



Customer Relationship Management Activities and Operational Performance in Taiwan Engineering Consultant Companies

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ABSTRACT

This study uses the engineering consultant company as the research subject to discuss effect of the market orientation and the information technology involvement on the customer relationship management activities execution degree, as well as the correlation between the customer relationship management activities execution degree and the operating performance. The research results show: the higher degree of customer relationship management activities execution has a significant and positive effect on the operational performance; execution of the market orientation helps to carry out the customer relationship management activities; the higher degree of the information technology involvement has a significant and positive effect on the degree of the customer relationship management activities execution. The engineering consultant company can adopt the market orientation strategy as well as strengthen the degree of the information technology involvement to promote the operational performance by carrying out the customer relationship management activities.

Keywords: customer relationship management, market orientation, operational performance.

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1.0 INTRODUCTION

Public Construction Commission, Executive Yuan in Taiwan defined the engineering consultant company as a company engaged in newly constructing, additionally constructing, reconstructing, constructing and removing the constructions and their affiliated equipment, changing the natural environment behavior and other technical services of the engineering identified by the competent authorities, including planning and feasibility research, basic design, detailed design, assisting bidding

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and award of bid, construction supervision, project management and their relevant technical services. The engineering consultant company is a member of the engineering consultant service industry, which plays an important role in the national economic development and public construction. At present, supply exceeds demand in the engineering consultant market and the market is becoming more and more competitive. While facing the highly competitive environment stress, it has been emphasized by many enterprises' operating strategies that how an engineering consultant company selects the appropriate operating strategy, brings the information technology and the market orientation concepts to the customer relationship management activities and then provide the customers with better service quality and promote the operational performance. In the empirical research, little research has brought the market orientation and information technology involvement concepts to the customer relationship management activities to discuss their effect on the operational performance. Therefore, this study uses the engineering consultant company as the research subject to discuss the correlation between the market orientation, information technology involvement, customer relationship management activities and operational performance. The purposes of this study are: (1) to discuss effect of the market orientation degree on the degree of the customer relationship management activities execution; (2) to discuss effect of the information technology involvement on the degree of the customer relationship management activities execution; (3) to discuss the effect of the customer relationship management activities execution degree on the operational performance; (4) to provide the engineering consultant companies with the proposed projects to carry out the customer relationship management activities and promote the operational performance with the results achieved by this study.

2.0 LITERATURE REVIEW

2.01 MARKET ORIENTATION

Narver and Slater (1990) divided the market orientation into three dimensions, including (1) customer orientation: fully understand the demands of the customers in the target market and predict the change in the customers' demands during the market change; (2) competitor orientation: analyze the existing and potential competitors and further develop their own companies' adaptive strategy; (3) cross-functional coordination: the enterprise coordinates and integrates the company's resources and creates the superior value for the customers. The market orientation defined by Kohli & Jaworski (1990) includes the market intelligence collection, the market intelligence transmission and response to the market intelligence. Narver and Slater (1990) preferred to observe the market orientation from the cultural dimension, while Kohli & Jaworski (1990) discussed the market orientation from the behavior dimension. Hurley & Hult (1998) thought that the market orientation can be discussed from many different dimensions, but from the perspective of the cultural dimension, market orientation is most meaningful. This study divides the market orientation into three dimensions of customer orientation, competitor orientation and cross-functional coordination according to the dimensions raised by Narver and Slater (1990).

2.02 INFORMATION TECHNOLOGY INVOLVEMENT

Roberts (1996) thought that information technology refers to all the software and hardware tools, used to obtain, apply, display, store and communicate the information. Li (2006) defined the information technology involvement as the resources and mental and physical efforts input by the organization to complete the management function of the information technology according to the literature discussion. Sakaguchi & Dibrell (1998) thought that degree of the information technology involvement can be measured with investment and training of information technology. Miller & Doyle (1987) thought that information technology involvement shall pay attention to three dimensions: (1) to understand the importance of information technology in the company; (2) to gain the benefits only by a certain degree of investment in software, hard ware and personnel; (3) to carry out the personnel training by considering the users' demands. This study divides the degree of information technology

involvement into three dimensions of personnel perception, software and hardware investment, and personnel training according the literature review (Miller & Doyle 1987; Sohal et al., 2001; Meso & Smith, 2000; Sakaguchi & Dibrell 1998; Li 2006).

