

The Determinant of Supply Chain Management Practices in Indonesian Small-Medium Enterprises - An Empirical Study

James C. Chen

**Department of Industrial Engineering and Engineering Management
National Tsing-Hua University
Kuang-Fu Rd, Hsinchu 30013, Taiwan**

Imam Baihaqi

**Department of Business and Management
Institute of Technology Sepuluh Nopember
Sukolilo, Surabaya 60111, Indonesia**

Nadia Aulia Arifin

**Departement of Industrial Engineering and Engineering Management
National Tsing-Hua University
Kuang-Fu Rd, Hsinchu 30013, Taiwan**

Abstract

Supply Chain Management (SCM) has been well known as a simultaneous integration of customer requirements, internal processes, and upstream supplier performance. The term of supplier is diverse from big scale enterprises to small and medium enterprises (SMEs). Particularly, SMEs are also known as a bigger supply chain's counterpart and have significant impact to speed up the whole integration in global supply chain. Using institutional theory as theoretical lens, this paper hypothesize that the implementation of SCM in SMEs is influenced by internal and external aspects including environment uncertainty, institutional theory, and internal resource. A survey method is being used to gather 130 Indonesian SMEs to describe their level of SCM implementation from resource based point of view. Data was then analyzed by using Structured Equation Modeling (SEM) to test the hypotheses. The results show that there are significant correlations between SCM practices with organizational performance. Whereas, the most affecting factor in SCM practices is internal resource including information technology alignment and advancement. It is important for SMEs to be equipped with primer technology, such as computer, internet, and simple enterprise package software.

Keywords

SCM, SMEs, SEM, environment uncertainty, institutional theory, internal resource, organizational performance.

1. Introduction

Today's competition is become tighter due to the fact of perfect competition and perfect market (Pujawan and ER, 2010). Achieving efficiency within organization is no longer enough. A whole supply chain needs to be efficient as the competition is no longer between firms, but also among supply chains. Supply chain itself is constructed from upstream and downstream level of supply. Whereas in upstream level, a smaller enterprise is playing a big role sustain the continuity of raw materials, machine parts, and also consumer products (Li *et al.*, 2004). This player is identified by Small-Medium Enterprises (SMEs) by public. Therefore, SMEs also need to be efficient in managing their supply chain activities. Implementing supply chain management (SCM) in SMEs may offer potential benefits as their large firm counterparts benefit from its implementation (Baihaqi and Shandhu, 2010). The benefit is including better vendor management, enabling the pull system production, and corporate responsibility issue. In short, literature has reported that SCM contribute significantly to an organization's performance and to bring a competitive advantage among businesses. Li *et al.* (2004) has explored that organization with higher SCM level has higher competitive advantage and performance. Therefore, SCM can be regarded as one alternative strategy to improve the organizational performance. Forward-thinking firms have emerged as the star in competitions because of their intensive management in supply chain. Williamson (1983) found some factors affecting the integration of

supply chains, such as: internal resource and environment uncertainty. Internal resource, or recently known for its IT context, tend to drive these firms to be unique, rare, more valuable, and more competitive (Zhang and Dhaliwal, 2009). Environmental uncertainty as identified in several economic, manufacturing, and supply chain literatures is considered to be cause factor in selecting SCM policy. As explained by the Transaction Cost Theory, high levels of business uncertainty tend to drive the firm towards a vertical integration strategy. Another factor, which even less researched, is institutional theory. Institutional theory refers to the expectations of behavior practice from other institutions (DiMaggio and Powell, 1983).

SMEs are industries which give a high contribution to economic transactions. They are known as those who saved the Indonesian economy after the crisis situation. Their role as the trigger of economic growth and employment in Indonesia was an early step for its government to empower the production sector in many different fields (Indonesian Statistic Bureau, 2004). SMEs contribute 60% of Indonesia Gross Domestic Product (GDP) and absorb 97% employment in Indonesia (Indonesian Statistic Bureau, 2011). In many large firms, the implementation of SCM has been established (Norek *et al.*, 2007) but not in Indonesian SMEs. A literature review revealed that there is a limited research of SCM in SMEs (Bayraktar *et al.*, 2009)

The purpose of this paper is to investigate the drivers of SCM implementation in SMEs and the role of internal resources in the successful implementation of SMC in SMEs. The paper is structured as follows. First, the next section discusses the review of relevant literatures, followed by literature review including supply chain and supply chain practices, and factors affecting supply chain integration. The third section is hypothesis development, followed by data collection in fourth section and result and discussion in fifth section.

