Asian Journal of Marketing

ISSN 1819-1924

Academic Journals Inc.

www.academicjournals.com

Asian Journal of Marketing 1 (1): 1-13, 2007
ISSN 1819-1924

Exploring Critical Factors for Supplier Selection in Telecommunication Industry in Malaysia

[1]Arun Kumar Tarofder and [2]Ahasanul Haque,
[1]School of Business, Binary University College, Puchong, Malaysia
[2]Department of Business Administration, International Islamic University Malaysia, 53100 Kuala Lumpur, Malaysia

Abstract: There is good growth rate in the Malaysia telecommunication sector over the last decade although this sector was badly affected by economic crisis during the late 1990's. The potential for exponential market growth attracted new players to this business, which turns dramatically to lead competition. This put force on speed and product margins which droves companies to find out most effective and efficient business solution via partnership with stake holders such as suppliers. The selection of right suppliers is not an easy task. Therefore, this study is aims to find out what are critical factors that play an important role for selecting right suppliers of telecommunication industry. Results of this study provide a comprehensive analysis of the important factors for suppliers' selection for this industry. The analysis confirms the significant positive relationship of cost factor, technical capability and quality assessment factor. These factors are expected to have a great role during the supplier selection in telecommunication industry. In conclusion, practitioners can derive a better understanding of the activities that are undertaken by these organizations and how the way these activities are being dealt with.

Key words: Supplier selection, exploring factors, telecommunication industry, Malaysian perspectives

INTRODUCTION

The telecommunications sector is currently experiencing phenomenal global change, with the liberalization and privatization of the sector and this appear to be benefiting the environment in a number of expected ways. Many players in the Malaysian telecommunication sector were badly affected by economic crisis of the late 1990s. Thereafter has been recovered good growth rate over the last decade. Total telephone users since increased from 6520000 in 1998 to 16945000 in 2004 (CMC, 2004a, b) resulting in a penetration rate 66.24%. The mobile phone itself indicated great growth rate, total mobile subscribes in 1998 was 2150000 where as the total subscribers on mobile in 2004 was 12398000 (CMC, 2004a, b). At the turn of the millennium this is witnessing a process of fundamental change in industries, economics, national societies and cultural globally. This transformation process, which is also referred to as informational among social scientists, that substantially been boosted by new innovations in information technology and communication system. It is very much visible that there is a rapid change in telecommunication industry such as now telecommunication industry is using 3rd generation language by most of the developing and developed countries. The new innovations in technology created new business opportunity in this industry. The potential for exponential market growth attracted new players to the business, which in turn to leads competition dramatically. This pressure on speed and product margins, drive companies to find the most effective and cost-efficient

Corresponding Author: Ahasanul Haque, Department of Business Administration, International Islamic University Malaysia, 53100 Kuala Lumpur, Malaysia

business solution via partnership with stakeholders such as suppliers and restructuring but the relationship between companies and their suppliers has traditionally been distant. Today's global economy just-in-time manufacturing and value focus there is a heightened need to change this adversarial relationship to one of cooperation and seamless integration. Many authors agreed that the following factors makes the supplier selection decision making process complicated (Sonmez, 2006; Muralidharan *et al*., 2001; Weber *et al*., 2000). Theses factors are (1) multiple criteria: Both qualitative and quantitive (2) Conflict amongst criteria: Conflicting objectives of the criteria (3) involvement of many alternatives: Because of high competition (4) internal and external constrains imposed on buying process. However, it has been indicated byQuigley (1995) it takes a lot of work effort and patience to develop this partnership. Since, the right supplier selection process encompasses different functions such as purchasing, quality etc. within the company; it is a multi-objectives problem, encompassing many tangible and intangible factors in a hierarchical manner (Prueitt, 2000). Effective supplier means who can supply the right amount of materials or services at the right time, at right price and the right quality. It is obvious therefore, that effective international supplier selection must deal with a host of quantitative and qualitative factors that are in conflict with one another. The study begins with the overview of literature on supplier selection process and provides an extension and update information on Malaysian telecommunication industry. Specifically, this study also seeks to identify important factors associated with supplier selection in the telecommunication industry. Since supplier selection is very important task in telecommunication industry, a key question that arises in the context is, which supplier selection strategies or criteria should be pursued by the telecommunication industry to augment their service (Ndubisi *et al*., 2005; Hou and Su, 2007). Moreover, there is no adequate empirical evidence about the guideline on how to select supplier for the telecommunication industry. Therefore, this study is an attempt to fill this gap.

