

Value Chain Costing, Competitive Advantage and Firm Success: Evidence from Thai Auto Parts Manufacturing Businesses

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ABSTRACT

This study investigates the influences of value chain costing on competitive advantage and firm success of auto parts manufacturing businesses in Thailand. Customer response, customer acceptance and customer satisfaction are also hypothesized to be mediators of the relationships between value chain costing and competitive advantage. In this study, 138 auto parts manufacturing businesses in Thailand are the samples of the study. The results reveal that value chain costing (value creating activity, interdependent network, supplier-customer relationship, and continuous improvement) plays a significant role in determining business outcomes. Customer response, customer acceptance, customer satisfaction, and competitive advantage are important for driving their consequences. In addition, customer response, customer acceptance and customer satisfaction are the mediators of the research relationships. This study verifies the importance of value chain costing as consistent with dynamic capability theory. Supplier-customer relationship, interdependent network, value creating activity, and continuous improvement have a critical determinant of business outcomes respectively.

JEL Classification: M41

Keywords: value chain costing; customer response; customer acceptance; customer satisfaction; competitive advantage; firm success

I. INTRODUCTION

In increased highly and rigorously competitive environments, firms need to utilize valuable resources and capabilities through implementing critical operational techniques and reasonable organizational strategies so as to enable them to cope with these challenges efficiently. To provide an effective means of optimizing the use of limited resources, value chain analysis is important for understanding a sequence of strategically relevant activities that add values, benefits and contributions to the products or services provided by an organization to its customers (Chang and Hwang, 2002). It explicitly promotes firms to manage these activities effectively by deleting and minimizing unnecessary activities and maintaining and pooling necessary activities. It integrates value chain activities together by improving cost structure and profitability and creating customer satisfaction with firms' products or services. The necessary activities affect firms' competitive advantage and performance, but the unnecessary activities do not. Thus, value chain analysis is an increasingly significant business tool in helping firms respond customer needs and market requirements and achieve superior performance and sustainable success (Christopher and Gattorna, 2005). It becomes a key source of competitive advantage, performance and success within rapidly business situations and circumstances. Firms with effective value chain analysis tend to develop and exploit their inter- and intra-organizational capabilities to successfully compete in uncertain and unpredictable business markets and environments. Accordingly, successful value chain analysis leads to increased customer satisfaction, added competitive advantage and improved organizational success.

As mentioned earlier, value chain analysis is a main determinant of customer satisfaction, competitive advantage and organizational performance. It is an important topic for practitioners and researchers in several disciplines, such as marketing, management, production, and accounting. In existing accounting literature, value chain analysis and related issues have been empirically studied through the lens of what is so called "value chain costing." Value chain costing is one characteristic of strategic management accounting. It attempts to integrate concepts of accounting, management and marketing aspects in recognizing, managing and utilizing relevant business activities through cost structure, profitability and customer satisfaction in an organization. Moreover, value chain costing is a management accounting operationalization of value chain analysis. It is defined as an accounting approach of cost allocation to activities required to design, procure, produce, market, distribute, and service a product or service (Cadez and Guilding, 2007 and 2008). It views an organization as a link in the chain of all value creating activities associated with the provision of a product or service by considering any latent cost savings that lie unrealized in firms' linkages with their suppliers and customers. An outcome of value chain costing implementation is possibly contributed to cost management efficiency, operational improvement effectiveness, customer response quality, market advantage outstanding, and organizational success sustainability. Then, a successful implementation of value chain costing explicitly enables firms to meet customer requirements and achieve firms' competitive advantage and success in rigorous business competitions.

In this study, value chain costing comprises of four characteristics, including value creating activity, interdependent network, supplier-customer relationship, and

continuous improvement. It emphasized both cost and profit recognition and management of strategic relevant value chain activities. These characteristics are hypothesized to lead to firms' customer outcomes, competitive advantage and success. An effective implementation of the value chain costing characteristics is likely to drive superior aforementioned outcomes. Likewise, customer outcomes are consequences of value chain costing implementation, consisting of customer response, customer acceptance and customer satisfaction. They can lead to firms' competitive advantage and success. Firms with greater customer outcomes tend to develop and obtain competitive advantage and succeed in complex competitive markets and environments. To verify the value chain costing-competitive advantage relationships, indirect effects of value chain costing on competitive advantage are investigated. Thus, customer response, customer acceptance and customer satisfaction are hypothesized to mediate the research relationships. Also, the relationships between competitive advantage and firm success are empirically examined. Greater competitive advantage is positively linked to firms' more success in long term and future aspects. Their success can be perceived and measured through the lens of efficiency, effectiveness, profits, executive satisfaction, and sustainability.

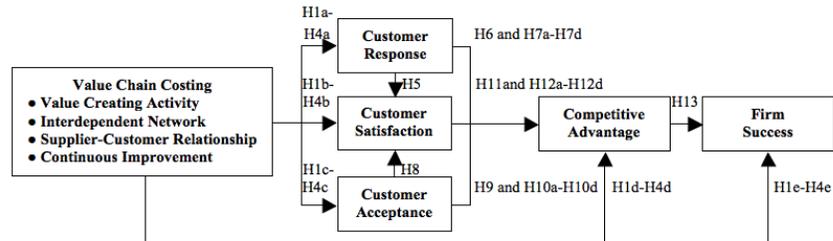
The objective of this study is to investigate the influences of value chain costing on competitive advantage and firm success of auto parts manufacturing businesses in Thailand. The key research question is how value chain costing influences both competitive advantage and firm success. The specific research questions are: (1) how does value creating activity, interdependent network, supplier-customer relationship, and continuous improvement lead to customer response, customer acceptance, customer satisfaction, competitive advantage, and firm success? (2) How do customer response and customer acceptance affect customer satisfaction and competitive advantage? (3) How does customer satisfaction influence competitive advantage? (4) How does competitive advantage impact firm success? And (4) how do customer response, customer acceptance and customer satisfaction mediate the research relationships? The remainder of this study presents relevant literature reviews, provides significant research hypotheses development, discusses the research methods used to test the hypotheses, indicates the results and reasonable discussions of the study, and concludes by discussing contributions for theory and management and providing directions for future research.

