VALUE CHAIN COSTING CAPABILITY AND FIRM PERFORMANCE: AN EMPIRICAL INVESTIGATION OF ELECTRONIC AND ELECTRICAL APPLIANCE BUSINESSES IN THAILAND

ศักยภาพการบัญชีต้นทุนห่วงโซ่คุณค่าและผลการดำเนินงาน: งานวิจัยเชิงประจักษ์ธุรกิจอุปกรณ์อิเลคทรอนิกส์และเครื่องใช้ไฟฟ้าในประเทศไทย

Sarinya Suphatranon[1], Kornchai Phornlaphatrachakorn[2], Karun Pratoom[3]

สรินยา สุภัทรานนท์[1], กรไชย พรลภัสรชกร[2], การุณย์ ประทุม[3]

Mahasarakham University[1,2,3]

kaisirinya@hotmail.com[1]

Abstract

The main purpose of this research is to examine the effects of value chain costing capability on firm performance. Data were collected by using a questionnaire survey from 152 accounting managers from electronic and electrical appliance businesses in Thailand. Network theory is applied to explain the relationship between determined variables; and the ordinary least squares (OLS) regression analysis was used for hypothesis testing. It was found in the study that cost competitiveness influenced firm performance, especially on expenditure monitoring report; and cost reduction competency highly influenced cost competitiveness. As a result, managers should support the business operation by auditing the follow-up reports of expenditures and by improving competency for cost reduction in order to obtain competitive advantages and effective performance in the future.

Keyword: value chain costing capability, cost competitiveness, firm performance

บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์หลักเพื่อศึกษาผลกระทบของ ศักยภาพการบัญชีต้นทุนห่วงโซ่คุณค่าที่มีต่อ ผลการดำเนินงานของกิจการอุปกรณ์อิเลคทรอนิกส์และเครื่องใช้ไฟฟ้าในประเทศไทย จำนวน 152 กิจการ จากผู้บริหารฝ่ายบัญชี โดยใช้แบบสอบถามเป็นเครื่องมือในการเก็บข้อมูล ทฤษฎีเครือข่ายใช้อธิบายความสัมพันธ์ของตัวแปรเหล่านี้ ผลการวิเคราะห์ความถดถอยพหุคูณ พบว่า ความสามารถในการแข่งขันด้านต้นทุน มีอิทธิพลต่อ ผลการดำเนินงานของกิจการ โดยเฉพาะอย่างยิ่ง การรายงานติดตามตรวจสอบรายจ่าย และ ความสามารถในการลดต้นทุน มีอิทธิพลอย่างมากต่อ ความสามารถในการลดต้นทุน ดังนั้นผู้บริหารต้องสนับสนุนการดำเนินงานโดยให้มี การรายงานติดตามตรวจสอบรายจ่าย และ ส่งเสริมให้มีการพัฒนาความรู้ความสามารถ ในการลดต้นทุนการผลิต เพื่อสร้างโอกาสให้เกิดความได้เปรียบด้านการแข่งขัน และผลการดำเนินงานที่มีประสิทธิภาพในอนาคต

คำสำคัญ: ศักยภาพการบัญชีต้นทุนห่วงโซ่คุณค่า, ความสามารถในการแข่งขันด้านต้นทุน, ผลการดำเนินงาน

Introduction

According to environmental changes of the world economy, most businesses have to adapt themselves and search for operational strategies to effectively link the internal economics to the external one (Garrigos, Molina & Molina, 2014). In particular, the manufacturing industry is facing an increasingly competitive pressure. In addition, products are not only produced for an international standard approval, but they should also be available with variety and quality higher than standard (World Economic Forum, 2017). The concept of value chain is highly important for current businesses (Porter, 1985). As a result, managerial accounting is implemented with integrations of the supply chain, value chain and activity-based costing (Li & Zhang, 2012). These activities are beneficial to manage enterprise's cost and increase the competitiveness (Wangcharoendate, 2015). Value chain costing refers to the firm performance to record, collect and analyze data of production and operation with less expensive cost than competitors (Kirli & Gumus, 2011). Therefore, proper value chain costing capability (VCCC) is an important key to combine business activities and link managements in all sections in order to appropriately analyze the operation, assess the cost value, and be capable to continuously produce standard products with variety, especially to follow up expenditure reports for doing analytic comparison between the internal and external firm performance, leading to information availability for effective operation (Boyle, Dezoort & Hermanson, 2015). According to competitive advantage theory, an organization can create competitive advantages from various activities in the organization properly for cost reduction by using the prize leadership strategy or differentiation strategy (Porter, 1985). This concept conforms to effective supply chain management, leading to the increase of competitive capability and the effectiveness of the organization as well (Li et al., 2006). This is consistent to the concept of network theory which explains the business capabilities to link operational network for increasing the competitive advantages and business effectiveness (Peppard & Rylander, 2006). Moreover, network theory also supports communication and interaction among business stakeholders to reduce risk factors in decision making for business investment (Li et al., 2016).