Over the last two decades the world economy has been dramatically changed due to various reasons. The environment of business is characterized by rising complexity, uncertainty, instability and volatility. Companies have to do re-thinking that traditional methods and strategies for doing business to the pressure of changing market condition, intensified global competition, radical change in technology and shorter product life cycle (Bartlett and Ghoshal, 1987; Ohmae, 1989). Managers are now realizing that no matter how strong and resourceful their firms might be, they are no longer able to maintain a competitive advantage at every steps in the value chain in all national market, nor are they able to maintain a cutting edge in the wide range of technologies required for the design, development manufacturing and marketing of new products. Thus, good suppliers' strategic alliances have become an important means to rationalize operations to overcome potential difficulties and to help companies retain in the market (Ohmae, 1989). Supplier selection is generally consider as five phase process starting from the realization of the need for a new supplier, determination and formulation of decision criteria; pre-qualification; final supplier selection; to the monitoring of the supplier selection (Sonmez, 2006; De Boer and Van der Wegen, 2003). At first evaluation and assessment task needs the identification of decision characteristics against which the potential suppliers are to be assessed. Next evaluation seals are selected in order to measure the appropriateness of a supplier. The next step is to assign weight to attributes to identify the significance and contribution of each criterion to the supplier evaluation and assessment. Then an attribute may comprise of several sub attributes. The last stage is to evaluate potential suppliers against the characteristics identified at the beginning (Sonmez, 2006). Choy and Lee (2002) proposed Generic Supplier Management Tool (GSMT), which was models of (Lee *et al*., 1998 ; Lau *et al*., 1998). In this study he compared three parts of GSMT, these are Suppliers Management Network (SMN), Supplier Selection Hierarchical Model (SSHM) and Supplier Selection Workflow (SSW). For this study purpose discussed only the supplier selection hierarchical model. This model was designed as a general to cope with the multi criteria situations, including qualitative and quantitative attributes. All criteria had been categorized under the main category in

upper level. This model also highlighted intangible criteria could be converted into rational and logical form, such that pair-wise comparison using the criteria to the correspondent position of other suppliers in the same level can be made. Hou and Su (2007) identified the barriers for the supplier selecting issue and they developed a new approach based on their findings. Their whole concept provides a supplier selection approach for manufacturing environment by utilizing the web based technologies to deliver a means which enables geographically dispersed functions making supplier selection more efficiently. Chin-Chun Hsu *et al*. (2006) developed three factors supplier selection measure based on extensive literature review and practitioner interviews. They illustrated that underlying the documented suppliers selection criteria is the need to assess a supplier's quality and service capabilities as well as its strategies and managerial alignment with the buyer. In addition, Percin (2006) showed that intangible of an analytic hierarchy process and multi-objective pre-emptive goal programming both quantitives and qualitative factors, for selecting best supplier and allocating the optimum order quantifies among them. Another author Yang and Chen (2006) also proposed an integrated model by combining the analytical hierarchy process and grey relation analysis in a single evaluation model. They proposed that through this model, it is possible to effectively integrate the specialized knowledge and experience of each disposed evaluation and the quantitative data to select the best supplier for cooperation.

Supplier selection is usually a time consuming process that are being evaluated on several criteria such as cost of production, raw material cost, quality assessment, organizational goal, quality staff, delivery system, personal facilities etc. Selection of suppliers is complicated process by the fact that numerous criteria must be considered in the decision making process. Dickson (1966) proposed 23 different criteria those were usually consider during the supplier selection process. Presently, the concept of customer-supplier partnership is being adopted at an increasing rate by USA and Europe. Based on Japanese supplier in early 1980's just-in-time concept introduced a philosophy of supplier customer inter-organizational relationship. Weber *et al*. (1991) reviewed the partner selection process and establishing it under quantitative and qualitative categories. Chao *et al*. (1993) surveyed in a number of industries and suggested that quality and on-time delivery are the most important attributes of purchasing performance evaluation. Briggs (1994) suggested that apart from optimum cost, joint development, culture, forward engineering, trust, supply chain management, quality and communication were also important. Wei *et al*. (1997) suggested that the suppliers' history of supply, production price, technical capability and transportation cost also play important role during suppliers' selection. Ghodsypour and O'Brian (1998), agreed with the cost, quality and service that are the most important factor in supplier selection process. Therefore, it is important to note that cost and quality dominated more in the supplier selection process.