2. Literature Review

2.1. Supply Chain Management and Supply Chain Practices

Supply Chain is a system, in which customer may benefited from product and service distribution. In SMEs context, SCM may be narrowed into stabilizing logistic procurement and product distribution (Indrajit and Djokopranoto, 2002). The basic principal covered by SCM is explained in Figure 1, as follow: (1) the flow of materials, (2) the flow of information, (3) and the flow of money.

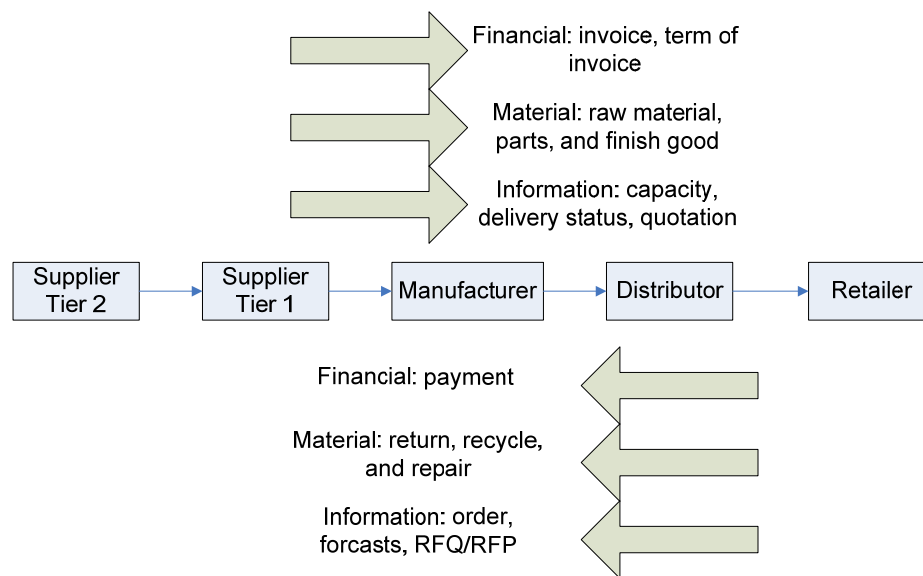


Figure 1: Simple model of three flows in Supply Chain (Pujawan and ER, 2010)

SCM can be seen in many point of view depend on the purpose of its implementation. There are some popular classifications of research, such as: (1) purchasing and supply management, (2) operation management, (3) organizational theory, (4) information system, (4) and marketing. From those various theories, there are some specific aspects for each perspective (Li *et al.*, 2004). Based on their research, there are some dimensions of supply chain practices, such as: (1) strategic supplier partnership, (2) customer relationship, (3) level of information sharing, (4) quality of information sharing, (5) and postponement.

2.2 Factors Affecting Supplier Integration

From resource-based point of view (RBV), SCM as a theoretical perspective that attempts to describe, explain, and predict, how firms can achieve a sustainable competitive advantage through acquisition and control over resources. According to the RBV, there are two dimensions of assets: tangible asset (e.g. equipment) and intangible asset (e.g. process knowledge and IT) (Rungtusanatham *et al.*, 2003). Besides RBV, there were also environment uncertainty and institutional theory as externalities. Uncertainty is the situation where the probability of the outcome of an event is unknown, as opposed to a risk situation where each outcome is calculated as probability (Luce and Raiffa, 1957). Institutions are part of a network of socio-economic relationships and they shape the institutional theory in their environments. In business environment, firms tend to put some normative pressures to influence the structure and practices in that environment. Institutional theory also increases the firm's survival capabilities (DiMaggio and Powell, 1983)

3. Hypothesis Development

By observing the nature of SCM implementation in SME, a framework is developed according to behavioral tendency to test some hypotheses:

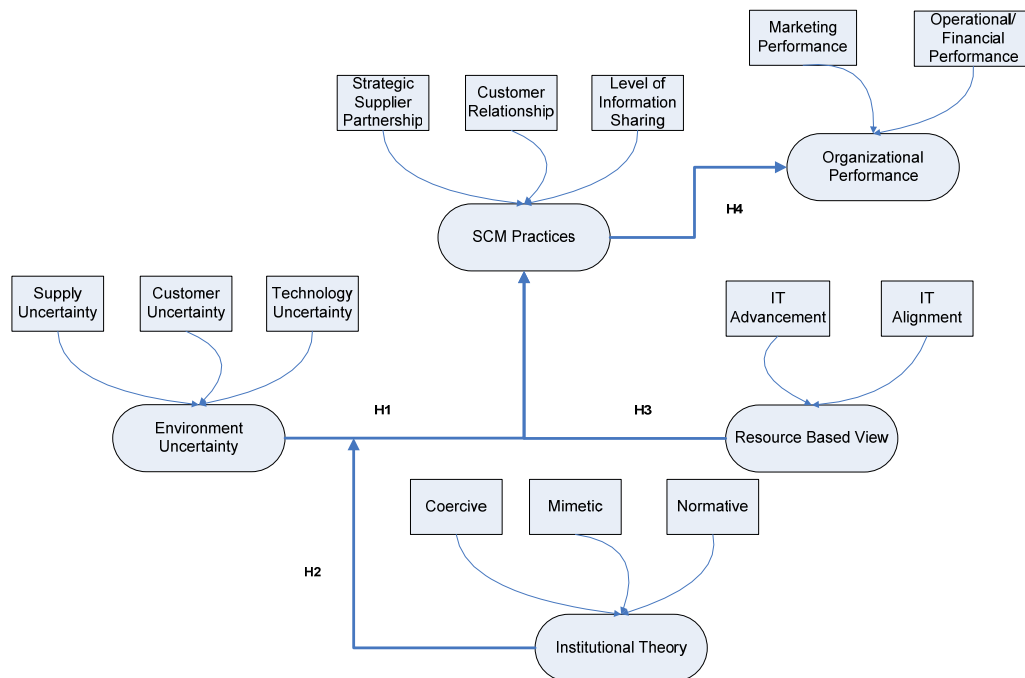


Figure 2: The Research Framework Model of SCM Practices in SMEs

H1: The environmental uncertainty will be positively associated with their SCM practices.

Davis (1993) suggests three different sources of uncertainty in supply chain: (1) customer uncertainty, (2) supply uncertainty, (3) technological uncertainty. Customer uncertainty refers to the quantity and timing of demand, while supply uncertainty refers to quality and lead time. These conditions lead to excess or shortage inventory. Technology uncertainty caused by different technology implemented by firms. This kind of uncertain condition leads the firm to work together with partners in order to have more sustained performance.

H2: The institutional theory will moderate the relationship between environmental uncertainties and their SCM practices.

Lai *et al.* (2006) found that institutional theory emphasizes the institutional isomorphic processes that exist in groups of firms. There are three types of isomorphism: (1) coercive, (2) mimetic, and (3) normative. While coercive is dealing with political influence and problem of legitimacy, mimetic is more concern in standard response to uncertainty, and normative is associated with professionalism (DiMaggio, 1983). These factors will be affecting both environment and supply chain practices. The coercive isomorphism will lead to sustain environment, mimetic

isomorphism will lead to integration between firms to meet the same standard, and normative isomorphism will tend to drive disciplines among supply chain partners

H3: The internal resource will be positively associated with their SCM practices.

IT links the firm's internal organization and it is identified as key successes in supply chain integration. Wu *et al.* (2006) found that to understand how IT can affect the supply chain is described from two perspectives: IT advancement and IT alignment.

H4: The SCM practices will be positively associated with organizational performance

There will be three dimensions of SCM practices that will be identified in this research, they are: (1) strategic supplier partnership, (2) customer relationship, (3) and level of information sharing (Li *et al.*, 2004). There is an indication that an effective SCM will be positively correlated with a higher performance of organization. To measure the correlation between SCM and organization performance, there are two indicators: marketing performance and financial/operation performance.