The research is conducted with Thai electronic and electrical appliance industry, because this manufacturing industry type likely faces with competitive challenges (Noordin et al., 2015). Thus, approaches for development are needed for the manufacturing firms in Thailand not only to keep up with the quality standards, but also to shift the quality level of the product higher than standard and customer expectation, leading to a competitive advantage in quality. In addition, this manufacturing industry type may respond to change rapidly by VCCC function. In order to increase firm value and good performance, this manufacturing industry type should be aware of reducing costs in all production activities and increasing the ability to create the efficiency of managerial accounting information (Phornlaphatrachakorn, 2017). Hence, electronic and electrical manufacturing businesses are an appropriate sample for this research. Accordingly, the researcher is interested to study the effects of VCCC on cost competitiveness and firm performance of the electronic and electrical appliance in Thailand to obtain empirical data used as guidelines for analysis, planning and operation.

Research Objectiveness

1. To test the relationships among each dimension of value chain costing capability (business goal integration, strategic operational linkage, operational activity analysis, cost reduction competency, and expenditure monitoring report) on cost competitiveness and firm performance.

2. To examine the impacts of cost competitiveness on firm performance.

Literature review and research hypotheses development

In this study, a conceptual framework of VCCC and the firm outcome is explicitly discussed and elaborately examined. Therefore, the conceptual model presents the relations between VCCC and firm performance as shown in Figure 1.
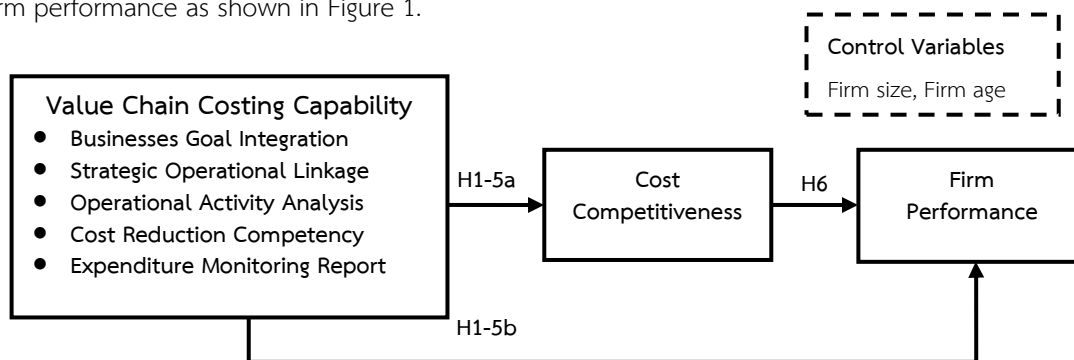

Figure 1: Conceptual Model of Value Chain Costing Capability and Firm Performance

1. Value Chain Costing Capability (VCCC) refers to the firm's ability to record, collect, and analyze information which related to manufacturing activities, internal and external firm operations with lower cost than competitors, informational presentation correctly and timely, and value creation to customers, leading to competitive advantages as well as higher firm performance consecutively (Fearne & Martinez, 2012). From the prior research and literature, VCCC is one of the fundamental tools to achieve the success in the cost management of the firm (Cadez & Guilding, 2008). It also plays a very important role in significant for decision-making improvement about strategic management accounting (Rosli, Said & Mohd, 2014, Aykan & Aksoylu, 2013). Moreover, the capability of a firm about value chain costing obtained the new approaches to manage enterprise's cost and enhance the competitiveness advantage (Mu & Cui, 2012).

1.1 Business Goal Integration (BGI) refers to the ability of the firm to combine policies, information, and guidelines for management in various sections; to transfer information; to share operation guidelines; and to set the production cost suitably (Swink, Narasimhan & Kim, 2005). From the literature review, corporate executives use business goal integration to determine production costs accurately have a relationship provide added competitiveness for firm performance (Lii & Kuo, 2016). Besides, the ability of combine business policies efficiently systematic and efficient policies appropriately for working in the organization can use to be a standard of performance has a positive relationship to competitive capabilities and manufacturing in the future more effective (Valanciene & Gimzauskiene, 2007). In contrast, to integrate business goals for good firm performance, the managers should be able to manage according to the internal and external environment too (Briscoe & Dainty, 2005). Likewise, the integration of the production process

with friendly-environment raw materials may cause higher production cost, resulting in undesirable financial operation (Mao, Zhang & Li, 2017). Therefore, the associations are hypothesized as follows:

H1: BGI is positively associated with a) cost competitiveness, and b) firm performance.