In the supplier selection workflow, that he proposed, had a back and data store containing an authorized list of suppliers and made of three profiles of suppliers. These are technical capability, quality assessment and organizational profile. Suppliers' data regarding these criteria has been stored in a case structure which consisting of a number of fields representing the criteria in each showed the relevant numerical performance values of the corresponding criteria of suppliers. Choy and Lee (2002), suggest a Case Based Supplier Management Tool (CBSMT) using the Case Based Reasoning (CBR) in the area of intelligent suppliers selection and management. This will make better performance compare to using the traditional approach. Feng *et al*. (2001) illustrated a stochastic integer programming approach for synchronous selection of tolerances and supplier based on the quality loss function and process capability indices. Lau *et al*. (1998), indicated Data Envelopment Analysis (DEA), proposed an approach which compares suppliers for supplier selection and performance improvement. Noci (1997) proposed a model, which first recognized measure assessing a supplier's environmental performance and lastly suggest effective techniques for building the selection procedure, relating to an environmental viewpoint.

Development of Supplier Selection Model

In this study, the purchasing competitive priorities and its measures given by Kraue *et al*. (2001) and Kahraman *et al*. (2003) have been adopted as the criteria. The supplier selection criteria described in the subsequent paragraph.

Cost Criteria

The aim of this criterion is to identify vital element of cost associated with purchase. The most common cost related with a product is purchase price, transportation cost and taxes (Kahraman *et al*., 2003). Operational costs are also be considered during the supplier selection. The operational cost includes transaction processing; cost of rejects etc. but it requires more effort to estimate. Thus, cost is very important criterion for selection of right suppliers. The cost factor has been measured based on the importance of the following cost/price dimensions in supplier selection in telecommunication industry: raw material cost, cost due to delay, cost of inspection, after sales service, rework cost, engineering cost and labor cost.

Technical Capability

Suppliers' need competent technical ability to provide high quality product or service, ensure future improvements in performance and promote successful development efforts. Especially, this is very important when the firm's strategy included development of a new product or technology or access to proprietary technology. These technical criteria insist company to shift into the global market place. This factor has been measured on the basis of the importance of the following technical dimensions: compliance with quantity, compliance with due date, compliance with packaging standard, production planning systems of suppliers, maintenance activities of suppliers, plant layout and material handling, transportation, storage and packaging systems.

Quality Assessment

It is the key factor of suppliers by which they can improve and maintain quality and delivery performance. It is very important for the company and suppliers. Quality and availability of product depends on this criterion. This factor has been measured on the basis of the importance of the following quality dimensions: management commitment, product development of suppliers, process improvement of suppliers, quality planning and quality assurance in supply chain, quality assessment in production, inspection and experimentation and quality staff of suppliers.

Organizational Profile

This factor has been measured on the basis of the importance of the following organizational dimensions: achievement of sales and marketing goals, financial performance, achievement of current organizational goals and strategy for new technology age. In view of above discussion of current literature the proposed model for this study is presented in Fig. 1.

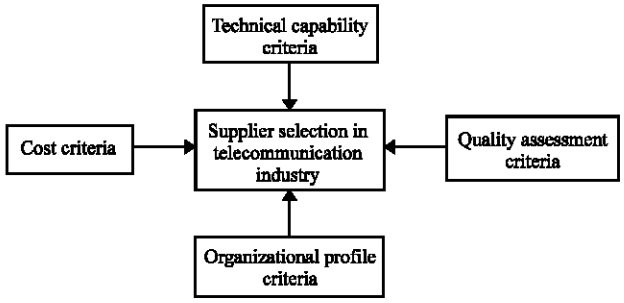

Fig. 1: Theoretical framework for this study

MATERIALS AND METHODS

The purpose of conducting this research is to explore the general and specific issues that involve supplier selection among Malaysian telecommunication companies, hence making this research is an exploratory one. Although much information is available worldwide in this field of study, it is worth exploring to gain a better understanding on how their issues in supplier selection are comparable to those in context to the Malaysian telecommunication industry. By exploring the issues and volatile environment of the telecommunication industry it was wish to obtain a better grasp of the supplier phenomenon and further advance our knowledge to generate a conclusion that will provide a deeper understanding on the issues. Specifically, the questionnaire for this study several numbers of functions by translating research objectives into a series of questions. Firstly, the questionnaire and response format were standardized so that stimuli were same for all respondents. Secondly, the questionnaire was designed in a way to provide comprehensible questions to motivate respondents to cooperate and complete accurately all the questions asked. Finally it facilitated and simplified administrative and data which are required for this study (Frazer and Lawley 2000; Malhotra 1999).