4. Data Collection

Without certain respect to other methods, survey is being used to test the hypotheses according to these following reasons: (1) the survey involves collection of information by asking respondents in structured format, (2) the survey requires a standardized information in order to define or describe factors and relationship between factors, (3) and the collected survey will be able to generalize findings from the population of the sample (Baihaqi and Sandhu, 2011). The survey point itself is widely adopted from existing journals with modification to SME respondents.

4.1 Statistic Description

To grasp the information instrument, we had been working with Mitra Bersama Organization, an Indonesian organization that helps people to educate their operating management business. Some of our respondents (50%) were the members of Mitra Bersama Organization and the rest were established independently. There were 130 SMEs gathered during the data collection. The SMEs classified into: metal, food and beverage, chemical, plastic, glass, furniture, handicraft, garment, fashion, etc. The investigated firms' sizes start from 1-20 headcounts, 20-50 headcounts, 50-100 headcounts, and more than 100 headcounts. From 130 respondents, all of them achieved such a formal pedigree; junior high school graduates, senior high school graduates, vocational school graduates, diploma graduates, bachelor graduates, and master graduates. There were 50 statements about: supplier uncertainty (EU1), customer uncertainty (EU2), technology uncertainty (EU3), coercive (IT1), normative (IT2), mimetic (IT3), IT advancement (IR1), IT alignment (IR2), strategic supplier partnership (SC1), customer relationship (SC2), and level of information sharing (SC3), and organizational performance approved by respondents. The detail of each question is listed on Appendix 1. The value of data represents Statistical description to their answered displayed in table below:

Table 1: Statistic description of respondents' answer

	N	Minimum	Maximum	Mean	Std. Deviation
EU1	130	2	5	3,785	0,948
EU2	130	2	5	2,923	0,841
EU3	130	2	5	3,046	1,120
IT1	130	2	5	3,023	0,840
IT2	130	2	5	2,915	0,826
IT3	130	1	4	2,523	0,799
IR1	130	1	4	2,162	0,824
IR2	130	1	4	2,323	0,934
SC1	130	2	5	3,323	0,917
SC2	130	2	5	3,800	0,811
SC3	130	2	5	3,069	0,818
OP1	130	2	5	3,085	0,949
OP2	130	2	5	2,962	0,991

To analyze the validity of the constructs, EFA and CFA are needed. However, the number of manifest indicator and the number of respondents do matter in the processing stage. The insufficient data will lead to inappropriate construct conclusions. To make the data more reliable, there were two steps approaches to SEM; to build composite value for each indicator and then validate the sub dimension with CFA. The description of composite indicators as follow:

Table 2: Composite values

Indicator	Mean	St. Dev	Var- iance	Composite Reliability	Loading Factor Composite	Error Variance Composite
EU1	5,064	0,710	0,503	0,648	0,805	0,177
EU2	3,977	0,844	0,712	0,441	0,664	0,398
EU3	3,696	0,868	0,753	0,800	0,894	0,151
IT1	4,242	0,744	0,554	0,788	0,888	0,117
IT2	4,297	0,665	0,442	0,690	0,831	0,137
IT3	3,456	0,631	0,398	0,897	0,947	0,041
IR1	3,140	0,968	0,937	0,848	0,921	0,142
IR2	2,939	1,022	1,045	0,948	0,974	0,054
OP1	3,827	0,674	0,454	0,781	0,884	0,099
OP2	3,537	0,789	0,622	0,919	0,959	0,050

4.2 Structural Equation Modeling (SEM)

The assumption for SEM is data should have normal distribution, outlier free (z-score ± 3), and no multicollinearity. After the assumptions is being met, the sub dimensions from EFA are validated by using CFA. CFA treats each variable as independent variable, so that the correlation among them data are presented. Soon after we get correlation value, the model is transformed to full assessment model. The model could be revised if there is unsatisfied results. The modification could be: (1) find the unprompted indicator based on its cr and p-value, (2) find the reasonable covariance in modification idicies, (3) correlate the exogenous variables with co-variance arrow, (4) and replace the negative variance with a small positive value (0,05) (Ghozali, 2011). In the end, the moderation model should be assessed in order to validate the hyphteses.