1.2 Strategic Operational Linkage (SOL) refers to the ability of the firm to link the internal operations, cost management, cost allocation, including the control and evaluation in the same direction (Ensign, 2001; Herzog, Tonchia & Polajnar, 2009). From the literature review, it was found operational linkage is the most important contributor to cost-containment while linkage with the supplier is the best strategy to cost competitiveness and achieve performance (Won, Kwon & Severance, 2007). Especially, in linking between manufacturing strategies has an important role to support It provides operational is positively related to firm performance, including competitive advantage (Holweg, & Helo, 2014). Therefore, the associations are hypothesized as follows:

H2: SOL is positively associated with a) cost competitiveness, and b) firm performance.

1.3 Operational Activity Analysis (OAA) refers to the ability of the firm to specify good operation guidelines, to analyze the benefits of each operational activities, and to set direction and plan systematically and concretely (Chang & Hwang, 2002). From the literature review, it was found OAA that the benefit of the activity-based costing is the cost control to the internal enterprise enables the firms to determine directions and concretely influence for the core competitiveness (Li & Zhang, 2012). Moreover, the firm to set guidelines for good such as value chain costing enables the firm to synthesize competitive capability of the organization for setting the continuous competitive advantages (Joglekar & Le, 2013). Therefore, the associations are hypothesized as follows:

H3: OAA is positively associated with a) cost competitiveness, and b) firm performance.

1.4 Cost Reduction Competency (CRC) refers to the ability of the firm to analyze and plan production cost in the past and at present, to reduce non-performing activities, and to evaluate the worth of the invested cost accurately and beneficially for decision-making (Grigore, 2013). Cost management is focused on value added activities, cost integration and reduction of non-performing activities that lead to cost competitiveness and firm performance (Bachev, 2014). Most of the industries emphasize on the value chain costing for cost reduction and improvement of competitive advantages (Aykan & Aksoylu, 2013). Thus, for the manufacturing firm that needs progressiveness, the value chain cost is the key strategy to provide more information useful for decision-making (Garrigos et al., 2014). Therefore, the associations are hypothesized as follows:

H4: CRC is positively associated with a) cost competitiveness, and b) firm performance.

1.5 Expenditure Monitoring Report (EMR) refers to the ability of the firm to identify, analyze, and present the expense information in each step of the working procedure accurately, timely and conformingly to the real situations (Boyle, DeZoort & Hermanson, 2015). EMR is presented to the management on the basis of preciseness, timeliness, completeness. It suggests that the expenditure monitoring affects developing the capacity for competitiveness and firm performance (Yasin, Muhamad & Sulaiman, 2016). Thus, EMR with the accuracy, completeness and timeliness disclosure has evidence to monitor the operations of the organization and to firm succeed (Teeratansirikool, et al., 2013). Therefore, the associations are hypothesized as follows:

H5: EMR is positively associated with a) cost competitiveness, and b) firm performance.

      2. Cost Competitiveness (CCT) refers to the possess of an effective operation line with short production time, quick and correct delivery, distinctive and creative products, and continuously lower operation cost (Bustinza, et al., 2015). In the competition of manufacturing business encourages the firm to focus on using the value chain costing as a tool for cost reduction and improving firm performance (Ussahawanitchakit, 2017). Hence, CCT is an instrument for enhancing firm performance to reduce cos. Therefore, the associations are hypothesized as follows: H6: CCT is positively associated with a firm performance.

      3. Firm Performance (FPF) refers to the ability in financial and non-financial performance over the previous years, such as revenue, market share, market growth, and return on investment (Kroes & Ghosh, 2010). In prior research, both financial and non-financial measures were used to estimate the performance of the firm (Ho, Ahmad, & Ramayah, 2016). In addition, FPF is an operation that presents the efficiency of corporate management both financial and non-financial activities, in order to survive in the future. Therefore, this research offers that VCCC has better relation to creating FPF.

      4. Control variables: Firm Size (FS) refers to the number of current full-time employees. Previous research has presented that firm size affects the ability of the firm performance (Zahra, 2007). Firm Age (FA) refers to the number of years a firm has been in operation. Previous research indicated that firms with long time operation were more experienced to operate with cost management and new learning, development, and investment (Capelleras & Rabetino, 2008).