Variables and issues for the study

This study has tended to cover the overall environment of the Malaysian telecommunication industry. Therefore the whole research was set in the industry that consists of five-telecommunication operators. Although the industry consists of only five major players consisting of Telekom Malaysia, Digi, Celcom, Maxis and Time Telekom, the environment is ever dynamic and evolving. All the organizations have been studied extensively in terms of supplier selection issues. The research framework has developed from the following issues and variables, which have been gleamed through in our literature review. A total number of three categories were used from the study (Choy and Lee, 2002). The remaining one category namely 'cost' attributes were included in the instruction for the following reasons. Chao *et al*. (1993) highlighted six important criteria of suppliers' selection and described the response of sample of Chinese purchasing managers. Their results segmented the respondents into three clusters based on similarities in their supplier evaluation process and differentiates these clusters in terms of whether the managers emphasize reliable delivers, price/cost consideration, or product quality. Finally, they proposed that cost is an important factor in the supplier selection process. On the other hand, Wei *et al*. (1997) suggested that supplier history of supply, product price, technical ability and transportation cost should consider in the supplier selection process. In addition, Ghodsypour and O'Braien (1998) agreed that cost quality and service are the three main categories when deciding supplier selection parameters. Selected proposed variables are given in the Table 1.

Questionnaire and Scale

In ensuring the validity of the findings from this study, the design of the questionnaire follows principles of instrument design accepted within the academic community. This includes the process of generating items from the literature to tap the variable and assessing their representativeness (Deng and Dart, 1994). In the beginning of the questionnaire, it has been quoted that please consistently answer these questions based on your judgment toward the supplier selection factors. This statement design to avoid measurement error, which may influence the result, has the survey not made it clear that the basis for answering the factor related questions. The questionnaire was made into two parts. The first part deals with information about the company which includes how many years they are doing telecommunication business; do they have suppliers; do they have any long term contracts with their suppliers or not; what types of telephone line they have; are they thinking that suppliers are important for this industry or not; is supplier selection in this industry easy or not; are there many factors for selecting suppliers or not.

Table1: Variables list

Variables name	Items
Technical capability	Compliance with quantity
	Compliance with due date
	Compliance with packaging standard
	Production planning systems of suppliers
	Maintenance activities of suppliers
	Plant layout and material handling
	Transportation, storage and packaging systems
Quality assessment	Management commitment
	Product development of suppliers
	Process improvement of suppliers
	Quality planning
	Quality assurance in supply chain
	Quality assessment in production
	Inspection and experimentation
	Quality staff of suppliers
Organizational profile	Achievement of sales and marketing goals
	Financial performance
	Achievement of current organizational goals
	Strategy for new technology age
Cost factor	Raw material cost
	Cost due to delay
	Cost of inspection
	After sales service
	Rework cost.
	Engineering cost
	Labor cost

Table 2: Respondents profile

Company name	No. of respondents
Telekom Malaysia	56
Maxis	53
DiGi	55
Celcom	57

The second part of the questionnaire deals with factors regarding the supplier's selection. There were 26 suppliers' evaluation criteria that divided into four broad categories. These categories were: Technical categories; quality assessment categories; organizational profile categories and cost categories. The questionnaire predominantly utilizes five point Likert scales to measure the importance of supplier selection criteria. Likert scales are primarily as they offer advantages of speed, ease of coding for SPSS and administration (Neuman, 1994; Tull and Hawkins, 1993). The order of the questions was randomized to get effective response from the respondents.

Sample and Research Setting

Data was collected from four main dominant organizations that are involved in the telecommunication business in Malaysia. They were: Telecom Malaysia; Maxis; DiGi; and Celcom. Multiple respondents were interviewed from all of these companies. Total 250 questionnaires were being used for survey, but 29 were unusable because company policy did not allow it, or unfortunately, some persons did not believe that these factors were not important for supplier selection in their business. A summary of the result was offered as an incentive, but due to budgetary restrains, no second mailing or other types of ways were utilized. In order to minimize trance, the interviewers were told to approach respondents from different department of the companies. Especially, interviewers gave emphasis to collect data from management, marketing, operational department of the selected companies. The breakdown of the respondents was presented in the Table 2. For the different companies different papers were used to print questionnaire and also different code was used to identify the companies.

Table 3: Descriptive statistics

Descriptions	Mean	Standard Deviation
Telephone line	2.99	0.153
Years of doing business	1.96	0.650
suppliers play important role	1.00	0.000
have suppliers	1.00	0.000
contract with suppliers	1.27	0.445
Selection of suppliers is difficult	3.64	0.809

Table 4: KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.863
Bartlett's test of sphericity	Approx. Chi-Square	3209.429
	df	220
	Sig.	0.000

Table 5: Reliability Analysis

Reliability coefficients	
No. of case	221
No. of items	26
Alpha	0.932

Types of Analysis

Firstly, descriptive statistic such as means summarized the information about company and factor related to supplier selection enable us to get better feel for the data (Tull and Hawkins, 1993) and provide guideline for conducting other analysis (Malhotra 1999). Secondly factor analysis was employed to reduce and find important factors for this study. For the hypotheses testing was employed regression analysis. This regression analysis was carried out to determine whether our model was fit with this study or not and which factors that described in the hypotheses were important for supplier selection in telecommunication industry.