2.03 CUSTOMER RELATIONSHIP MANAGEMENT ACTIVITIES

Peppard (2000) pointed out that customer relationship management is to make the best use of the existing and potential customers' information, and these information are used to predict and respond to customers' needs. Swift (2001) thought that customer relationship management is that the enterprises understand and influence the customers' behavior by the sufficient interaction with the customers. Ott (2000) thought that customer relationship management is the continuous relationship marketing, which meets the demands of the customers in different areas with different products and paths and continuously communicates with the customers of different levels. Kandell (2000) thought that the core of customer relationship management is to meet the customers' demands and the main purpose is to retain the customers and provide the customers with different products and services. Kalakota & Robinson (1999) thought that execution of customer relationship management includes three different stages, including getting the potential buyers, promoting the profits of the existing customers and retaining the valuable customers respectively. Swift (2001) thought that the enterprises can execute the customer relationship management though knowledge discovery, market planning, customer interaction, analysis and modification. This study uses the steps raised by Swift (2001) as the dimensions to carry out the customer relationship management activities.

2.04 OPERATIONAL PERFORMANCE

Croteau & Bergeron (2001) measured the performance with two dimensions of profitability and sales growth. Pelham (2000) measured the performance with three dimensions of efficiency, growth and occupancy as well as profitability. Kirca et al. (2005) used four dimensions of the overall business performance, profitability, sales and the market share as the indicators to measure the performance. Chow et al. (2003) used the indicators of the long-term profitability, sales or earnings growth rate as well as the financial ability to measure the performance. Tippins & Sohi (2003) used profitability, return on investment, customer retention rate and sales growth rate to measure the organizational performance. Shrader (2001) used profitability and sales growth rate to measure the operation performance. In the research of Su et al. (2003), the operation performance was measured by the dimensions of profit revenue and the customer satisfaction. Baker & Sinkula (1999) used the sales revenue, market share and profitability as the indicators to measure the performance. Summarizing the relevant literature discussion and considering the operation features of the engineering technology consultant company, this study uses six indicators of profitability, business growth rate, return on investment, customer retention rate, customer satisfaction and market share as the indicators which the company uses to measure the operational performance.

2.05 MARKET ORIENTATION AND CUSTOMER RELATIONSHIP MANAGEMENT ACTIVITIES

Chen & Ching (2004) thought that the market orientation has a positive effect on the execution performance of customer relationship management. Jaakkola et al. (2009) pointed out that the market-orientated culture must build within the organization in order to develop the customer relationship. Chen et al. (2004) pointed out that the market orientation is the footstone for the customer relationship management. The highly market-orientated culture in the organization will be considerably helpful for the organization's information acquisition, information technology investment and relationship activity proceeding. Through the literature discussion above, this study proposes **H₁: the higher degree of the market orientation has a significant and positive effect on the degree of customer relationship management activities execution.**

2.06 INFORMATION TECHNOLOGY INVOLVEMENT AND CUSTOMER RELATIONSHIP MANAGEMENT ACTIVITIES

Ko et al. (2008) indicated that the maturity degree of the information system will influence the degree of customer relationship management execution. Ratcliff (2000) thought that information technology enables the work related to customer relationship management to be executed more effectively. Caldwell (2000) thought that the key point of customer relationship management lies in building the close relationship between the enterprise and the customers, and application of information technology makes interaction between the enterprise and the customers more intimate. Cooper et al. (2000) thought that information technology is helpful to maintain the customer relationship. Linoff (1999) proposed that customer relationship management combined with application information technology can retain the customers who contribute to the enterprise. Krishnan et al. (1999) proposed that more and more companies provide the customers with the services based on information technology, in order to improve the product and service quality. Through the literature discussion above, this study proposes **H₂: the higher degree of information technology involvement has a significant and positive effect on the degree of customer relationship management activities execution.**

2.07 CUSTOMER RELATIONSHIP MANAGEMENT ACTIVITIES AND OPERATIONAL PERFORMANCE

Swift (2001) thought that the customer relationship management activities is an operation model that the enterprise understands and influences the customers' behavior by the sufficient interaction with the customers and then promote the customer loyalty and the customers' profitability. Tiwana (2001) pointed out that the customer relationship management activities can assist the enterprises to improve the customer relationship and obtain more profits from the existing customers. The research of Yim et al. (2004) pointed out that customer relationship management activities execution can promote the customer satisfaction and customer loyalty to reach the purpose of promote the enterprises' operational performance. Christy et al. (1996) thought that the customer relationship management activities can increase the revenue and the market share. Through the literature discussion above, this study proposes **H₃: the higher degree of customer relationship management activities execution has a significant and positive effect on the operational performance.**