Research Methods

      Sample Selection and Data Collection Procedure: The population of this research was the electronic and electrical appliance businesses in Thailand. The sample was selected from the online database of the Department of Business Development, Ministry of Commerce, Thailand (www.dbd.go.th). The firms active in the database were in total of 703 firms (information drawn on March 30, 2017). Consequently, a fit sample size was 255 [703 / (1+703 (0.05^2)] firms under the 95% confidentiality principle (Yamane, 1973). Based on prior business research, a 20% response rate for a mail survey, without a fit follow-up process, is deem enough (Aaker, Kumar & Day, 2001). Thus, 1,275 firms for a sampling frame (255 x 100/20); however, this number exceeded the expected sample size. As a result, this research used 703 firms as a sample population and for a distributed mail survey. With regard to the questionnaire mailing, 28 surveys were undeliverable. Deducting the undeliverable from the original 703 mailed, the complete mailing was 675 surveys, from which 152 responses were received. After four weeks of mailing the questionnaires, there were 122 responding questionnaires returning to the researchers. Then the researchers did the questionnaire follow-up by telephoning and obtained another set of 31 returning questionnaires. Only one questionnaire was incomplete. As a result, the completed questionnaires were 152. The effective response rate was about 22.51 percent [(152/675) x 100]. The response rate for a mail survey, without a fit follow-up process, if greater than 20 percent, is considered passable (Aaker, Kumar & Day, 2001). Hence, 152 firms are a sufficient sample size for employing multiple regression analysis. Moreover, the key informants were accounting executives, accounting directors or accounting managers.

Questionnaire Development and Variable Measurement: In this research, a questionnaire consists of six sections. In the first section asked for personal information. The second section was about general information electronics and electrical appliances businesses in Thailand. The third section was related to evaluate each of constructs in the conceptual model. The fourth section measured consequences of VCCC. Finally, the fifth section provided an open-ended question. In this conceptual model, all variables were measured on the five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree) excluding control variables. In addition, all constructs are developed for measuring from the definition of each construct and prior literature reviews. Thus, the variable measurements of this study are described as follows:

Dependent Variable: Firm performance is the ending dependent variable in this research. This construct is measured via the ability in outcomes, financial and non-financial performance, over the prior year, such as revenue, market share, market growth, and return on investment. This construct is an adopted scale, including five items.

Independent Variables: VCCC includes five dimensions: business goal integration, strategic operational linkage, operational activity analysis, cost reduction competency, and expenditure monitoring report. Each variable is measured using a four new items scale, in the questionnaire developed from the literature and the definitions. The variable measurements of each dimension are described as follows: Business goal integration is measured via the firm perception to determine the utilization of mixing precise, to transfer information, to share operation guidelines and to set the production cost suitably. Strategic operational linkage is measured via the firm perception toward its ability application of new techniques into manufacturing related to business strategy in order to prepare and present cost information to achieve greater success. Operational activity analysis measured via the firm perception of the importance of value activities analysis, product examination and information flow in order to reduce cost and evaluate competitive cost position during management control of the chain. Cost reduction competency is measured via the degree of application of value-added activities, by collecting and integrating cost information in each production process and eliminating non value-added activity, to be tools for controlling an operation. Expenditure monitoring report is measured via systematic monitoring evaluation, correct evaluation, completeness, timeliness, verifiable evidence.

Mediating Variables: Cost competitiveness is measured via the perception of a firm the outcome of cost saving, accurate cost allocation, continuous reduction of non-profitable activities, using less time in the production cycle and achieving the planned setting.

Control variables in this study comprise firm size and firm age. For the analysis, firm size is represented by a dummy variable including 0 (total employees less than or equal to 150 employees), and 1 (total employees more than 150 employees). Firm age is represented by a dummy variable including 0 (less than or equal 15 years), and 1 (more than 15 years).

Reliability and Validity: In this study, the Cronbach's alpha was used to test the reliability of the measurement. Coefficient alpha indicates the degree of internal consistency among items that should be

greater than 0.70 (Hair et al., 2010). Also, convergent validity was tested by the factor loading, each of construct should be greater than the 0.40 cut-off and all factors are statistically significant (Hair et al., 2010).

The results of measure validation show in table 1. Table 1 presents all variables have factor score between 0.650 - 0.959 indicating that there is the construct validity. Moreover, the reliability of all variable is accepted because Cronbach's alpha for all variables are shown between 0.800 – 0.946.