RESULTS AND DISCUSSION

In respondents' profile, mainly highlighted all of the company has either mobile or fixed phone line. All the companies have been doing business for more than ten years. Surprisingly, from Table 3, all of the respondents from four telecommunication companies agreed that suppliers play an important role in this business (mean 1) and all of them have suppliers (mean 1). On the other hand, most of the respondents agreed that they have long term contract with suppliers (mean 1.27). The mean for the difficulty of suppliers selection was 3.64 which means it is a difficult process to select suppliers.

Applying SPSS the Principal Component Analysis (PCA) was carried out to explore the underlying factor associated with the 26 items. The construct validity was tested by applying Bartlett's Test of Sphericity and The Kaiser-Meyer-Olkin Measure of sampling adequacy analyzing the strength of association among variables. The Bartlett Test of Sphericity was highly significant (chi-square: 3209.429; df: 220; significance: 0.000) and the Kaiser-Meyer-Olkin Measure of Sampling adequacy showed significant 0.863 (Table 4). According to the Cronbach's alpha the reliability of the standardized was relatively high with a value of 0.932 (Table 5).

The data of scale were subjected to principle component analysis with varimax rotation, with respect to suppliers selection criteria; four factors were extracted (eigenvalue 1) which explained 62.87 percent of the total variance as indicated (Table 6). Seven items loaded highly (average loading = 0.738) on the first factor: cost due to delay; cost of inspection; raw material cost; cost after sales; labor cost; engineering cost; rework cost of suppliers. This factor labeled as cost criteria of supplier selection in telecommunication business.

Another eight items loaded highly on (average loading = 0.622) the second factor. These eight items were maintenance activities; compliance with due date; product development; plant layout; production planning; management commitment; transportation; compliance with quantity. This factor labeled as

Table 6: Item loading on each factor

	Components			
Description	1	2	3	4
Cost criteria				
Cost due delay	0.843			
Cost of inspection	0.813			
Raw material cost	0.790			
Cost after sales	0.723			
Labor cost	0.708			
Engineering cost	0.697			
Rework cost of suppliers	0.595			
Technical capability criteria				
Maintenance activities		0.729		
Compliance with due date		0.679		
Product development		0.648		
Plant layout		0.628	0.527	
Production planning		0.600		
Management commitment		0.591		
Transportation		0.572		
Compliance with quantity		0.529		
Financial performance				
Compliance with packet standard				
Quality assessment attributes				
Quality planning			0.817	
Inspection			0.693	
Quality staff			0.688	
Process improvement			0.575	
Quality assurance in production			0.568	
Quality assurance in supply chain			0.561	
Organizational profile attitude				
Strategy of suppliers				0.848
Achievement of sales				0.823
Achievement of current goal				0.760

technical capability criteria of supplier's selection. Another six items loaded on factor with high average loading 0.650. These items were quality planning; inspection and experimentation; quality staff; process improvement; quality assurance in production; quality assurance in supply chain and this factor labeled as quality assessment criteria for supplier selection. Another three items with high average loading value 0.810 loaded for the last factor. These three items were strategy of suppliers; achievement of sales and achievement of current goals. This factor labeled as organizational profile criteria (Table 6). The result of items analysis showed that two items among 26 were not loading any of the four factors. These were financial performance and compliance with packet standard. Based on factor analysis, developed the following hypotheses for this study, these are:

H_1: Cost criterion has significant positive impact on supplier selection in telecommunication business.

H_2: Technical capability criterion has significant positive impact on supplier selection in telecommunication business.

H_3: Quality assessment criterion has positive impact on supplier selection in telecommunication business.

H_4: Organizational profile criterion has positive impact on supplier selection in telecommunication business.

Hypotheses Testing

Extraction method of factor analysis was used for determining exact independent variables those tested our research hypotheses via regression analysis. The result of the analysis indicated that 31% of the variance in supplier selection in telecommunication industry was explained by the independent variables with a significant F-value of 19.056 being significant at $p<0.000$ (Table 7).