II. RELEVANT LITERATURE REVIEW

To explain and propose the value chain costing-firm success relationships, dynamic capability theory is important for elaborating these research relationships. According to theory of dynamic capability, an important source of firms' competitive advantage and performance is its capability. This capability focuses on creating, adapting, combining, integrating, and reconfiguring skills, resources and abilities to renew competencies to achieve congruence with changing environments (Teece, Pisano and Shuen, 1997). In this study, value chain costing as a one source of firms' capabilities is valuable, rare, non-imitate, and non-substitute and it is a key in driving customer response, customer acceptance, customer satisfaction, competitive advantage, and firm success. The conceptual model of value chain costing and its consequences and relationships is presented in Figure 1.

Figure 1

Conceptual model of the value chain costing-firm success relationships



A. Value Creating Activity

Value creating activity is a key characteristic of value chain costing implementation and it is defined as an ability of firms to combine their competencies and capabilities through providing solutions to customer needs and maintaining and improving their profit margins (Kahkonen, Lintukangas and Hallikas, 2015). It considers a trade-off between benefits and sacrifices in both money and non-money views. In value creating activity, firms have attempted to combine, integrate and pool their competencies and capabilities in an intra-organizational connection and with their partners in an inter-organizational linkage by managing transaction costs of these competencies and capabilities efficiently and effectively in order to ensure customer satisfaction, improve competitive advantage and create success in operational and strategic aspects. Furthermore, value creating activity becomes a key source of competitive advantage for firms and it refers to a process by which firms have communicated, delivered and exchanged offerings to customers by building customer response, acceptance and satisfaction (Ngo and O-Cass, 2010). It explicitly promotes market credibility to an organization and definitely leads to sustainable competitive advantage and superior performance in uncertain business environments. Then, the development, improvement and utilization of value creating activity is likely to help firms receive positive outcomes from customers, successfully compete in rigorous markets, gain well performance, and survive and sustain in long term and future operations. Similarly, value creating activity is a concern to all kinds of businesses and it requires a high degree of coordination and shared visions among different actors via a reasonable combination of distinctive competencies, compromised confidentiality, business transfers, and ascertainment of relevant costs (Ronnback, Witell and Enquist, 2009). It can influence purchase decisions and lead to market share, revenue growth, profitability, and competitive advantage. Accordingly, value creating activity is conducted to promote competitiveness of firms through customer response, customer acceptance and customer satisfaction, improve competitive advantage and performance and enhance success, survival and sustainability in the volatile markets and environments. Therefore, the research hypothesis is as follows:

- H1: Value creating activity has a positive effect on (a) customer response, (b) customer acceptance, (c) customer satisfaction, (d) competitive advantage, and (e) firm success.

B. Interdependent Network

To achieve an effectiveness of value chain costing implementation, interdependent network is also one characteristic of its qualifications and practices which firms have utilized to promote their operational efficiency and organizational effectiveness so as to meet customer needs and expectations, improve competitive advantage, increase competitiveness, gain superior performance, and obtain long term success in rigorously competitive environments. In this study, interdependent network refers to the condition in which one subsidiary or subunit of firms relies on another subunit's activities or inputs in order to perform its roles effectively (O'Donnell, 2000). It reflects the outcomes of one actor that are influenced by the actions of another actor. It enables firms to exploit their resources and capabilities to achieve and maintain a competitive advantage in the complex marketplace via an interaction of exchanges within and across relationships. The organization and growth of interdependent network explicitly help them determine successes of their businesses through increased competitiveness, provided specialized products and services and opened access to much wider markets (Caschili, Medda and Wilson, 2015). Thus, firms have used an interdependent network as an increasingly important tool in successfully doing business operations. In an aspect of strategic management accounting as value chain costing, interdependent network is considered as a critical key qualification and requirement of its implementation. Closed relationships with these networks are possible to affect value chain costing effectiveness. Stronger interdependent network definitely presents better uses of value chain costing in an organization for obtaining success, survival and sustainability. Then, interdependent network is likely to significantly respond customer requirements and positively influence competitive advantage and success. Therefore, the research hypothesis is as follows:

H2: Interdependent network has a positive effect on (a) customer response, (b) customer acceptance, (c) customer satisfaction, (d) competitive advantage, and (e) firm success.