3.0 RESEARCH METHOD

This study mainly discusses the correlation between the market orientation, information technology involvement, customer relationship management activities and operational performance. According to the literature discussion, this study deduces the research hypotheses as follows:

H₁: the higher degree of the market orientation has a significant and positive effect on the degree of customer relationship management activities execution.

H₂: the higher degree of information technology involvement has a significant and positive effect on the degree of customer relationship management activities execution.

H₃: the higher degree of customer relationship management activities execution has a significant and positive effect on the operational performance.

3.01 QUESTIONNAIRE COLLECTION AND DATA ANALYSIS

This study questionnaire is divided into four parts in total. The contents from Part One to Part Four are measured by Likert 5-point scale. Part One: the market orientation mainly includes three dimensions: (1) customer orientation; (2) competitor orientation; (3) cross-functional coordination. Part Two: information technology involvement includes three dimensions: (1) personnel perception degree; (2) software and hardware investment degree; (3) personnel training degree. Part Three: customer relationship management activities includes four dimensions: (1) knowledge discovery activity; (2)

market planning activity; (3) customer interaction activity; (4) analysis and modification activity. Part Four: operational performance is measured by the indicators of the company's profitability, business growth rate, return on investment; customer retention rate, customer satisfaction, market share and working efficiency. This study used 230 member companies registered by Chinese Association of Engineering Consultants in Taiwan as the empirical research subjects and collected the relevant data by the way of mailing and distributing the questionnaires from July to August 2015. The questionnaires collected from 36 companies were valid and the respondents were the companies' supervisors.

The reliability of the variables in this study are as shown in Table 1. Nunnally (1978) thought that the reliability in the exploratory research can be accepted as long as it reaches 0.7 and above. The reliability values of the variables in this study are all above 0.7, so it is trustworthy in reliability. This study uses the statistical software SPSS for windows to analyze and process the data and the main statistical analysis technique is variance analysis.

Table 1: Cronbach's α coefficients for all variables		
Questionnaire Dimension		Cronbach's α
Market Orientation	customer orientation	0.79
	competitor orientation	0.83
	cross-functional coordination	0.81
	personnel perception	0.85
Information Technology involvement	software and hardware investment	0.89
	personnel training	0.83
	knowledge discovery	0.84
Customer Relationship Management	market planning	0.88
	customer interaction	0.90
	analysis and modification	0.87
Operational Performance		0.86

3.02 MEASUREMENT OF VARIABLES

The variables being measured include the market orientation, information technology involvement, customer relationship management activities execution degree and operational performance, and the methods to measure the variables are narrated separately as follows:

3.2.1 MEASUREMENT FOR THE MARKET ORIENTATION

According to the relevant literature review and considering the operation type of the engineering consultant company, this study concludes the items needing to be executed by the market orientation, including

1. Customer orientation dimension: the content includes that (a) the customer satisfaction will be systematically measured; (b) the customer satisfaction will be the primary goal; (c) the improved service will be provided; (d) the commitment to the customers will be abided by; (e) the relevant information will be collected to grasp the customers' demands.
2. Competitor orientation dimension: the content includes that (a) the supervisors will regularly discuss the competitors' advantages and disadvantages; (b) the supervisors will use all kinds of channels to collect the information related to the competitors to provide the reference for various units; (c) the supervisors will quickly respond to the activities of the competitors; (d) the supervisors will continuously search for the market bringing the competitive advantages to the market.

3. Cross-function coordination dimension: the content includes that (a) all the units will exchange the customers' relevant information and intelligence; (b) the integration between each unit will be carried out according to the holistic strategy; (c) all the units will share the resources; (d) all the units will play the indispensable role in providing the customer value.

Likert 5-point scale is used for scoring, ranging from 5 (strongly agree) to 1 (strongly disagree).

3.2.2 MEASUREMENT FOR INFORMATION TECHNOLOGY INVOLVEMENT

In the dimension of information technology research, this study divides information technology involvement into the dimensions of personnel perception, software and hardware investment and personnel training according to the literature review.