Table 7: ANOVA analysis of conceptual model

Model		Sum of squares	df	Mean square	F-value	Sig.
1	Regression	25.406	4	6.352	19.056	0.000(a)
	Residual	55.331	166	0.333		
	Total	80.737	170			

Table 8: Regression result of conceptual model

Model	R	R^2	Adjusted R^2	Standard. Error of the estimate
1	0.561(a)	0.315	0.298	0.577

Table 9: Effects of each factor on supplier selection

		Unstandardized coefficients		Standardized coefficients		
Model		B	Std. Error	Beta	t-value	Sig.
1	Cost criteria	0.215	0.044	0.312	4.861	0.000
	Technical capability	0.248	0.044	0.361	5.612	0.000
	Quality assessment	0.170	0.044	0.247	3.844	0.000
	Organizational profile	-0.111	0.044	-0.162	-2.516	0.013

Summary of regression analysis results showed in Table 8 and indicated that all variables were significant. Technical capability was the most important factor for the suppliers selection in telecommunication business with beta weight 0.361 and supported H_2, with being significant at $p<0.000$. Followed by, 'Cost factor' was second most important factor with beta weights .312, at significant level of $p<0.000$. This indicates cost criteria have positive impact and accepted H_1. Quality assessment also indicted third most important factor (H_3) for supplier's selection in telecommunication industry with beta weight 0.247 and being significant at $p<0.000$. As expected the direction of effect for organizational profile was positive, however, result showed that this factor had negative impact for supplier selection with beta-0.162, with being significant at $p<0.013$. Hence, a hypothesis H_4 was not accepted (Table 9). Precisely, the result indicated that supplier's selection in telecommunication industry is strongly influenced by technical capability criteria; followed by cost criteria; quality assessment criteria and organizational profile (negative relationship).

DISCUSSION

Findings of this study generally support conceptual model. The results indicated to support hypothesis. Consideration of the four broad dimensions emerging from this study provides an indication of what factor underlie to select supplier in telecommunication industry. The analysis confirms the significant positive relationship of cost factor, technical capability and quality assessment factor. On the other hand, result showed that organizational profile had a negative relationship with the supplier selection in telecommunication industry.

Cost Criteria

Studies of Ellram (1993) Degraeve *et al*. (2000) Weber *et al*. (2000) Braglia and Petroni (2000) Ghodsypour and O'Brien, (1998) Chan and Chan, 2004 and Yuan-Jye Yu-Hua, (2005) confirm the findings of this study that cost factor has positive effect in supplier selection in telecommunication industry. Hence H_1 is supported based on the result. Purchasing factors usually considered should include a supplier's product price, transportation cost which is important during supplier selection (Wei *et al*., 1997). Kahraman *et al*. 2003 has developed a total cost approach where the quoted price is taken from all suppliers and then compared all suppliers. Similarity, the findings of this study support the previous research that showed cost factor is very important during supplier selection.

Thus, each supplier in the telecommunication industry should be careful about their cost. Consequently, when suppliers want to supply to any telecommunication company should carefully examine all of their cost. Specifically, the company will select those suppliers who can provide everything in less cost with quality.

Technical Capability

Technical capability is an important factor for supplier selection in the telecommunication industry. It is supported by many previous studies Chao *et al*. (1993) Wei *et al*. (1997) Braglia (2000) Choy and Lee (2002) Chan and Chan (2004) Yuan-Jye and Yu-Hua, (2005). They agreed that technical capability of suppliers is an important for any companies. Braglia and Petroni (2000) identified that multiple outputs and inputs, based on capabilities relating to management, technical, production facilities, technology and quality and delivery compliance are the vital factors for supplier's selection. Chao *et al*. (1993) suggested that on time delivery is the most important criteria of purchasing performance evaluation from his survey result in a number of industries. Moreover, Briggs (1994) suggested that joint development; technical capabilities are the key requirements of a supplier's partnership, apart from optimum cost. This is because by technical capability company and suppliers can produce new product or new services; even they can handle everything effectively if suppliers have more technical capabilities. Consequently, suppliers should have good technical capability in terms of timely delivery, compliance with quantity, product development, transportation facilities, plant and layout, as proposed in this study. Therefore, when a supplier has more technical capabilities, there is more chance of being selected by telecommunication company.

Quality Assessment Criteria

Findings highlighted that quality related factor is a very important factor in telecommunication industry for selecting suppliers. Quality assessment related factor is important in terms of quality planning, inspection and experimentation, quality staff, process improvement, quality assurance in production and quality assurance in supply chain. However, the findings of this study are similar with previous studies (Chao *et al*., 1993; Briggs, 1994; Ghodsypour and O'Brien, 1998; Chan and Chan, 2004; Yuan-Jye and Yu-Hua, 2005). Tracey and Tan (2001) suggested that quality, reliability and product performance are the important criteria for supplier selection. Therefore, result also indicated that quality is an important factor in the telecommunication industry for selecting suppliers. Thus, all of the suppliers must be concerned about their quality for being selected.