Table 1: Result of Measure Validation

Variables	Factor Loadings	Cronbach's Alpha
Business Goal Integration (BGI)	0.894-0.921	0.923
Strategic Operational Linkage (SOL)	0.890-0.947	0.892
Operational Activity Analysis (OAA)	0.769-0.858	0.845
Cost Reduction Competency (CRC)	0.780-0.927	0.880
Expenditure Monitoring Report (EMR)	0.650-0.919	0.856
Cost Competitiveness (CCT)	0.724-0.872	0.800
Firm Performance (FPF)	0.871-0.959	0.946

Statistical Techniques All dependent and independent variables in this study are the metric scale. Therefore, OLS regression is appropriate technique to test all hypotheses. From the conceptual model and hypotheses, the following five equation models are formulated:

Equation 1: CCT $= \alpha_1 + \beta_1 BGI + \beta_2 SOL + \beta_3 OAA + \beta_4 CRC + \beta_5 EMR + \beta_6 FS + \beta_7 FA + \varepsilon_1$

Equation 2: FPF $= \alpha_2 + \beta_8 BGI + \beta_9 SOL + \beta_{10} OAA + \beta_{11} CRC + \beta_{12} EMR + \beta_{13} FS + \beta_{14} FA + \varepsilon_2$

Equation 3: FPF $= \alpha_3 + \beta_{15} CCT + \beta_{16} FS + \beta_{17} FA + \varepsilon_3$

Results

Table 2 shows descriptive statistics and correlation matrix for all variables. Correlation coefficients of variables are ranging from 0.297 - 0.688. With respect to potential problems relating to multicollinearity, variance inflation factors (VIF) were used to test the intercorrelation among independent variable. In this study, the VIFs range from 1.090 to 1.127, well below the cut-off value of 10 (Hair et al., 2010), meaning that the independent variables are not correlated with each other. Therefore, there are no substantial multicollinearity problems encountered in this study.

Table 2: Descriptive Statistics and Correlation Matrix

Variables	BGI	SOL	OAA	CRC	EMR	CCT	FPF	FS
Mean	4.08	3.91	3.91	4.02	3.98	3.54	3.91	n/a
S.D	0.34	0.48	0.48	0.52	0.57	0.50	0.66	n/a
SOL	0.651***							
OAA	0.513***	0.676***						
CRC	0.517***	0.683***	0.613***					

Variables	BGI	SOL	OAA	CRC	EMR	CCT	FPF	FS
EMR	0.452***	0.620***	0.688***	0.660***				
CCT	0.297***	0.400***	0.472***	0.400***	0.503***			
FPF	0.303***	0.413***	0.422***	0.495***	0.410***	0.562***		
FS	0.042	0.073	0.123	0.157	-0.008	-0.070	0.060	
FA	-0.115	0.030	0.082	0.072	0.071	-0.137	-0.042	0.262***

***Correlation is significant at the 0.01 level (2-tailed).

Table 3: Results of Hierarchical Regression Analysis

Independent Variables	Dependent Variables[a]		
	CCT (Eq1)	FPF (Eq2)	FPF (Eq3)
Business Goal Integration	0.156**	0.102	
(BGI: H1a-b)	(0.068)	(0.071)	
Strategic Operational Linkage	0.046	0.157**	
(SOL: H2a-b)	(0.069)	(0.072)	
Operational Activity Analysis	0.207**	0.219**	
(OAA: H3a-b)	(0.068)	(0.071)	
Cost Reduction Competency	0.210**	0.329***	
(CRC: H4a-b)	(0.068)	(0.071)	
Expenditure Mentoring Report	0.460**	0.288***	
(EMR: H5a-b)	(0.069)	(0.071)	
Cost Competitiveness			0.331***
(CCT: H6)			(0.068)
Firm Size (FS)	-0.135	0.048	-0.036
	(0.141)	(0.148)	(0.087)
Firm Age (FA)	-0.352**	-0.183	-0.030
	(0.143)	(0.150)	(0.123)
Adjusted R^2	0.309	0.249	0.482
Maximum VIF	1.127	1.127	1.090

Beta coefficients with standard errors in parenthesis, *** $p<0.01$, ** $p<0.05$, * $p<0.10$

Table 3 demonstrated the hypothesis testing results. As show in model 1, the result indicated that the coefficients of BGI have a significant positive influence on CCT ($\beta1 = 0.156$, $p < 0.05$). Consistent with prior research found that firm that has a good process to combine policies, information, and guidelines for management in various sections, it can help firm to operate smoothly under variable conditions and operational cost is lower than competitors (Lii & Kuo, 2016). Thus, firm with business goal integration will be able to attain greater cost competitiveness. On the other hand, as show in model 2 BGI has no significant relationship with both FPF ($\beta8 = 0.102$, $p > 0.01$). It may be implied that firms that have a poor goal integration system, they will unable to maintain the competitive level in the present and future economic conditions (Mao, Zhang, & Li, 2017). It makes firms cannot firm performance. Therefore, Hypothesis 1a is supported but 1b is not. Secondly, as show in model 2 SOL has a positive significant influence on FPF