1. Personnel perception dimension: the content includes that (a) the company holds the support attitude to information technology input; (b) the company has the common perception in the importance of information technology; (c) the degree of the personnel's accepting information technology is high.
2. Software and hardware investment dimension: the content includes that (a) the expenditure used in information technology by the company is sufficient; (b) the software invested in information technology by the company is sufficient; (c) the hardware invested in information technology by the company is sufficient.
3. Personnel training dimension: the content includes (a) educational training for information technology accepted by the personnel is sufficient; (b) the personnel can expertly use information technology; (c) the company has sufficient information technology professionals; (d) the company has the integrated information system textbooks and instruction manuals.

Likert 5-point scale is used for scoring, ranging from 5 (strongly agree) to 1 (strongly disagree).

3.2.3 MEASUREMENT FOR CUSTOMER RELATIONSHIP MANAGEMENT ACTIVITIES

The customer relationship management activities in this study adopt the four-dimension activity raised by Swift (2001), and considering the operation type of the engineering consultant company, the customer relationship management activities will be carried out and concluded to

1. Knowledge discovery dimension: the activity content includes that (a) the specific service market will be confirmed by analyzing the customers' information; (b) the better decision will be made by analyzing the previous historical materials and the customers' characteristics; (c) the customers will be confirmed, distinguished and predicted to allocate and use the resources in the most effective way.
2. Market planning dimension: the activity content includes that (a) the customers' information will be analyzed to develop the service plan; (b) the service types will be designed according to the customers' response; (c) the effective way to communicate with the customers will be developed; (d) the effective marketing channels will be found out to promote the company's business quality; (e) the factors attracting the customers to have the business contact with the company will be found out.
3. Customer interaction dimension: the activity content includes that (a) the information software or system devices will be used to continuously interact with the customers; (b) the customers will be interacted through various channels which are used to contact with the customers; (c) the customers' response will be detected and the data will be updated at any time.
4. Analysis and modification dimension: the activity content includes that (a) the information obtained from interaction with the customers will be analyzed and the customers' demands will be continuously understood; (b) the program developed previously according to the analysis results will be modified to search for the new market.

Likert 5-point scale is used for scoring, ranging from 5 (strongly agree) to 1 (strongly disagree).

3.2.4 MEASUREMENT FOR OPERATIONAL PERFORMANCE

In summary of the relevant literature review and considering the operation features of the engineering consultant company, this study uses six indicators of profitability, business growth rate, return on investment, customer retention rate, customer satisfaction and market share as the indicators to measure the company's performance. The measurement indicators include: (1) the company's profitability is higher compared to the same business; (2) the company's business growth rate is higher compared to the same business; (3) the company's return on investment is higher compared to the same business; (4) the proportion that the old customers trade with the company once again is very high; (5) the customers' satisfaction degree to the services provided by the company is higher compared to the same business; (6) the improvement degree of the company's market share is higher compared to the same business. Likert 5-point scale is used for scoring, ranging from 5 (strongly agree) to 1 (strongly disagree).

4.0 RESEARCH RESULTS

4.01 RELATIONSHIP BETWEEN THE MARKET ORIENTATION AND CUSTOMER RELATIONSHIP MANAGEMENT ACTIVITIES

This study divides the market orientation (customer orientation, competitor orientation, cross-functional coordination) degree into two groups (high and low execution degree), and inspects whether there is any significant difference between them according to the respective average scores of the customer relationship management activities execution degree in the two groups. ANOVA in the influence of market orientation on customer relationship management activities is shown in Table 2. The research results accept H_1 : the higher degree of the market orientation has a significant and positive effect on the customer relationship management activity execution degree.

Table 2: ANOVA of market orientation on customer relationship management (CRM) activities

CRM activities	Market orientation	Customer	Competitor	Cross-Functional
		Orientation	Orientation	Coordination
Knowledge Discovery	Low [#]	3.38	3.30	3.28
	High [#]	3.85	3.71	3.70
	F-value	23.18	11.50	13.41
	P-value	<0.001	0.002*	0.001*
Market Planning	Low [#]	3.28	3.29	3.27
	High [#]	3.77	3.73	3.68
	F-value	9.55	8.96	8.23
	P-value	0.004*	0.005*	0.007*
Customer Interaction	Low [#]	3.19	3.31	3.20
	High [#]	3.82	3.93	3.83
	F-value	8.04	5.69	7.79
	P-value	0.008*	0.023*	0.009*
Analysis and Modification	Low [#]	3.25	3.23	3.19
	High [#]	3.88	3.87	3.85
	F-value	7.27	7.51	9.11
	P-value	0.011*	0.010*	0.005*

Note: Low[#]: the market orientation execution degree is less than 3.5; High[#]: the market orientation execution degree is greater than 3.5; * $p < 0.05$.