Organizational Related Profile Criteria

In this study, stated that organizational profile is an important factor for supplier selection in the telecommunication industry. It is important due to strategy of suppliers, achievement of sales and achievement of current goals. Result highlighted it has a negative impact on supplier selection. Thus, hypothesis was not supported by the result. Although some studies found it is as an important factor for supplier selection (Briggs, 1994; Wei *et al*., 1997; Choy and Lee, 2002), but our present result showed it has negative impact. The organization with good technical capabilities in developing countries like Malaysia, can manage efficiently with whatever type of organizational have. In addition, they are not beginning of organizational profile to affect their performance in the management of their suppliers. This is may be the reasons for the not being significant.

Conclusion and Implementation

This research provides a comprehensive analysis of the important factor for supplier selection in the telecommunication industry. In doing so, it has contributed to the cumulated body of research in both supplier selection and telecommunication industry. The result from a survey conducted on impotent factors for supplier selection in Malaysian telecommunication companies have been

presented in this study. Supplier selection is one of the most important part in supply chain management that gains importance increasingly in the globalization process. Most of the companies can improve their competitive advantage by selecting good suppliers. In this study, we proposed a model for selecting suppliers among the conflicting criteria that are cost, technical capability, quality and organizational profile. One of the most important advantages of this proposed model is that it includes both tangible and intangible factors in supplier selection process. Since an extensive analysis is needed in the entire selection process, the proposed factors would help purchasing managers in the evaluation of supplier selection. These factors are expected to have a great role during the suppliers selection in telecommunication industry.

The findings discussed above have a number of implementation for management theories, companies involving telecommunication business and suppliers in this telecommunication industry. The factors put forward in this study serve as a building block for the development of a holistic conceptual theory dealing with supplier selection especially in telecommunication industry. However this study is consider as one of the first empirical study to suggest and validate those factors that play an important role in the telecommunication industry for supplier selection. It also provides scope for academic theories to operationally the concept of critical success factor in supplier's selection process. This study also has potential for managerial application during the supplier selection. It provides useful guideline in the form of the critical success element and factor that can engender success in supplier selection. From this study practitioners can derive a better understanding of the activities that are undertaken by the organization and how the way these activities are being dealt with can result in different forms of result. The factor proposed by this study should also enhance the current suppliers selection process models. There are limited literatures on the roles of supplier selection in telecommunication industry. The advancement of technology, globalization, stiff competition and movement towards free market economy has heightened the importance of supply chain flexibility. There is need to investigate all mentioned factors further especially in other industries. In addition, there are manufacturing factors focus on material, equipment, program etc. that examined. There is suspicion that supplier selection strategies could have some moderating effect on the relationship between supplier selection and all other factors mention in this study. Future research in this area should explore this moderator effect. Also replicating the current study in other industries in other nations is suggested. Such future research should include larger sample size to increase the external validity of the findings.

REFERENCES

Bartlett, C. and S. Ghoshal, 1987. Managing across borders: New strategies requirements. Sloan Manage. Rev., 28: 7-17.

Braglia, M. and A. Petroni, 2000. A quality assuranceoriented methodology for handling trade-offs in supplier selection. Int. J. Phys. Distribution and Logistics Manage., 30: 96-112.

Briggs, P., 1994. Case study: Vendor assessment for partners in supply. Eur. J. Purchasing Supply Manage., 1: 49-59.

Chan, F.T.S. and H.K. Chan, 2004. Development of the supplier selection model-a case study in the advanced technology industry. Proceedings of the Institution of Mechanical Engineers, December 218: 1807-1824.

Chao, C., E.E. Scheuing and W.A. Ruch, 1993, Purchasing performance evaluation: An investigation of different perspectives. Int. J. Purchasing-Mater. Manage., 29: 33-39.

Choy, K.L. and W.B. Lee, 2002. A generic tool for the selection and management supplier relationship in an outsourced manufacturing environment-the application of case based reasoning, Logistic Inform. Manage., 15: 235-253.

CMC., 2004a. (Communication and Multimedia Commission) http://www.cmc.gov.my/facts figures/ stats/ View Statistic. asp?cc=15194340&srid=32244510 visited 23.11.2004

CMC., 2004b. (Communication and Multimedia Commission) http://www.cmc.gov.my/facts figures/ stats/ index. asp visited 23.11.2004.

De Boer, L. and van der L.L.M. Wegen, 2003. Practice and promise of formal supplier selection: A study of four empirical cases. J. Purchasing-Supply Manage., 9: 109-118.

Degraeve, Z., E. Labro and F. Roodhooft, 2000. An evaluation of vendor selection models from a total cost of ownership perspective. Eur. J. Operat. Res., 125: 34-58.