(β9 = 0.157, p < 0.05). These results are according to prior research which recommends that SOL also enables firms to the products quality products and to quality improvement, management professionals and achieve the goal as planned (Holweg, & Helo, 2014). This means it can give more FPF. Besides, as show in model 1 SOL has no significant effects on CCT (β2 = 0.046, p > 0.10). It may be implied that firms that has a poor SOL revealed no relationship with operational cost is lower than competitors (Parnell, 2011). Therefore, Hypotheses 2b is supported but, 2a is not. Thirdly, as show in model 1 and 2 the coefficients of OAA have a positive and significant impact on CCT (β3 = 0.207, p < 0.05) and FPF (β10 = 0.219, p < 0.05). Consistent with prior research found that firm that can analyze of each operational activity in the organization and business operational plans, be beneficial to firm's innovative products, products always meet market' demands, innovative products are continuously more outstanding than competitors and operational business effectively (Li & Zhang, 2012). Thus, firm with OAA will be able to attain greater CCT and FPF. Therefore, Hypotheses 3a, and 3b are supported. Fourthly, as show in model 1 and 2 the coefficients of CRC focus has a significant positive influence on CCT (β4 = 0.210, p < 0.05) and FPF (β11 = 0.329, p < 0.01). Consistent with prior research found the firm can evaluate the worthiness of cost investment, reduce non-productive activities, and plan cost production accurately cause production effectively and operation quality (Aykan & Aksoylu, 2013). Thus, the firm with CRC will be able to attain greater CTT and FPF development. Therefore, Hypothesis 4a, and 4b are supported. Fifth, as show in model 1 and 2 the coefficients of EMR has a significant positive influence on CCT (β5 = 0.460, p < 0.01) and FPF (β12 = 0.288, p < 0.01). Consistent with prior research found that the firm can to classify, analyze expense data, in time accurately and quickly according to with full benefits is positively influence on production, manages operational efficiency, and achieve the goal as planned (Teeratansirikool, et al., 2013). Thus, firm with EMR will be able to attain greater CCT and FPF. Therefore, Hypotheses 5a, and, 5b are supported.

Finally, as show in model 3 the coefficients of CCT has a significant influence on FPF (β15 = 0.331, p < 0.01). In line with previous research, it was found that the production line is effective, innovative products this will help companies FPF (Ussahawanitchakit, 2017). Therefore, Hypothesis 6 is supported. For the control variables, the result present that firm age has a negative and significant effect on CCT (β7 = -.352, p < 0.05). Mean that firm with more than 15 years in business operation has less than CCT. This effect a new business usually involves   innovation and it is simple to accept innovation and new concept (Ciabuschi, Pema & Snehota, 2012).

Contributions and Conclusions

Theoretical Contribution: The results of this research enhance the concept of the network theory in terms of linkages and mutual relationship among working units in a good organization. The network theory can explain the relationship of VCCC variables and consequences. This theory perceives that the linkages of good relationship networks enable the people in a particular network to work collaboratively, leading to competitive advantages and better firm performance. The relationship network can be integrated to the business goals, link operation, and analysis of working activities in order for business staff to collaborate work well, be capable of reducing cost, and audit the expense. The data of cost management can be used for effective decision-making in order to make the better firm performance.

Managerial Contribution: Firstly, the findings reveal that the dimension of CRC is the most influence on FPF. Thus, the managers have to emphasize on the analysis and production cost planning in order to reduce

non-performing activities as well as to evaluate the worth of the cost investment accurately and beneficially for decision-making on financial and non-financial operation of the firm. In addition, the dimensions of EMR, OAA, and SOL are also the factors with influence on FPF. As a result, administrators should focus on OAA to operate the production operation with suitable and accurate cost allocation. The expenditure information should be obtained quickly, accurately and in time, according to particular rapidly changing situations. For example, administrators can apply value chain costing properly with full potential by doing production activity analysis to link all production procedures in each step to collaborate well among one another with added value. Any non-performing activities should be reduced, and the application of accounting information technology should be focused in order to obtain quick and accurate accounting reports for continuously doing the operation evaluation and follow-up activities. Finally, the results show that CCT is the mediator variable which is the most influence on the FPF. Therefore, the administrators have to be determined to improve the operating systems by using new technology and production techniques to produce quality products to meet the market demands in uncertain situations for the better FPF. For example, the administrators support the application of new production technology and techniques to reduce the production time, but with high quality products, lower cost than competitors, and quick and accurate delivery. Therefore, administrators should allocate investment on necessary production technology, and focus on staff training for increasing staff's skills and experience for taking their responsibilities.