4.02 RELATIONSHIP BETWEEN INFORMATION TECHNOLOGY INVOLVEMENT ON CUSTOMER RELATIONSHIP MANAGEMENT ACTIVITIES

This study divides information technology involvement (personnel perception, software and hardware investment, personnel training) into two groups (high and low degree), and inspects whether there is any significant difference between them according to the respective average scores of the customer relationship management activities execution degree in the two groups. ANOVA in the influence of information technology involvement on customer relationship management activities is shown in Table 3. The research results accept H₂: the higher degree of information technology involvement has a significant and positive effect on the customer relationship management activities execution degree.

Table 3: ANOVA of information technology involvement on CRM activities

IT involvement		Personnel	Software and	Personnel
		Perception	Hardware	Training
CRM activities	IT involvement		Investment	
	Knowledge Discovery	Low [#]	3.38	3.34
High [#]		3.75	3.84	3.85
F-value		7.91	11.26	9.03
P-value		0.008*	0.003*	0.005*
Market Planning	Low [#]	3.28	3.24	3.23
	High [#]	3.70	3.73	3.82
	F-value	6.58	5.65	6.24
	P-value	0.015*	0.023*	0.033*
Customer Interaction	Low [#]	3.27	3.20	3.25
	High [#]	3.71	3.82	3.82
	F-value	4.87	8.01	5.89
	P-value	0.034*	0.008*	0.021*
Analysis and Modification	Low [#]	3.15	3.16	3.24
	High [#]	3.79	3.87	3.84
	F-value	9.14	8.89	5.09
	P-value	0.005*	0.006*	0.031*

Note: Low[#]: information technology involvement is less than 3.5; High[#]: information technology involvement is greater than 3.5; * p < 0.05.

4.03 RELATIONSHIP BETWEEN CUSTOMER RELATIONSHIP MANAGEMENT ACTIVITIES AND OPERATIONAL PERFORMANCE

This study divides the customer relationship management activities (knowledge discovery, market planning, customer interaction, analysis and modification) execution degree into two groups (high and low execution degree), and inspects whether there is any significant difference between them according to the respective average scores of the operational in the two groups. ANOVA in the influence of customer relationship activities on operational performance is shown in Table 4. The research results accept H₃: the higher degree of customer relationship management activities execution has a significant and positive effect on the operational performance.

Table 4 : ANOVA of CRM activities on operational performance

	Operational Performance			
	Low [#]	High [#]	F-value	P-value
Knowledge Discovery	3.37	3.78	12.98	0.001*
Market Planning	3.31	3.82	26.31	<0.001*.
Customer Interaction	3.30	3.75	16.33	<0.001*
Analysis and Modification	3.40	3.71	6.32	0.017*

Low[#]: customer relationship management activities execution degree is less than 3.50;

High[#]: customer relationship management activity execution degree is greater than 3.50; * p < 0.05.

5.0 CONCLUSION AND SUGGESTIONS

In the empirical research, less researches have brought the market orientation and information technology involvement concepts into the customer relationship management activities to discuss their effect on the operational performance. Therefore, this study used the engineering consultant company as the research subject to discuss the correlation between the market orientation, information technology involvement, customer relationship management activities and operational performance. The research results show that the higher degree of market orientation and information technology involvement both helps the execution degree of the customer relationship management activities. In addition, the higher degree of customer relationship management execution has a significant and positive effect on the operational performance. Therefore, this study suggests that if the engineering consultant companies want to improve the operational performance, they shall need to promote the market orientation and strengthen the information technology involvement and customer relationship management activities execution degrees. This study only researches and discusses the engineering consultant companies. In the future, the empirical analysis can also be carried out on other industries to discuss the correlation between the market orientation, information technology involvement, customer relationship management activities and operational performance of the organizations in different industries, in order to obtain the more integrated research results.

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