional managers.

2. LITERATURE REVIEW

This paper discusses the aspects and indicators of managerial competences for EC professional managers. The first part of this literature review presents studies related to managerial competence, while the second part focuses on the methods of evaluation for competence.

2.1 Studies on Managerial Competence

Although the earliest study on competence appeared in late 1960s, recent studies on competence rarely focus on the research of managerial competence possessed by EC managers, and without mentioning the indicators for them. This study aims to start with the previous studies on managerial competence and managerial skills both in Taiwan and overseas. In this case, the managerial competence which needs to be possessed by EC managers be investigated, so that the research methods and procedure could be made. To this purpose, contemporary studies on managerial competence will be discussed as follows: (1) the personality trait school, (2) the functional school, (3) the situational school, and (4) the survey school.

The personality trait school tended to adopt "the moment of heroism" and suggested that successful

managers should have some special characteristics in their personalities. Hence, as long as a person has special characteristic in his/her personality, he/she could be trained and become a successful manager. In terms of personality, Gattell (1973) has made observations and analyses of various behaviors in our daily life. Eventually, the 171 types of personalities he found were sorted into 16 categories according to factors that would affect people's behaviors. Robbins (1985) tended to see from the managerial perspective and asserted that a person's ability is mainly composed of intellectual and physical abilities. Intellectual ability means the ability of mind activities, which includes the abilities of calculation, language, response, and logic. Physical ability denotes one's spirit, physical flexibility, energy etc. Professions of higher positions require more intellectual ability, whereas technical or mechanical jobs need people with more physical ability. Maslow (1954) proposed the hierarchy of needs theory and suggested that there are five levels of needs for every one. From the lowest-order need to the highest-order need they are: physiological need, need of safety, social need, need of self-esteem, and need of self-actualization. In general, for those who require less in life, physical need tends to be more important, while for managers the needs of self-esteem and self-realization would be more emphasized. However, there are quite a few uncertainties in the personality theory, such as the neglect of interactions between leader and staff, the fact that personalities are too complicated and difficult to be clarified, etc. Hence, theories in this school have gradually tended to be ignored.

Katz, the leader of the functional school, argued that managers of various levels require different levels of skills such as following: 1. professional skill, 2. social skill, and 3. technical skill (Katz, 1955). Those three skills would be different due to the different tasks required for managers of different levels, which was also confirmed in the theory of Guglielminio (1979). In other hand, the situational school emphasized the importance of circumstances, and believed that some specific situations could make some people become heroes. In other words, they denied the importance of the manager's personality and function. They took further that what makes one a successful manager was not necessarily his/her personality, but how to deal with the confronted situations. For instance, Fieldler (1967), a scholar of this school, proposed the leadership contingency model and suggested that the function of the leadership could be influenced by the relationship between the leader and the fellow group members, the structure of each task, and the authority of the leader. Besides, in his path-goal theory, House (1971) added that the manager's behaviors can be affected by the circumstantial factors, such as the structure of the work, the system of the official authority, and team involved in the work. Leadership can also be affected by the quality of staff members, such as their ability for internal and external control, experiences, and abilities.

All these factors would have influences on the manager's performance and satisfaction with the job.

The proper managerial competences for the managers were discovered via survey methods in the theory of investigation. Chang (1998) surveyed managers at various levels and suggested that the important managerial competence for managers at higher positional levels are "planning and coordination", "decision making", "management reforming", "strategies adopting", "prospect", "problem solving", "sensitivity to the market", "consultation and authority", "insurance managing", "social network", "outstanding performance", "and "perfectionism". The important managerial competences for managers of intermediate positional levels are: "project and procedure management", "goals setting", "communication skills", "staff training and supporting", "incident managing and group constructing", "innovation" and "negotiation". The major managerial competences for managers of basic positional levels are: "professional skills", "efficiency", "being active and enthusiastic", "executive ability", "time management", "quality management", "reliability", "good learning attitudes", "customer services" and "emotional control". Chung (1998) has researched on the managerial competence of higher positional managers in the high-tech industry, and his research focused on 159 junior managers of higher positional level in an industrial technology research institute (ITRI). The result showed that competences possessed by managers there were the abilities of "strategies adopting and coordinating", "problem solving", "quality control", "action directing", and "group constructing". The major competences that needed to be trained and improved are "sensitivity in management", "ability of negotiation", "strategies adopting and coordinating", "inspiration on others", "quality control". Wu (1993) asserted that managerial competence should include both personal qualities and managerial skills. In terms of personal qualities, personality and motivation would be the main factors, whereas managerial skills contain: social skills (including communication skills), administrative skills (i.e. planning and coordinating), cognitive skills (such as analysis and decision making), leadership skills (such as inspiring and tutoring), and technical skills.