Conclusions: The purpose of this study is to examine the effect of VCCC on firm performance. The results indicated that three dimensions of VCCC (including OAA, CRC and EMR) have a significant positive influence on CCT and FPF. Furthermore, CCT has a positive influence on FPF. From the results, it can be summarized that electronic and electrical appliance business in Thailand with great VCCC will increase CCT, which leads these firms to survive in the long term. This research has some limitations that should be mentioned. With regards to the position of respondent's characteristics, approximately 22.51 percent are in other positions instead of chief accounting executive, account director or accounting manager. The rating scale that they answer to might not have the concrete judgment of key informants. Possibility, some answers provided affect the quality of the testing result. Thus, future research should be developing other research methodologies to test this conceptual framework. For example, qualitative in-depth interviews may help to explore the up-to-date point of views of reality from the chief accounting executive, the accounting director or the accounting manager of each electronic and electrical appliance business. This qualitative methodology stimulates the whole picture and the comprehensive understanding of VCCC.

References

Aaker, D. A., V. Kumar & Day G. S. (2001). *Marketing Research.* New York: John Wiley and Sons.

Aykan, E., & Aksoylu, S. (2013). Effects of competitive strategies and strategic management accounting techniques on perceived performance of businesses. *Australian Journal of Business and Management Research, 3*(7), 30.

Bachev, H. (2014). Integration of small-scale farmers in value chains in Bulgaria, with a case study on agrobusiness 88 Ltd., Skravena. IUP *Journal of Supply Chain Management, 6*(3), 39-61.

Boyle, D. M., DeZoort, F. T., & Hermanson, D. R. (2015). The effects of internal audit report type and reporting relationship on internal auditors' risk judgments. *Accounting Horizons, 29*(3), 695-718.

Briscoe, G., & Dainty, A. (2005). Construction supply chain integration: an elusive goal? *Supply chain management: an international journal, 10*(4), 319-326.

Bustinza, O. F., Bigdeli, A. Z., Baines, T., & Elliot, C. (2015). Servitization and competitive advantage: the importance of organizational structure and value chain position. *Research-Technology Management, 58*(5), 53-60.

Cadez, S., & Guilding, C. (2008). An exploratory investigation of an integrated contingency model of strategic management accounting. *Accounting, organizations and society, 33*(7-8), 836-863.

Capelleras, J. L. and Rabetino, J. R. (2008). Individual Organizational and Environmental Determinants of New Firm Employment Growth: Evidence from Latin America. *International Enterprise Management, 4*(1), 79-99.

Chang, C. J., & Hwang, N. C. R. (2002). The effects of country and industry on implementing value chain cost analysis. *The International Journal of Accounting, 37*(1), 123-140.

Ciabuschi, F., Perna A. & Snehota I. (2012). Assembling resources when forming a new business. *Journal of Business Research. 65*, 220-229.

Ensign, P. C. (2001). Value chain analysis and competitive advantage: Assessing strategic linkages and interrelationships. *Journal of General Management, 27*(1): 18-42.

Fearne, A. & Martinez, M. G. (2012). Dimensions of sustainable value chains: implications for value chain analysis. *Supply Chain Management: An International Journal, 17*(6), 575-581.

Garrigos, J. A., Molina, B. D. M. & Molina, M. D. M. (2014). Positioning in the global value chain as a sustainable strategy: a case study in a mature industry. *Administrative Sciences, 4*, 155-172.

Grigore, A. M. (2013). The Cost strategical analysis and chain value for the Romanian book publishing industry. *Romanian Journal of Marketing,* (3), 55-60.

Hair, J. F. Jr., Black W. C., Babin B. J., Anderson R. E. & Tatham R.L. (2010). MultivaGriate data analysis. 6[th]ed. *New Jersey: Pearson Education International.*

Herzog, N. V., Tonchia, S., & Polajnar, A. (2009). Linkages between manufacturing strategy, benchmarking, performance measurement and business process reengineering. *Computers & Industrial Engineering, 57*(3), 963-975.

Ho, T. C., Ahmad, N. H., & Ramayah, T. (2016). Competitive capabilities and business performance among manufacturing SMEs: Evidence from an emerging economy, *Malaysia. Journal of Asia-Pacific Business, 17*(1), 37-58.

Holweg, M., & Helo, P. (2014). Defining value chain architectures: Linking strategic value creation to operational supply chain design. *International Journal of Production Economics,* 147, 230-238.