C. Supplier-Customer Relationship

Supplier-customer relationship is an important characteristic of value chain costing and it is defined as an ability of firms to create collaboration with their customers by reducing transaction costs and creating transaction value (Jean, Sinkovics and Kim, 2014). A well-performing relationship exists when both suppliers and customers are satisfied through productive operations of firms and rewarding satisfaction of customers. Improving relationship efficiency and effectiveness, firms can exchange strategic information about planning and forecasting new product development with their customers. Moreover, supplier-customer relationship is a critical linkage to loyalty, satisfaction and anticipation of customer needs and sustainable competitive advantage (Stading, 2007). It becomes a long term commitment of a customer to a supplier and a favorable attitude of the supplier toward that supplier through information sharing along with risk sharing and relationship award. Thus, supplier-customer relationship tends to focus on working together as absorption, combination and coordination toward a common goal by delivering relationship performance and creating greater customer value in highly competitive markets. Firms have implemented

supplier-customer relationship in order to achieve lower product cost, reduced time-to-market, improved quality, advanced technology, and improved service and delivery (Bendixen, Abratt and Jones, 2007). They can utilize commitment, trust and continuous improvement for creating an impression of a personal relationship to customers in order to gain their benefits of supplier-customer relationship, including increased operational flexibility and more powerful competitive strategies. As mentioned earlier, supplier-customer relationship can help firms fulfill customer expectations, improve competitive advantage and build their success. Thus, it is likely to promote best business outcomes. Therefore, the research hypothesis is as follows:

- H3: Supplier-customer relationship has a positive effect on (a) customer response, (b) customer acceptance, (c) customer satisfaction, (d) competitive advantage, and (e) firm success.

D. Customer Improvement

In existing accounting literature, understanding continuous improvement is a knowledge integration of management accounting and modern management together. Continuous improvement is a key concept of value chain costing and it reflects a necessary implementation of value chain costing development. It is defined as a systematic effort aimed at finding and applying new ways of conducts to actively and repeatedly take initiatives to introduce changes (Anand et al., 2009). It attempts to search for problem solving methodology through using experiences resulting from made mistakes. In order to provide continuous improvement, both inter-departmental and inter-organizational processes are required. These processes involve using the capabilities found in currently held potential of an organization in an evolutionary manner. Firms with effective continuous improvement can use their capabilities to make cohesive and quick process to improve competitive advantage, performance and success. In achieving business excellence, continuous improvement is considered as an extremely important phenomenon through institutionalizing different tools, approaches and techniques with aims of stimulating successful business performance. It refers to a systematic management approach that seeks to achieve ongoing incremental performance enhancements through a gradual never-ending change process (Audretsch, Martinez-Fuentes and Pardo-del-Val, 2011). It is a culture of firms that enables to use their core and dynamic capabilities by involving organizational members working together with cross-functional works to make improvements with a low level of financial investment required. The efficiency and effectiveness of continuous improvement can fulfill firms' goals and objectives, promote customer satisfaction and improve overall performance. Likewise, continuous improvement promotes employees working together using a scientific approach to improve organizational processes and routines detection and elimination of root that causes of errors and other issues or problems (Kovach and Fredendall, 2013). It focuses on a long term process of team members' social exchanges by sharing explicit knowledge and combining information from various sources. It is targeted toward improved customer value through new versions of products and services and improved performance in reducing variations, defects and other kinds of wastes. Thus, continuous improvement is considered vital in responding to customer needs, building acceptance and satisfaction from customers,

improving competitive advantages, and promoting success in a highly competitive environment. Therefore, the research hypothesis is as follows:

- H4: Customer improvement has a positive effect on (a) customer response, (b) customer acceptance, (c) customer satisfaction, (d) competitive advantage, and (e) firm success.

E. Customer Response

Customer response is the first consequence of value chain costing implementation and it refers to the competence of an organization in serving customer needs through effective and quick actions (Jayachandran, Hewett and Kaufman, 2004). It comprises of customer response expertise (the extent to which the responses of a firm effectively meet customer needs) and customer response speed (the extent to which a firm's response to customer needs are rapid). More expertise and speed in responding needs, expectations and requirements of customers tend to affect sustainable competitiveness and long term stability and survival in highly competitive environments. Thus, successful customer response enables firms to achieve great business outcomes. Firms can obtain customer satisfaction, increase competitive advantage and promote organizational success via utilization of customer response. Similarly, customer response includes affective response and emotional response. Firstly, affective response can be measured from product assessment, company evaluation, word of mouth, purchase intention, and brand loyalty (Fatma and Rahman, 2016). Firms with customers' more affective response can gain better business performance. Secondly, emotional response is the feelings of customers that are aroused in association with a brand or product category (Chan, to and Chu, 2015). It focuses on a sense of well-being that fulfills psychological needs and increases satisfaction with one's status and quality of public goods. To pursue goals and objectives of business operations and practices, firms have attempted to create the competencies and capabilities of customer response in an organization in order to build customer satisfaction and achieve competitive advantage. Hence, customer response is important and it is likely to have a positive influence on the aforementioned outcomes. It also links value chain costing to competitive advantage. Then, customer response can help build indirect effects of value chain costing on competitive advantage. Therefore, the research hypotheses are as follows:

- H5: Customer response has a positive effect on customer satisfaction.
 H6: Customer response has a positive effect on competitive advantage.
 H7: Customer response mediates (a) the value creating activity-competitive advantage relationships, (b) the interdependent network-competitive advantage relationships, (c) the supplier-customer relationship-competitive advantage relationships, and (d) the continuous improvement-competitive advantage relationships.

F. Customer Acceptance

Customer acceptance is the second consequence of value chain costing implementation and it is defined as the strength of customers' intention to perform a specific behavior,

such as personal beliefs, attitudes and participations (Gao, Sultan and Rohm, 2010). It reflects to customers' receptiveness and intentions to engage in firms' activities, including involvements and participations of products, services and others. Greater customer acceptance tends to significantly affect improved customer satisfaction and increased competitive advantage. Likewise, customer acceptance occurs from customers' behavioral intentions through attitudes and subjective norms (Shin, 2009). Attitudes toward behaviors are customers' positive performance by performing target actions while subjective norms are customers' perceptions by thinking how they should perform. Firms with customer acceptance can successfully motivate their target customers to involve and participate in their operations, practices and activities efficiently and effectively. Thus, customer acceptance has a positive effect on customer satisfaction and firms' success. It has a significant role in determining customer satisfaction and driving firm success. According to the discussions earlier, value chain costing can create the acceptance from customers relating to high quality of products and services and low reasonable costs. In this part, customer acceptance is a key determinant of customer satisfaction and competitive advantage in an organization. Thus, customer acceptance plays an important mechanism in explaining the research relationships as a dependent variable of the study and a mediator of the value chain costing-competitive advantage relationships. Therefore, the research hypotheses are as follows:

- H8: Customer acceptance has a positive effect on customer satisfaction.
- H9: Customer acceptance has a positive effect on competitive advantage.
- H10: Customer acceptance mediates (a) the value creating activity- competitive advantage relationships, (b) the interdependent network-competitive advantage relationships, (c) the supplier-customer relationship-competitive advantage relationships, and (d) the continuous improvement-competitive advantage relationships.