Recent studies on managerial competence have tended to include theories and perspectives from different theories and have combined various methods to examine managerial competences. Ritter and Germunden (2004) discussed and analysis the impact of the dual nature of the key to competitiveness in the network economy. Lin (1996) has adopted the Fuzzy theory to the evaluation models of managerial competences, considering aspects on both personal qualities and skills. Personal qualities include ability, personality, and motivation, whereas managerial skills could be divided into the aspects of technical skills, social skills, and conceptual skills. Additionally, Wu

(1999) has also adopted the Fuzzy Analysis Hierarchy Process to construct the evaluation model of managerial competence and suggested that managerial competence contains eight aspects: (1) conceptual skills, (2) social skills, (3) leadership skills, (4) administrative skills, (5) professional skills, (6) personal qualities, (7) abilities and (8) motivations. Accordingly, the direction of his research has already covered the concepts from personal characteristic, functional and investigative theories. Chang, Huang, and Lin (2000) proposed a new fuzzy Delphi method and fuzzy statistics for managerial talent assessment. Their taxonomical approach was derived from the open systems view of firms. The new method was able to identifying and distinguishing different aspects of organizational competence. Sanchez (2004) also developed a taxonomy of five models of competences than an organization must develop and maintain in its various activities to reach overall competence.

2.2 Methods of Evaluation on Competences

The primary methods of evaluation on competences are as follows: 1. Evaluation on working ability (McClellan, 1973; Tseng, 1998). 2. Focus group. 3. Examination on competence models (Hsieh, 1998). 4. Peer Evaluation (Parry, 1998). 5. Assessment centers (Parry, 1998). 6. Circumstantial tests (Parry, 1998; Chang, 1997). 7. Evaluation tables of competence (Chuang, 1997). 8. Fuzzy theory (Ishikawa, et al., 1993; Lin, 1998; Wu, 1999). Apart from these, Richard & James (1995) had adopted the two-stages method which combined qualitative and quantitative methods for the research of competencies for computer software technicians. While in the first stage qualitative study approach was adopted for detailed interviews, in the second stage quantitative analysis was used to generate the final list of competence via Q-Sort techniques and discriminant analysis.

Ishikawa et al (1993) had adopted the Fuzzy theory for the purpose of solving some problems in the existing conventional Fuzzy Delphi Method. They used Max-Min and Fuzzy Integration to examine Fuzzy Delphi Method's workability, and the result has proven that the Fuzzy method has some advantages that the traditional methods do not have. Therefore, more and more scholars, such as Lin (1996), have started to adopt Fuzzy theories in the evaluation of managerial competences. Later, Wu (1999) and Huang, Chang, and Lin (1997) constructed his evaluation model of managerial competences through Fuzzy Analysis Hierarchy Process.

To sum up, from the literature review we found that in terms of competence there were no exact common consensus between theories from different schools, and the methods adopted were various. Therefore, it would be important to start with a more complete managerial structure, which should also be adoptable for electronic

commerce. Since the managerial structure proposed by Wu (1999) has included more aspects, our study proposes to adopt his structure of competences as the initial structure for the study of managerial competences, which is illustrated bellow. In terms of methodology, to increase the accuracy of our research and to follow the tendency of studies nowadays, we have adopted several methods and the combination of qualitative and quantitative methods. The Fuzzy Delphi Method used to choose suitable aspects and indicators of the managerial competences for EC managers.

3. METHODOLOGY

The objective of this research is to discover the managerial competences and indicators for EC managers. The initial construct of competences for EC professional managers is shown in Fig. 1. To achieve this goal, a both qualitative and quantitative approach is adopted in our research. In this way the advantages from each method could be integrated in this study, instead of relying too much on a certain type of methods and the disadvantages that might occur. Here, the process of this study could be discussed in two parts: 1. focus group, and 2. Fuzzy Delphi Method.

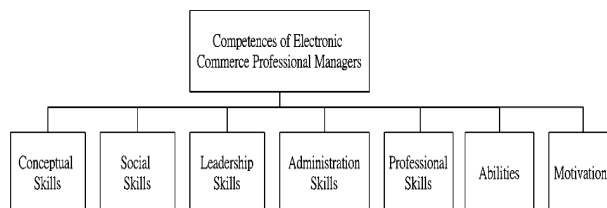


Figure 1. The Initial Construct of Competences for EC Professional Managers

3.1 Focus Group

After establishing the structure through literature review, a focus group of EC experts was held on for the purpose of discovering the managerial competences related to the job of EC managers, which also provided some suggestions for the adjustment to the initial structure of our study. To ensure that the experts invited would be representative, 12 experts from the industrial, governmental, and academic fields of the electronic commerce in Taiwan were invited for the focus group. The experts from the industrial field were the leaders who were responsible for electronic commerce business in a certain enterprises.