Joglekar, N. and Le´vesque, M. (2013). The role of operations management across the entrepreneurial value chain. *Production and Operations Management, 22*(6), 1321-1335.

Kirli, M. & Gumus H. (2011). The implementation of strategic management accounting based on value chain analysis: Value chain accounting. *International Journal of social sciences and humanity studies, 3*(1), 307-321.

Kroes, J. R., & Ghosh, S. (2010). Outsourcing congruence with competitive priorities: Impact on supply chain and firm performance. *Journal of operations management, 28*(2), 124-143.

Li, C. Z., Hong, J., Xue, F., Shen, G. Q., Xu, X., and Mok, M. K. (2016). Schedule risks in prefabrication housing production in Hong Kong: a social network analysis. *Journal of Cleaner Production, 134*, 482-494.

Li, Lijie & Zhang. (2012). Organic combination of supply chain, value chain and activity-based costing. *Journal of Business Venturing, 26*(4), 489–503.

Lii, P., & Kuo, F. I. (2016). Innovation-oriented supply chain integration for combined competitiveness and firm performance. *International Journal of Production Economics, 174***,** 142-155.

Li, S., Ragu-Nathan, B., Ragu-Nathan, T.S., & Rao, S.S. (2006). The impact of supply chain management practices on competitive advantage and organizational performance. *Omega, 34*(2), 107-124.

Mao, Z., Zhang, S., & Li, X. (2017). Low carbon supply chain firm integration and firm performance in China. *Journal of Cleaner Production, 153*, 354-361.

Mu, L. & Cui, X. (2012). An experimental research on governance mechanisms for cost of value chain. *Nankai Business Review International, 3*(2), 199-218.

Noordin, R., Zainuddin, Y., Mail, R.& Sariman, N.K. (2015). Performance outcomes of strategic management accounting information usage in Malaysia: insights from electrical and electronics companies. *Procedia Economics and Finance, 31*, 13-25.

Parnell, J. A. (2011). Strategic capabilities, competitive strategy, and performance among retailers in Argentina, Peru and the United States. *Management decision, 49*(1), 139-155.

Peppard, J., & Rylander, A. (2006). From value chain to value network: Insights for mobile operators. *European Management Journal, 24*(2-3), 128-141.

Phornlaphatrachakorn, K. (2017). Competitor accounting and marketing performance: An empirical investigation of electronics and electrical appliance businesses in Thailand. *University of the Thai Chamber of Commerce Journal, 37*(4), 35-55.

Porter, M.E., (1985), Competitive Advantage: Creating and Sustaining Superior Performance, *New York: The Free Press***,** 3.

Rosli, M. H., Said, J., & Mohd, F. (2014). Factors that influence the use of Strategic Management Accounting in Malaysian Government-Linked Companies (GLCs). *Malaysian Accounting Review, 13*(2), 23-46.

Swink, M., Narasimhan, R., & Kim, S. W. (2005). Manufacturing practices and strategy integration: effects on cost efficiency, flexibility, and market‑based performance. *Decision Sciences, 36*(3), 427-457.

Teeratansirikool, L., Siengthai, S., Badir, Y., & Charoenngam, C. (2013). Competitive strategies and firm performance: the mediating role of performance measurement. *International Journal of Productivity and Performance Management, 62*(2), 168-184.

Ussahawanitchakit, P. (2017). Value chain costing, competitive advantage and firm success: Evidence from Thai auto parts manufacturing businesses. *International Journal of Business Research, 22*(3), 231-250.

Valanciene, L., & Gimzauskiene, E. (2007). Changing role of management accounting: Lithuanian Experience case studies. *Engineering Economics, 55*(5), 16-23.

Wangcharoendate, S. (2015). An increasing strategic cost management and organizational achievement from electronics parts businesses in Thailand. *Journal of Thonburi University, 9*(20), 9-23.

Won L., C., Kwon, I. W. G., & Severance, D. (2007). Relationship between supply chain performance and degree of linkage among supplier, internal integration, and customer. *Supply chain management: an International journal, 12*(6), 444-452.

World Economic Forum, 2017. The global competitiveness report 2016-2017 [Online]. *Available from http://reports.weforum.org/global-competitiveness-report-2016-2017/* [accessed 2 January 2017].

Yamane, T. (1973). Statistics: An introductory analysis.

Yasin, F. M., Muhamad, R., & Sulaiman, N. A. (2016). Effectiveness of corporate governance mechanisms: A review of the literature. *Asian Journal of Accounting Perspectives, 9*(1), 30-54.

Zahra, S. A. (2007). New Product Innovation in Established Companies: Associations with Industry and Strategy Variables. *Entrepreneurship Theory and Practice, 8*, 47-69.