G. Customer Satisfaction

Customer satisfaction is the third consequence of value chain costing implementation and it is a great value in understanding customers' perception and evaluation. In this study, customer satisfaction is an outcome of value chain costing practices and it is defined as an evaluation based on a comparison between customers' experiences and their initial expectations (Xu and Li, 2016). It is a main factor of creating competitive advantage and increasing firms' success. Greater results of this comparison in both objective and subjective aspects are considered to explicitly lead to more competitive advantage and longer success. Firms have attempted to build customer satisfaction in order to achieve sustainable competitiveness and superior success. Moreover, customer satisfaction refers to the degree to which customer expectations of a product or service are met or exceeded as against the perceived performance (Murali, Pugazhendhi and Muralidharan, 2016). It emphasized identification of customers and their needs and expectations, and measurements of their perceptions. It is a result of how firms can serve products and services to customers are satisfied. Then, an ability of firms to understand their customers' expectations is necessary and it can enhance competitive advantage and promote their great success. Furthermore, customer satisfaction is an

overall evaluation based on the total purchase and consumption experience with a good or service over time (Terpstra and Verbeeten, 2014). It reflects to an immediate post-purchase evaluation judgment and an affective reaction. Hence, customer satisfaction is positively related to firms' competitive advantage. In existing value chain costing literature, customer satisfaction is a mediator of the value chain costing-competitive advantage relationship. It helps link value chain costing to competitive advantage through indirect effects of the relationship. Therefore, the research hypotheses are as follows:

H11: Customer satisfaction has a positive effect on competitive advantage.

H12: Customer satisfaction mediates (a) the value creating activity-competitive advantage relationships, (b) the interdependent network-competitive advantage relationships, (c) the supplier-customer relationship-competitive advantage relationships, and (d) the continuous improvement-competitive advantage relationships.

H. Competitive Advantage

In this study, value chain costing, customer response, customer acceptance, and customer satisfaction are sources of competitive advantage in an organization. Competitive advantage is a key driver of firms' success and it is defined as an outcome of effectively utilizing firms' resources and capabilities in business operations, activities and practices that outperform their competitors (Wang, 2014). It enables firms to provide distinguished them from their competitors, improving organizational performance, creating added-value, and charging premium prices. Firms that have a sustainable competitive advantage can have higher long-term success. In addition, competitive advantage is defined as the comparative positional superiority that leads to outperform their competitors in the marketplace (Tsao, 2014). It consists of three characteristics, including cost leadership, innovation and market differentiation. Market differentiation is the creation of a unique image in the marketplace while innovation is the creation of the most up-to-date and attractive products by leading competitors in quality, efficiency, design, and style. Both market differentiation and innovation significantly lead to customer loyalty through meeting customers' particular needs in future and long term aspects. Also, cost leadership presents lower potential litigation costs and expenses in the markets compared with their competitors (Leonidou et al., 2015). It comes from having preferential access to cheaper raw materials, adopting recycling programs, exploiting financially reprocessed by products, and achieving economies of scales. Firms with cost leadership can gain superior performance in short term aspect. Thus, competitive advantage is positively related to firm success. Therefore, the research hypothesis is as follows:

H13: Competitive advantage has a positive effect on competitive advantage.

III. RESEARCH METHODS

A. Data Collection

In this study, auto parts manufacturing businesses in Thailand were a population of the study. All 618 auto parts manufacturing businesses in Thailand from Thai auto-parts

manufacturers association were selected as the samples of the study. These businesses are important because they are major parts of Thailand's economy and they have invested their high amount of money in the businesses. Thailand's government has explicitly supported auto parts manufacturing businesses through issues of laws and regulations, tax benefits and others. Likewise, a structure of cost information in the auto parts manufacturing businesses in Thailand is complicate. Thus, they tend to apply value chain accounting as a strategic tool in order to gain sustainable competitive advantage and achieve superior performance. A mail survey procedure via questionnaire was implemented by using accounting executives as the key informants because they have taken the highest responsibilities of accounting functions and other related activities in an organization, such as accounting directors or accounting managers. The questionnaire was developed from existing literatures of accounting and related fields. Deducting the undeliverable mailing, the valid mailing was 607 surveys, from which 144 responses were received. Of the surveys completed and returned, there are 138 usable questionnaires. The effective response rate was approximately 22.73% which is considered acceptable for the response rate for a mail survey because it is greater than 20% (Aaker, Kumar and Day, 2001). Thus, these usable questionnaires are empirically utilized to measure validation of the research instrument and analyze data for the research results. Likewise, this study verified potential and non-response bias by centering on a comparison of the first and the second wave data, such as firm experience and firm employee as recommended by Armstrong and Overton (1977). Our final samples of the study are 138 auto parts manufacturing businesses in Thailand. Accordingly, the first and the second wave data is 69 and 69 respectively. There were no statistically significant differences between first and second groups at a 95% confidence level as firm experience ($t = 0.107$, $p > 0.05$) and firm employee ($t = 0.117$, $p > 0.05$). According to this regard, neither procedure explicitly showed significant differences.