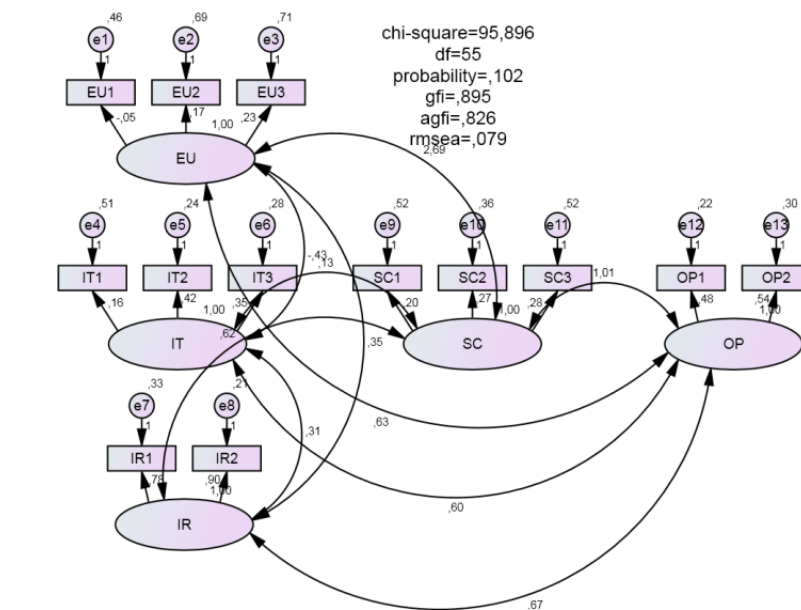


Figure 3: CFA Model

CFA of composite model displays the estimated correlation between independent variables. All of the correlation was expected to be positive definite, however the correlation between EU and IT was negative (-0,42). There would be an indication that these variables were reversely connected.