3.2 Fuzzy Delphi Method

From the opinions collected via the focus group for the adjustments on the items and aspects of managerial competences for EC managers, we proposed to adopt group-decision skills for the confirmation on those items and indicators. Among the group-decision skills, Delphi Method is the one that has usually been applied. The approach is to survey the opinions of experts in the specific fields with questionnaires. Without any

common consensuses or exchanges of ideas among experts, the negotiator will integrate the opinions from the experts and select the average or 50% of the result as the collective opinion. If the result does not satisfy the standard of converge, the survey will need to be repeated several times until the standard is achieved (Hsu, 1990). Therefore, the disadvantages of the conventional Delphi Method are: opinions from the experts might not easily achieve the standard of converge; the survey would often need to be repeated for several times until the acceptable standard is achieved, which might result in high expenses of the capital and time; and with the decrease of response rate, the result might be affected by the negotiator's subjective thoughts (Hsu and Lee, 1997). Hence, if the Fuzzy theory could be applied to the Delphi Method, apart from the benefit that the result obtained could be similar to the conventional Delphi Method, the repeating time for survey could be decreased and the time and capital could therefore be reduced. In particular, the individual characteristic of each expert could be reflected and the professional knowledge of each expert would be more reasonably and suitably dealt with (Ishikawa et al., 1993).

Therefore, our study adopts the reformed Fuzzy Delphi Method introduced by Hsu and Lee (1997), which based on the triangular fuzzy numbers. This method was applied to make confirmation on the managerial competences and aspects for EC managers, because it not only improved the disadvantages resulted from the conventional Delphi Method, but that the result would not easily be affected by the extreme opinions. The questionnaires for the survey on Fuzzy Delphi Methods were sent on 15 June 2002 to the recipients, who were members of EC association in Taiwan, and the experts invited for the focus group. The total numbers of the questionnaires sent were 120 and with 40 valid responses, which made it 33% valid response rate. Finally, the procedure of adopting Fuzzy Delphi Method to the structure of managerial competences for EC managers is described as follows:

Step One: Building the structure of managerial competences for EC managers. Our initial setting of managerial competences for EC managers could be discussed from 8 aspects, which were conceptual skills, social skills, leadership skills, administrative skills, professional skills, personal qualities, abilities and motivations.

Step Two: Setting up the evaluations of weights.

By using the triangular fuzzy numbers to integrate the opinions from experts, the problems of fuzzy human thoughts and inaccuracy could be reduced. Besides, the decision maker's real attempt could be more clarified. The approaches to integrate the group opinions were average number(s), total number(s), the maximum, the minimum, and the hybrid method of

average of the maximum and the minimum. Besides, as pointed by Saaty (1980), it would be better to present the opinions of the experts with the geometric average method, which has been applied frequently in practical studies. Moreover, because the result from the geometric average method would be suitable for the definition of fuzzy judgment matrix, in our study with Fuzzy Delphi Method we used geometric averages to demonstrate the collective opinions from experts. Hence, the triangular fuzzy numbers were adopted, which were the most often applied in fuzzy numbers, for the purpose of setting up the fuzzy membership function of the experts' opinions. In this chart, the minimum of the experts common consensuses is presented as point "l", whereas the maximum of them is showed as point "u". Accordingly, the satisfaction degree to these two extremes would be presented as 0, while the segments between u and 1 would be given the satisfaction degree between 0 and 1. Hence, the fuzzy number of the total opinions from experts is contained in our study, which is presented as $\tilde{W} = (l, m, u)_{L-R}$, whereas the fuzzy weight number of the indicator for the managerial competence item j by an individual expert i would be $\tilde{W}_{ij} = (l_{ij}, m_{ij}, u_{ij})_{L-R}$. Consequently, the approach described above could prevent from the problem of deleting information as happened in the conventional Delphi Method, and the common consensuses among experts were included as many as possible.