B. Measurements

All constructs were measured using a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree), except from firm experience and firm employee. These measurements of all variables are presented in Appendix A. Independent variables include value creating activity, interdependent network, supplier-customer relationship, and continuous improvement. Firstly, four-item scale was issued to assess value creating activity as how firms combine, integrate and pool their competencies and capabilities in an intra-organizational connection and with their partners in an inter-organizational linkage by managing transaction costs of these competencies and capabilities efficiently and effectively. Secondly, four-item scale was developed to gauge interdependent network as how firms exploit their resources and capabilities to achieve and maintain a competitive advantage in the complex marketplace via an interaction of exchanges within and across relationships. Thirdly, four-item scale was initialed to measure supplier-customer relationship as how firms create collaboration with their customers by reducing transaction costs and creating transaction value. Lastly, four-item scale was introduced to evaluate continuous improvement as how firms find and apply new ways of conducts to actively and repeatedly take initiatives to introduce changes and provide problem solving methodology through using experiences resulting from made mistakes.

Customer response, customer acceptance and customer satisfaction are the mediating variables of the study. Four-item scale was developed to examine customer response as how firms provide the competence of an organization in serving customer needs through effective and quick actions. Next, four-item scale was issued to test customer acceptance as how firms make the strength of customers' intention to perform a specific behavior, such as personal beliefs, attitudes and participations. Finally, four-item scale was established to investigate customer satisfaction as how firms provide the degree to which customer expectations of a product or service are met or exceeded as against the perceived performance.

Competitive advantage and firm success are the dependent variables of the study. Four-item scale was developed to assess competitive advantage as how firms measure an outcome of effectively utilizing firms' resources and capabilities in business operations, activities and practices that outperform their competitors. In addition, five-item scale was issued to examine firm success as how firms achieve business goals through efficiency, effectiveness, profits, executive satisfaction, and sustainability of their operations, activities and practices. To test the control variables of this study, firm experience (FX) was measured by the number of years a firm has been in existence, and firm employee (FE) was measured by the number of employees in the firm.

C. Instrument Test

Factor analysis, item-total correlation and Cronbach alpha were conducted to prove the quality of the research instrument in this study. Firstly, factor analysis was conducted separately on each set of the items representing a particular scale due to limited observations and it has a high potential to inflate the component loadings. Thus, a higher rule-of-thumb, a cut-off value of 0.40, was adopted (Nunnally and Bernstein, 1994). All factor loadings as values of 0.63-0.90 are greater than the 0.40 cut-off and are statistically significant. Secondly, discriminant power was utilized to gauge the validity of the measurements by item-total correlation. In the scale validity, item-total correlation as values of 0.63-0.90 is greater than 0.30 (Churchill, 1979). Lastly, the reliability of the measurements was evaluated by Cronbach alpha coefficients. In the scale reliability, Cronbach alpha coefficients as values of 0.76-0.90 are greater than 0.70 (Nunnally and Bernstein, 1994). The scales of all measures appear to produce internally consistent results; thus, these measures are deemed appropriate for further analysis as they express an accepted validity and reliability in this study. Table 1 presents the results of measure validation for multiple-item scales used in this study.

To test the value-chain costing-firm success relationships, ordinary least squared (OLS) regression analysis is conducted because all variables in this study were neither nominal data nor categorical data. The results of this study are presented in the next section.

IV. RESULTS AND DISCUSSION

The descriptive statistics and correlation matrix for all variables are provided as shown in Table 2. To verify the multicollinearity problems of the study, multicollinearity might occur when inter-correlation in each predict variable is more than 0.80, which is a high relationship (Hair et al., 2010). The correlations ranging from 0.32 to 0.79 at the

Table 1
Results of measure validation

Items	Factor		Cronbach Alpha
	Loadings	Item-total Correlation	
Value Creating Activity (VC)	0.73-0.83	0.72-0.81	0.76
Interdependent Network (IN)	0.72-0.81	0.72-0.81	0.78
Supplier-Customer Relationship (SR)	0.71-0.89	0.73-0.88	0.82
Continuous Improvement (CI)	0.80-0.84	0.80-0.84	0.84
Customer Response (CR)	0.76-0.85	0.77-0.84	0.81
Customer Acceptance (CA)	0.86-0.90	0.86-0.90	0.90
Customer Satisfaction (CS)	0.75-0.89	0.75-0.87	0.84
Competitive Advantage (CD)	0.78-0.85	0.78-0.84	0.83
Firm Success (FS)	0.63-0.89	0.63-0.89	0.87

Table 2
Descriptive statistics and correlation matrix

Variables	VC	IN	SR	CI	CR	CA	CS	CD	FS
Mean	4.15	4.02	4.18	4.15	3.93	3.65	3.91	3.86	3.68
s.d.	0.47	0.53	0.54	0.53	0.55	0.66	0.59	0.57	0.66
VC									
IN	0.58***								
SR	0.54***	0.53***							
CI	0.55***	0.57***	0.66***						
CR	0.41***	0.48***	0.56***	0.54***					
CA	0.38***	0.45***	0.49***	0.45***	0.66***				
CS	0.36***	0.42***	0.58***	0.48***	0.72***	0.76***			
CD	0.47***	0.54***	0.55***	0.51***	0.62***	0.74***	0.79***		
FS	0.32***	0.50***	0.48***	0.41***	0.58***	0.69***	0.65***	0.74***	

***p<.01

$p < 0.05$ level, which means that the possible relationships of the variables in the conceptual model could be tested. Similarly, variance inflation factors (VIFs) were used to provide information on the extent to which non-orthogonality among independent variables inflates standard errors. The VIFs range from 1.03 to 2.99, well below the cut-off value of 10 as recommended by Neter, Wasserman and Kutner (1985), means that the independent variables are not correlated with each other. Thus, there are no substantial multicollinearity problems encountered in this study.