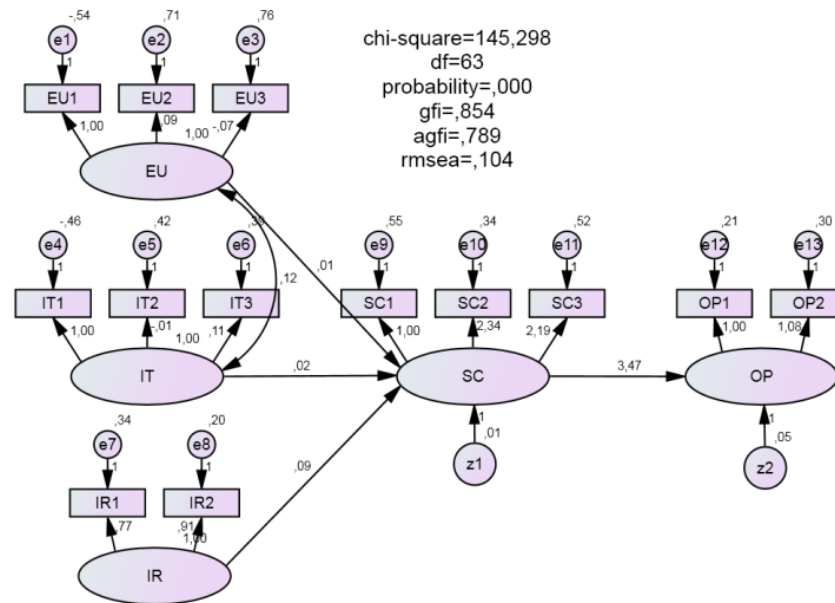


Figure 4: Deafult Model

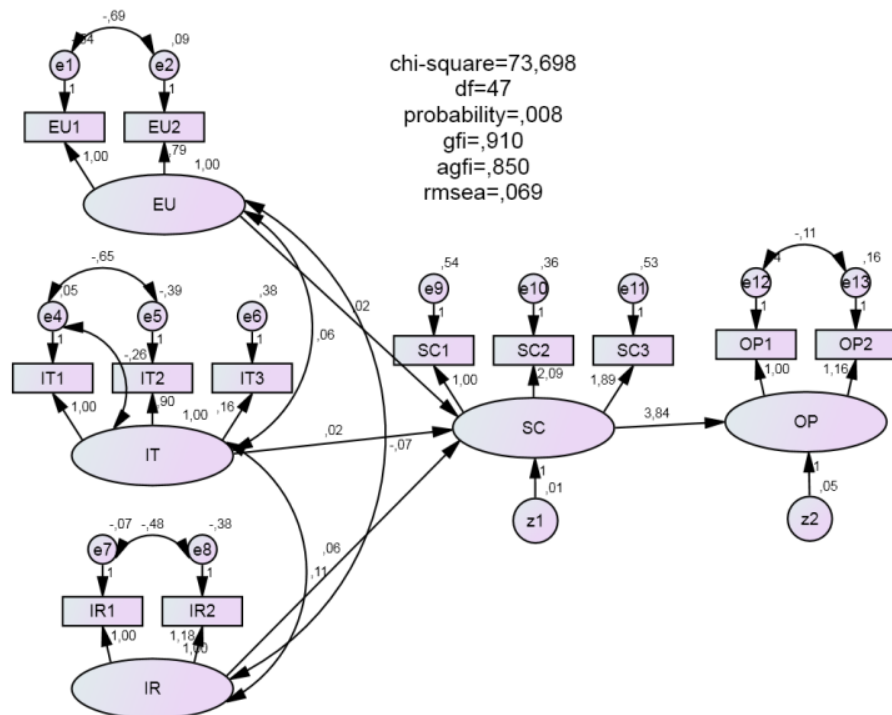


Figure 5: Modification Model

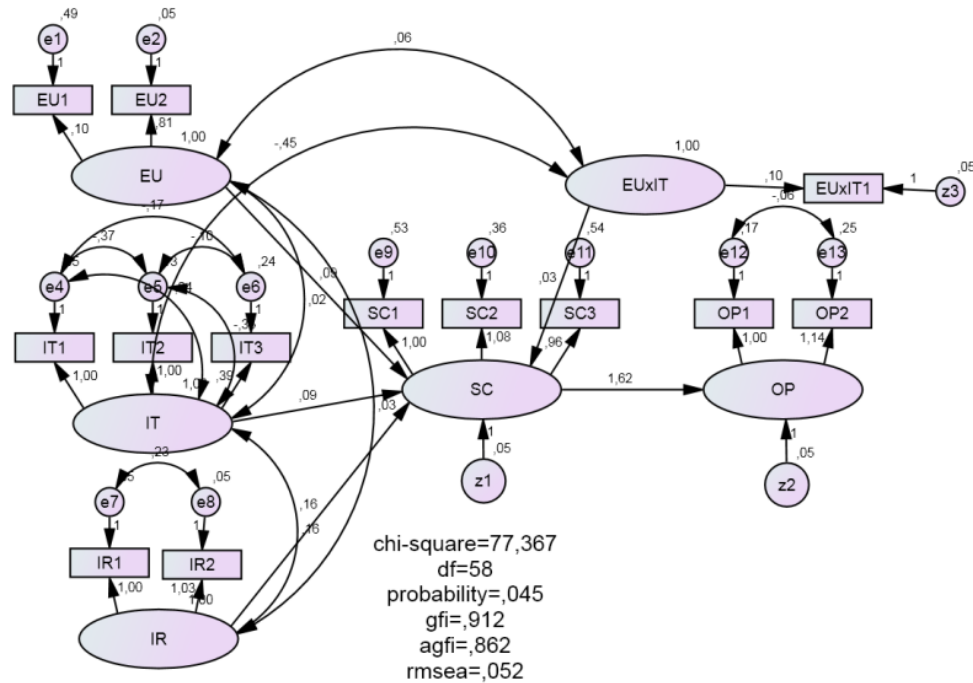


Figure 6: Moderated Models

After revising default model by eliminating insignificant variables, the modified and moderated model show better statistical indicators. The regression weight of each estimated parameter had achieved the acceptable values. Based on the table above, it is shown that the moderating variable is marginally affected SCM practices (Estimate= 0,03 ; CR= 0,52). All of variance have positive estimate and cr value. There is only one source of variable error IT2 (e5) which having least positive value. However, the value (Estimate= 0,12 ; CR= 0,27 P=0,78) can be still accepted. It has better goodness of fit within estimation. The probability is increasing significantly (0,05) and become very fitted. Ratio between chi-square and df are getting smaller (CMIN/DF= 1,34). This condition indicates significant improvement of model by adding the interaction indicator (EUxIT).