Deng, S. and J. Dart, 1994. Measuring market orientation: A multi-factor, multi-item, approach. J. Market. Manage., 10: 725-42.

Dickson, G.W., 1966. An analysis of vendor selection systems and decisions. J. Purchasing. 2: 28-41.

Ellram, L.M., 1993. Total cost of ownership: Elements and implementation. Int. J. Purchasing-Mater. Manage., 29: 3-11.

Feng, C.X., J. Wang and J.S. Wang, 2001. An tolerances and suppliers. Computers and Ind. Eng., 40: 15-33.

Frazer, L. and M. Lawley, 2000. Questionnaire Design and Administration, John Wiley and Sons, Brisbane.

Ghodsypour, S.H. and C. O'Brien, 1998. A decision support system for supplier selection using an integrated analytic hierarchy process and linear pro. Int. J. Prod. Econo., 56-57: 199-212.

Hsu, C., V.R. Kannan, G. Keong Leong and K.Ten, 2006. Supplier selection construct: Instrument development and validation. Int. J. Logistic Manage., 17: 213-239.

Hou, J. and D. Su, 2007. EJB-MVC oriented supplier selection system for mass customization. J. Manuf. Technol. Manage., 18: 54-71.

Kahraman, C., U. Cebeci and Z. Ulukan, 2003. Multi-criteria supplier selection using fuzzy AHP. Logistic Inform. Manage., 16: 382-394.

Kraue, D.R., M. Pagell and S. Curkovic, 2001. Toward a measure of competitive priorities for purchasing, J. Ops. Manage., 19: 497-512.

Lau, H.C.W., S.K. Tso and J.K.L. Ho, 1998. Development of an intelligent task management system in a manufacturing information network, Expert Sys. Applic., 15: 165-79.

Lee, W.B., F.W. Lam and K.L. Choy, 1998. Dispersed network manufacturing a Hong Kong model (Keynote), Proceedings of the 8th International Manufacturing Conference, Singapore, pp: 18-25.

Malhotra, N.K., 1999. Marketing Research: An applied orientation, Prentice Hall, Upper Saddle River, New Jersey.

Muralidharan, C., N. Anantharaman and S.G. Deshmukh, 2001. Vendor rating in purchasing scenario: a confidence interval approach. Int. J. Operat. Prod. Manage., 21: 1306-1325.

Ndubisi, N.O. M. Jantan, L.C. Hing and M.S. Ayub, 2005. Supplier selection and management strategies and manufacturing flexibility. J. Enterprise Inform. Manage., 18: 330-349

Neuman, W.L., 1994. Social Research Methods: Qualitative and Quantitative Approaches, 2nd Ed., Allyn and Bacon, Boston.

Noci, G., 1997. Designing green vendor rating systems for the assessment of a supplier's environmental performance. Eur. J. Purchasing and Supply Manage., 3: 103-14.

Ohmae, K., 1989. The global logic of strategic alliance, Harvard Business Rev., 67: 143-54.

Percin S., 2006. An application of the integrated AHP-PGP model in supplier selection Measure Business Excellence, 10: 34-49

Prueitt, G.C., 2000. Case study: US army utility helicopter fleet modernization analysis, Eng. Ecot., 45: 271-89.

Quigley, P.E., 1995. Managing Your Suppliers: A Common Sense Approach, APICS, Alexandria, VA.

Sonmez, M., 2006. A Review and Critique of Supplier Selection Process and Practices" Busness Schlool Occasional Paper, ISBN: 1 85901 1977.

Tracey, M. and C.L. Tan, 2001. Empirical analysis of supplier selection and involvement, customer satisfaction and firm performance, Supply Chain Management. Int. J., 6: 174-188.

Tull, D. and D. Hawkins, 1993. Marketing Research: Measurement and Method Macmillan Publishing Company, New York.

Weber, C., J. Current and W. Benton, 1991. Vendor selection criteria and methods, Eur. J. Operatl. Res., 50: 2-18.

Weber, C.A., J. Current and A. Desai, 2000. An optimization approach to determining the number of vendors to employ. Supply Chain Management: An Int. J., 5: 90-98.

Wei, S., J. Zhang and Z. Li, 1997. A supplier-selecting system using a neural network. IEEE International Conference on Intelligent Processing Systems, October.

Yang, C. and B. Chen, 2006. Supplier selection using combined analytical hierarchy process and grey relation analysis. J.Manufacturing Technol.Manage., 17: 926-941.

Yuan-Jye T. and L. Yu-Hua, 2005. A model for supplier selection and tasks assignment. J. Ame. Acad. Bus. Cambridge, 6: 197-207.