To investigate the effects of value chain costing on business outcomes, the results of OLS regression analysis of the research relationships are presented in Table 3. Firstly, value creating activity has a significant positive effect on firm success ($b = 0.19$, $p < 0.10$). In existing literature, firms have attempted to combine their competencies and capabilities through providing solutions to customer needs and maintaining and improving their profit margins (Kahkonen, Lintukangas and Hallikas, 2015). Effective value creating activity implementation explicitly encourages them to build intra- and

Table 3
Results of OLS regression analysis^a

Independent Variables	Dependent Variables				
	CR	CA	CS	CD	FS
VA	0.15 (0.11)	0.02 (0.09)	0.02 (0.09)	0.09 (0.09)	0.19* (0.12)
IN	0.16* (0.09)	0.23** (0.10)	0.13 (0.09)	0.29*** (0.09)	0.38*** (0.10)
SR	0.33*** (0.09)	0.25** (0.10)	0.45*** (0.09)	0.28*** (0.09)	0.30*** (0.10)
CI	0.21** (0.10)	0.14 (0.10)	0.13 (0.10)	0.11 (0.09)	0.05 (0.10)
FX	-0.07 (0.08)	-0.16 (0.08)	-0.07 (0.08)	-0.05 (0.08)	-0.08 (0.08)
FE	0.03 (0.08)	-0.01 (0.08)	-0.03 (0.08)	-0.04 (0.07)	-0.04 (0.08)
Adjusted R ²	0.37	0.28	0.34	0.39	0.31

*p<.10, **p<.05, ***p<.01, ^aBeta coefficients with standard errors in parenthesis.

inter-organizational connectivity through gaining value-added benefits and contributions in order to achieve superior success, survival and sustainability in rigorously competitive markets and environments. Thus, value creating activity is importantly to positive affect firms' success in doing business operations, activities and practices. For the indirect effects of the research relationships, value chain activity has no effect on customer response, customer acceptance, customer satisfaction, and competitive advantage. Firms can provide value chain activity implementation that directly links to their success. Therefore, Hypothesis 1e is supported, but Hypotheses 1a-1d are not.

Secondly, interdependent network plays a significant role in determining customer response, customer response, customer acceptance, competitive advantage, and firm success. Congruence with existing interdependent network literature, firms have attempted to exploit their resources and capabilities to achieve and maintain a competitive advantage in the complex marketplace via an interaction of exchanges within and across relationships (O'Donnell, 2000). They also utilize their interdependent network in order to meet and fulfill customer needs and requirements, increase competitive advantage and promote success of organizational operations in rapidly business condition changes. Greater interdependent network implementation is positively related to better business outcomes. Then, interdependent network has a positive effect on customer response ($b = 0.16$, $p < 0.09$), customer acceptance ($b = 0.23$, $p < 0.02$), competitive advantage ($b = 0.29$, $p < 0.01$), and firm success ($b = 0.38$, $p < 0.01$). Therefore, Hypotheses 2a, 2b, 2d, and 2e are supported, but Hypothesis 2c is not.

Thirdly, supplier-customer relationship is important and it represents firms' competencies in creating collaboration with their customers by reducing transaction costs and creating transaction value (Jean, Sinkovics and Kim, 2014). Achieving successful supplier-customer relationship implementation, firms have attempted to provide a long term commitment of a customer to a supplier and a favorable attitude of

the supplier toward that supplier through information sharing along with risk sharing and relationship award. Accordingly, supplier-customer relationship becomes a critical strategic tool in helping firms obtain customer response, customer acceptance and customer satisfaction, create competitive advantage and promote their success. Better supplier-customer relationship has a positive relationship with the aforementioned business outcomes. Thus, supplier-customer relationship is positively to influence customer response ($b = 0.33, p < 0.01$), customer acceptance ($b = 0.25, p < 0.02$), customer satisfaction ($b = 0.45, p < 0.01$), competitive advantage ($b = 0.28, p < 0.01$), and firm success ($b = 0.30, p < 0.01$). Therefore, Hypotheses 3a-3e are supported.

Lastly, continuous improvement has an important positive determinant of customer response ($b = 0.21, p < 0.03$). Firms have implemented the concepts of continuous improvement in an organization in order to find and apply new ways of conducts to actively and repeatedly take initiatives to introduce changes and search for problem solving methodology through using experiences resulting from made mistakes (Anand et al., 2009). They can respond their customers' changing and dynamic wants efficiently, effectively and successfully through an awareness of continuous improvement. Hence, continuous improvement is a key determinant of firms' competencies and capabilities in responding and fulfilling customer needs and requirements. However, continuous improvement do not affect changes of customer acceptance ($b = 0.14, p < 0.19$), customer satisfaction ($b = 0.13, p < 0.20$), competitive advantage ($b = 0.11, p < 0.24$), and firm success ($b = 0.05, p < 0.59$). Implementing continuous improvement, firms must also perform other activities, such new product development, organizational innovation creation and operational excellence adoption in order to build acceptance from and satisfaction for customers, increase competitive advantage and enhance their success. Then, only continuous improvement does not drive these aforementioned outcomes. Therefore, Hypothesis 4a is supported, but Hypotheses 4b-4e are not.