From the survey of Fuzzy Delphi Method, the evaluations of fuzzy weights from the experts were therefore obtained. Hence, the fuzzy weight number of expert i on managerial competence item j could be presented as follows:

$$\tilde{W}_{ij} = (l_{ij}, m_{ij}, u_{ij})_{L-R} \quad (1)$$

$$l_j = \text{Min}(l_{ij}), i = 1, \dots, n; j = 1, \dots, m \quad (2)$$

$$m_j = \left(\prod_{i=1, j=1}^{n, m} m_{ij} \right)^{1/n}, i = 1, \dots, n; j = 1, \dots, m \quad (3)$$

$$u_j = \text{Max}(u_{ij}), i = 1, \dots, n; j = 1, \dots, m \quad (4)$$

While n stands for the numbers of experts, m shows the numbers of indicators for managerial competences

Step Three: Selecting the suitable items of managerial competences for EC managers.

1. The fuzzy weight number \tilde{W}_{ij} generated from Step Two could not be used for direct comparison. Therefore, the fuzzy method solution which was provided by Hsu and Lee (1997) was provided in our study, and the result was transformed into a single number of_j .

$$of_j = \frac{u_j + m_j + l_j}{3} \quad (5)$$

2. Then a threshold was provided by experts. From the references of previous studies on managerial

competences, we decided to set the threshold $r=0.7$, and used this for the selection of suitable managerial competences. If $of_j \geq r$, then the managerial competence item should be selected; If $of_j \leq r$, then the managerial competence item should be deleted.

4. DATA ANALYSIS

After establishing the initial construct of competences for EC professional managers, a focus group method was used for the purpose of discovering the managerial competences related to the job of EC managers, which also provided some suggestions for the adjustment to the initial structure of our study.

Fuzzy Delphi Method is then applied in our study for the identification of managerial competences and aspects for EC managers. From the three steps for Fuzzy Delphi Method, the initial 73 items of managerial competences in 8 aspects, after deleting 33 less important items, 40 were left. The initial 73 indicators of managerial competences in eight aspects, after the selection with Fuzzy Delphi Method were all kept with 39 managerial competence indicators which have been selected, while the other 34 were considered by experts as unimportant managerial competences indicators and therefore have been deleted. The study result showed that professional skills, conceptual skills, social skills, leadership skills, administration skills and personal qualities were considered by the experts as important aspects. Therefore, most of the managerial competence items in these aspects have been retained; whereas the items deleted were mostly from the aspects of abilities and motivations, which eventually contained only 2 items for each aspect. Hence, the result also suggested that these two aspects were considered by most experts in the survey as unimportant aspects. Accordingly, the result of managerial competences for EC management also showed that viewpoints from the functional school and the investigation school tended to be more supported, while personal qualities and motivations were considered less important in the EC environment.

5. CONCLUSIONS

From the results mentioned above, competencies for EC professional manager can be compared with the study of Chang (1998) on the managerial competences for managers, we could see that managerial competences for EC managers tend to be closer to those for the managers in the intermediate level. For instance, the managerial competences for EC managers correspond to the "professional knowledge" for managers in the basic level; similar to "communication skills", "training and supporting staff members", "incident management and group construction", "innovation" and "negotiation" for managers in the intermediate level; and closed to "strategies planning", "sensitivity to the market", "consultation and authorization" and "prospect" for the managers in the high level. In addition, among the

managerial competences for EC managers, "strategies planning", "problem solving" and "negotiation" also echo the study of Chung (1998) on the managerial competences of higher level managers in the high-tech industry. Hence, we found that in both the business and academic fields in Taiwan, EC managers were considered as the "intermediate" or "high" level managers. One of the reasons for internet bubble economy, as our study suggests, is that the skill aspect had been too much emphasized in the Electronic Commerce. Our study also points out that it would be not enough to concentrate on the skill level only. EC managers still have to possess the thinking, leading and management skills which are in the strategic level. For example, if they could help the enterprise or company build the prospect, plan the strategies and assign the resources; if they are innovative; if they could evaluate and make analysis of the environment and future tendency; if they have good communication skills, incident management skills etc. All these are the managerial competences for a successful EC manager.

From our study, we found that EC management could be divided into eight aspects: 1. professional skills, 2. leadership skills, 3. conceptual skills, 4. abilities, 5. social skills, 6. personal qualities, 7. Administrative skills, and 8. motivations. In these aspects, professional skills and leadership skills are the most important aspects, while Administrative skills and motivations are the least important ones. In terms of the managerial competence items, the main difference between the competences for EC managers and traditional managerial competences lies in the emphasis of professional skills. In addition, domain knowledge and information management have been recognized by the experts as the most important items in professional skills. As for other managerial aspects, such as leadership skills and conceptual skills are similar to traditional management theories, which are also included as managerial competences possessed by successful managers. Besides, in terms of practical usages, the managerial competences and indicators proposed by our study would be very suitable for the companies when evaluating and hiring EC managers. Even for educational trainings, these managerial competences and indicators would certainly provide as a good reference and direction.

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