Table 3: Model Fitness

Model Fitness	Value	Goodness of Fit	Critical Value	Status
Chi-Square	77,36	Minimum is expected	358,44	Good
Df	58	≥ 1	78	Good
Probability	0,05	$\geq 0,05$	0	Good
CFI	0,90	$\geq 0,95$	0	Good
GFI	0,91	$\geq 0,90$	0,648	Good
AGFI	0,86	$\geq 0,90$	0,584	Good
RMSEA	0,05	$\leq 0,08$	0,172	Good

5. Result and Discussion

Most of investigated SMEs experienced some uncertainties in their environment, both from suppliers and customers. However, some of them agreed that customer contribute a significant impact to their SCM practices. This dependence condition led the firms worked together with their partners in order to have more sustained performance. Environment uncertainty has significant regression to SCM Practices (Estimate= 0,09; CR=2,90; P=0,04). The

institutional theory has two roles within this model. First, institutional theory affecting direct impact to SCM practices. Second, institutional theory affecting the SCM practices indirectly, but moderated another manifest variable, environment uncertainty, and SCM practices. When institutional theory is tested for direct impact, the result become lesser significant (Estimate=0,09; CR=1,99; P=0,04). There should be another explanation about another role of institutional theory in this model; as a moderator variable. Aligned with two previous hypotheses, internal resource particularly information technology (IT) is positively correlated with SCM practices. An organization should have IT support in order to keep them updated with information, knowledge, the development of technology, and business issues. The IT supports should be valuable, rare, and hard to substitute (Zhang and Dhaliwal, 2009). In SMEs, the contribution of IT is significant as its role to attain better SCM practices (Estimate=0,16; CR=4,96; P=0). There are some dimensions in which SCM practices strongly important; strategic supplier partnership, customer relationship, and level of information sharing. In SMEs, these dimensions would rather be elaborated with another, than affecting in single point indicator. In the end of the day, SCM practices will lead the organization attaining better performance (Estimate=1,61; CR=5,98; P=0).

There are some recommendations to enhance SMEs performance, especially in marketing and financial purposes. After the critical path has been identified, the improvement should be based on the highest regression of indicators. Customer is a priority aspect in business environment. Customer satisfaction will lead to loyalty and gain profit for the firm. Standard response to competition is indirectly accelerating the implementation of SCM practices in SMEs. Mimetic tends to make the environment less predicted by flocking the market with enormous product variety. the endeavor to build better SCM system is a good sign for practitioners and need to be stimulated with by providing workshop, training, and some success story sharing. In addition, IT alignment helps the organization becoming more valuable in terms of catching up potential market. To be aligned with their business partners especially customers, they have to be more advance in technology. In part-supply industries (B2B), IT can be used as an online catalogue to generate its brick-and-mortar channels. In grocery industries (B2C), IT can be used to build their own market by making people as member, giving special service level; etc (Chaffey, 2002). By providing information technology, the organization can develop relation among their suppliers, customers, and business partners. Overall, SMEs should be equipped with primer technology such as computer and advance software. The medium businesses are strongly advised to embed more advance SCM software, for example ERP or Oracle. However, the advance development should be focused on the man behind the business before its implementation. It takes further observation to find match characteristics suitable for business as good recruitment will be strongly necessary. The person in SMEs should be adaptive, creative, innovative, flexible, and efficient in order to capture any movement in global business. There are four criteria of ideal human resource in SMEs, including: (1) problem solving skills, (2) leadership skills, (3) team building skills, (4) and job skills (Gowen *et al.*, 2003). In the end, workshops and trainings related those criteria would potentially helpful to build a better organization culture in starting up company as such SMEs.