The results of OLS regression analysis of the research relationships are also presented in Table 4. Customer response is the competence of an organization in serving customer needs through effective and quick actions (Jayachandran, Hewett and Kaufman, 2004). More customer response can enable firms to gain customer satisfaction. Firms need to provide and utilize customer response in order to obtain customer satisfaction, but it does not have any direct effect on competitive advantage. Thus, customer response is positively related to only customer response ($b = 0.41, p < 0.01$) while it has no effects on competitive advantage ($b = 0.01, p < 0.98$). Therefore, Hypothesis 5 is supported, but Hypothesis 6 is not. Likewise, customer acceptance has a positive impact on both customer satisfaction ($b = 0.50, p < 0.01$) and competitive advantage ($b = 0.33, p < 0.01$). According to existing literature, firms have definitely attempted to create the strength of customers' intention to perform a specific behavior, such as personal beliefs, attitudes and participations (Gao, Sultan, and Rohm, 2010). Within greater acceptance of customers, firms can successfully motivate their target customers to involve and participate with their operations, practices and activities efficiently and effectively. Thus, they can create customer satisfaction and increase competitive advantage in highly competitive markets. Therefore, Hypotheses 8-9 are supported. Also, customer satisfaction positively leads to competitive advantage ($b = 0.54, p < 0.01$). It is a comparison between customers' experiences and their initial expectations (Xu and Li, 2016). It presents the degree to which customer expectations

Table 4
Results of OLS regression analysis^a

Independent Variables	Dependent Variables					
	CS	CD	FS	CD	CD	CD
VA				0.08 (0.08)	0.08 (0.07)	0.10 (0.06)
IN				0.23*** (0.09)	0.16** (0.07)	0.20*** (0.07)
SR				0.17* (0.09)	0.14* (0.07)	0.01 (0.07)
CI				0.04 (0.09)	0.04 (0.08)	0.03 (0.07)
CR	0.41*** (0.07)	0.01 (0.07)		0.36*** (0.08)		
CA	0.50*** (0.06)	0.33*** (0.08)			0.56*** (0.06)	
CS		0.54*** (0.08)				0.66*** (0.06)
CD			0.73*** (0.06)			
FX	0.02 (0.06)	0.03 (0.06)	-0.04 (0.07)	-0.03 (0.07)		-0.01 (0.06)
FE	-0.05 (0.05)	0.04 (0.05)	0.02 (0.06)	-0.05 (0.07)		-0.02 (0.05)
Adjusted R ²	0.65	0.66	0.54	0.46	0.61	0.67

*p<.10, **p<.05, ***p<.01, ^aBeta coefficients with standard errors in parenthesis.

of a product or service are met or exceeded as against the perceived performance. Greater customer satisfaction is positively related to more competitive advantage. Firms with customer satisfaction can gain superior sustainable competitive advantage. Therefore, Hypothesis 11 is supported.

To examine the mediating effects of the research relationships, customer response plays an important mediating role in determining the value chain costing-competitive advantage associations, except for value creating activity. In Table 3, interdependent network has a significant effect on customer response and customer acceptance; supplier-customer relationship has an important influence on customer response, customer acceptance and customer satisfaction; and continuous improvement has a critical impact on customer response. Moreover, customer response ($b = 0.36$, $p < 0.01$), customer acceptance ($b = 0.56$, $p < 0.01$) and customer satisfaction ($b = 0.66$, $p < 0.01$) have a significant positive influence on competitive advantage as shown in Table 4. According to Baron and Kenny (1986)'s study, when customer response, customer acceptance and customer satisfaction as proposed mediators of the research relationships become independent variables in the conceptual model, they significantly lead to competitive advantage. Thus, customer response is the mediator of the interdependent network-competitive advantage associations, the supplier-customer relationships-competitive advantage associations and the continuous improvement-competitive advantage associations. Likewise, customer acceptance is the mediator of the interdependent network-competitive advantage associations and the supplier-

customer network-competitive advantage associations. Similarly, customer satisfaction is the mediator of the supplier-customer network-competitive advantage associations. Therefore, Hypotheses 7b-7d, 10b-10c and 12c are supported, but Hypotheses 7a, 10a, 10d, 12a, 12b, and 12d.

In this study, the competitive advantage-firm success relationships are also investigated. Competitive advantage has a critical positive effect on firm success ($b = 0.73, p < 0.01$). It is an outcome of effectively utilizing firms' resources and capabilities in business operations, activities and practices that outperform their competitors (Wang, 2014). Firms with more competitive advantage are more likely to achieve their success in doing businesses in a better and longer run. Thus, competitive advantage is a main determinant of driving, determining and explaining firms' success. Therefore, Hypothesis 13 is supported,

V. CONTRIBUTIONS AND DIRECTIONS FOR FUTURE RESEARCH

A. Theoretical Contributions and Directions for Future Research

This study attempts to integrate value creating activity, interdependent network, supplier-customer relationship, and continuous improvement as key characteristics of value chain costing. It confirms that these characteristics play important roles in determining business outcomes as congruent with dynamic capability theory. However, both value creating activity and continuous improvement are positively related to only firm success and customer response respectively. Thus, future research may need to provide more literatures reviews of value creating activity and continuous improvement relating to importance, necessity, benefit, and contribution of these concepts in order to reconceptualize further research associations. To expand the research results, future research may need to test the direct effects of customer response, customer acceptance and customer satisfaction on firm success while the current study did not. To verify the generalizability of the study, future research may need to collect data from other populations and countries. Structural equation model and partial least squared are also recommended to use for future research in order to verify the research results.