Appendix 1

Questionnaire

1. We consider quality as a criterion when we select suppliers.
2. We regularly solve problems by involving suppliers
3. We have worked with supplier to improve the product quality
4. We have continuous improvement programs that include our key-suppliers.
5. We consult with our key suppliers to set goals and plan activities
6. Our suppliers are involved in new product development
7. We often interact with customers to grasp their needs and wants.
8. We often measure and evaluate customer satisfaction.
9. We often determine future customer expectations.
10. We have customer assistant.
11. We periodically evaluate our relationship with ongoing and potential customers.
12. We inform trading partners in advance when we face changes.
13. We have proprietary information that we share among trading
14. Our trading partners give us information about issues that may affect our business.
15. Our trading partners share knowledge of core business processes with us.
16. We and our trading partners exchange information related business planning.
17. We and our trading partners exchange information related other partners.
18. Unreliable quality in supply abrupt our SCM significantly

19. Unreliable lead time in supply abrupt our SCM significantly
20. Unreliable quantity in supply abrupt our SCM competitiveness significantly
21. Fluctuation in demand volume abrupt our SCM effectiveness significantly
22. Changing in lead-time requirements for shipping affects our SCM policy
23. Inaccurate demand forecast abrupt our SCM efficiency significantly
24. Changing in product and process technology affects our SCM fitness significantly
25. Complexity in product and process technology affects our SCM fitness significantly
26. We use the most advance supply chain communication
27. We use state-of-art communication technology
28. Our communication system is more advanced than our competitors relatively
29. We are always the first to use new communication system in our industry
30. We are regarded as business leader in our SCM network
31. Our communication system is well aligned with our partners
32. We invest in IT to be aligned with our partners
33. Our partner invests in IT to be aligned with us
34. Together with partners we define the best IT alignment
35. By providing IT advances for supply chain communication system between us and partners, increasing our SCM performance
36. Our main customers expect us to use SCM practices
37. We may not retain customers without SCM practices
38. Our main suppliers expect us to use SCM practices
39. Our crucial suppliers strongly advise us to use SCM practices
40. SCM practices has been widely adopted by our suppliers currently.
41. SCM practices has been widely adopted by our customers currently.
42. SCM practices has been widely adopted by our competitors currently.
43. Our main competitors that have adopted SCM practices benefited greatly.
44. Our main competitors that have adopted SCM practices are perceived favorably by customers.
45. Our main competitors that have adopted SCM practices are more competitive.
46. There was correlation between SCM strategies with our market share achievement.
47. There was correlation between SCM strategies with our return on investment achievement.
48. Our SCM implementation tends to contribute the growth in return on investment.
49. Our SCM implementation tends to contribute in the profit margin on sales.
50. Our SCM implementation tends to contribute in the overall competitive position.

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Biography

James C. Chen is Professor in the Department of Industrial Engineering and Engineering Management at National Tsing-Hua University (NTHU), Taiwan. He received a B.S. in Industrial Engineering from NTHU, Taiwan, an M.S. in Manufacturing Systems Engineering, and a Ph.D. in Industrial Engineering, both from the University of Wisconsin- Madison. His research interests include advanced planning and scheduling, lean production, supply chain management, business process reengineering, and project management. Dr. Chen was awarded Dr. Yi-Chi Mei Scholarship at NTHU in 1983, IBM Manufacturing Research Graduate Fellowship 1991-92, Outstanding Teaching Awards at CYCU, Distinguished University-Industry Collaborative Research Award at Chung Hua Picture Tubes (CPT) in 2009, Distinguished Industrial Engineer Award from Chinese Institute of Industrial Engineers (CIIE) in 2011, Outstanding Research Award at NTUST in 2011, and Feature Person: Enjoying the International University-Industry Collaboration, Engineering Science and Technology Bulletin, NSC in 2011.

Imam Baihaqi is Doctorate in the Department of Industrial Engineering at Institute of Technology Sepuluh Nopember (ITS), Indonesia. He received a B.Eng. in Industrial Engineering from ITS, an M.S. in Information Management from Lancaster University, United Kingdom and a Ph.D. in Operation and Supply Chain Management from Monash University, Australia. His research interests include supply chain management, strategic information management, and system engineering. He is currently joining Australian and New Zealand Academy of Management (ANZAM) association.

Nadia Aulia Arifin is Master student in the department of Industrial Engineering and Engineering Management at NTHU, Taiwan. She received a B.Eng. in Industrial Engineering from ITS. Her research interests include advanced planning and scheduling, lean production, supply chain management, and strategic information management.