B. Managerial Contributions

Executives of firms can implement and utilize value chain costing in order to fulfill customer needs, requirements and expectations, increase competitive advantage and competitiveness and promote profitability, success, growth, survival, and sustainability in doing business operations, activities and practices within highly and rapidly competitive markets and environments, especially concepts and characteristics of interdependent network and supplier-customer relationship concepts. They need to study, understand and use these concepts and characteristics efficiently, effectively and successfully through providing firms' valuable resources, competencies and capabilities to support the development and improvement of interdependent network and supplier-customer relationship in an organization for creating future opportunities and building long term operations. Firms' vision, policy and leadership are needed to promote the usefulness of value chain costing implementation. Hence, vision, policy and leadership are important which the executive need to provide for obtaining these goals.

VI. CONCLUSION

Value chain costing becomes a valuable strategic tool in helping firms obtain future opportunities in doing businesses. Hence, the objective of this study is to examine the relationships among value chain costing, competitive advantage and firm success of auto parts manufacturing businesses in Thailand. Value chain costing comprises four characteristics, including value creating activity, interdependent network, supplier-customer relationship, and continuous improvement. Customer response, customer acceptance and customer satisfaction are also hypothesized to be mediators of the research relationships. In this study, 138 auto parts manufacturing businesses in Thailand are the samples of the study. The results indicate that (1) value creating activity has a significant influence on firm success; (2) interdependent network has an important effect on customer response, customer acceptance, competitive advantage, and firm success; (3) supplier-customer relationship has a critical impact on customer response, customer acceptance, customer satisfaction, competitive advantage, and firm success; and (4) continuous improvement has an outstanding interaction with customer response. In addition, customer response is significantly related to customer satisfaction; customer acceptance is importantly affected to customer satisfaction and competitive advantage; and customer satisfaction is critically influenced to competitive advantage. Likewise, customer response, customer acceptance and customer satisfaction play mediating roles in determining, defining and explaining the value chain costing-competitive advantage relationships. Finally, competitive advantage explicitly leads to firms' success in doing business operations, activities and practice within future and long term aspects. To verify and expand the research results, future research are needed to provide more literature reviews of value chain costing, reconceptualize the conceptual model, test the direct effects on firm success, collect data from other populations and countries, and apply other statistics in examining the research relationships, such as structural equation model and partial least squared. To efficiently, effectively and successfully implement and utilize value chain costing, executive of firms need to pay an attention to studying and understanding the concepts and characteristics of value chain costing through usefulness of their resources, competencies and capabilities in developing and improving the value chain costing system.

APPENDIX

Measurement of all variables

Items
Value Creating Activity (VC)
1. We believe that value creating activity or value-added activity can enable firms to have more managerial efficiency and effectiveness.
2. We pay attention to analyze all activities in an organization that are value or non-value added in order to increase operational efficiency.
3. We emphasize in deleting or decreasing firms' non-value added activities for achieving a goal of cost and expense reductions.
4. We attempt to integrate all value-added activities together for reducing number of activities and promoting maximize operational capabilities.

Interdependent Network (IN)

1. We believe that good linkages of operations together within and across organizations can support firms to gain greater business success.
2. We emphasize linking operations from materials to end users for establishing operational excellence.
3. We focus on exchanges of operations and practices between partners in order to create superior competitive advantage.
4. We enhance a value development of operations within and across organizations to increase firms' managerial competencies and capabilities.

Supplier-Customer Relationship (SR)

1. We believe that building relationships with customers can help firms succeed in doing businesses.
2. We attempt to study and analyze characteristics and features of customers for creating a database in order to promote efficiency of productions and operations.
3. We focus on continuously creating good relationships with customers for increasing production and marketing planning efficiency.
4. We emphasize in exchanging data and information with customers systematically and objectively for achieving maximize operational effectiveness.

Continuous Improvement (CI)

1. We believe that continuous activity development and improvement in an organization can enable firms to achieve their goals and objectives very well.
2. We attempt to improve efficiency and effectiveness of organizational activities for increasing continuous competitive advantage.
3. We focus on bringing firms' operations, activities and practices to create good organizational outcomes efficiently and effectively.
4. We pay attention to continuously develop and improve value-added activities for promoting stability, survival and sustainability in future and long term operations.

Customer Response (CR)

1. We provide best and excellent management in responding customer needs.
2. We can effectively respond customer needs in all competitive situations.
3. In compared with competitors in markets, we can provide best services to customers.
4. We can develop managerial innovation in order to respond to customer needs better than competitors.

Customer Acceptance (CA)

1. We achieve acceptance from customers relating to best management practices.
2. We have good reputation and acceptance of outstanding creation and innovation.
3. We always present modern management forms that are best accepted.
4. We can maintain customers' acceptance relating to their operational activity success outstandingly.

Customer Satisfaction (CS)

1. We can gain the belief of managerial capability from customers.
2. We can obtain the creditability from customers about best capable entrepreneurs.
3. We can achieve reliability from customers relating to continuous innovative productions into markets.
4. We can get confidence from customers that is related to ethical and morale entrepreneurs.

Competitive Advantage (CD)

1. We have operational innovation and creativity continuously.
2. We can manage their organizational operations, activities and practices economically and beneficially.
3. We can create management quality that has more different and outstanding than competitors.
4. We always apply new and modern operational methods, techniques and processes.

Firm Success (FS)

1. We have a confidence that we can operate our businesses with stability and sustainability in the current and future aspects.
 2. We have gained continuous market share increase compared with competitors.
 3. We have new customers recommended by existing customers who continuously join our business operations, activities and practices.
 4. We have different innovative operations from competitors that continuously present to the markets.
 5. We always have overall performances better than competitors.
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