Indonesian Journal of Business and Entrepreneurship, Vol. 4 No. 2, May 2018
Permalink/DOI: http://dx.doi.org/10.17358/IJBE.4.2.179
Available online at http://journal.ipb.ac.id/index.php/ijbe

Accredited by Ministry of RTHE Number 32a/E/KPT/2017

SSCM PERFORMANCE IMPROVEMENT STRATEGY OF CONTAINER SHIPPING INDUSTRY IN INDONESIA

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Abstract: The objectives of this study are to measure and analyze the factors that significantly impact the performance of Sustainable Supply Chain Management (SSCM) container shipping industry in Indonesia. This research will then formulate recommendations on SSCM performance improvement strategy using SEM-PLS method. The results show that currently the business actor and service user perceive the SSCM performance of container shipping industry in Indonesia as low. Furthermore, four latent variables give significant and positive impact to SSCM performance. The latent variables include Technology, Integrated Logistic System, Sustainable Market Orientation and Fair-Trade System. The Technology and Integrated Logistic System as the priority should be give more attention. The conclusion of the research result shows that strategy to improve the SSCM performance of container shipping industry in Indonesia must be carried out through a holistic approach and seen as a system. The managerial implication of this study is that the four latent variables of the model sorted, according to their priorities from the total effect coefficients, can be applied as a strategy to improve SSCM performance.

Keywords: sustainable supply chain, container shipping, SEM, SSCM

Abstrak: *Tujuan dari penelitian ini adalah untuk mengukur dan menganalisis faktor-faktor yang secara signifikan mempengaruhi kinerja industri pelayaran kontainer SSCM di Indonesia. Penelitian ini kemudian akan merumuskan rekomendasi strategi peningkatan kinerja SSCM dengan menggunakan metode SEM-PLS. Hasil penelitian menunjukkan bahwa saat ini pelaku usaha dan pengguna jasa melihat kinerja SSCM industri pelayaran kontainer di Indonesia tergolong rendah. Selanjutnya ada empat variabel laten yang terbukti secara empiris memberikan dampak positif dan signifikan terhadap Kinerja SSCM: Teknologi, Sistem Logistik Terpadu, Orientasi Pasar yang Berkelanjutan dan Sistem Perdagangan yang Adil. Teknologi dan Sistem Logistik Terpadu sebagai prioritas untuk lebih diperhatikan. Kesimpulan dari hasil penelitian ini menunjukkan bahwa strategi untuk meningkatkan kinerja industri perkapalan SPCM di Indonesia harus dilakukan harus dilakukan melalui pendekatan holistik dan dilihat sebagai suatu sistem. Implikasi manajerial dari penelitian ini adalah bahwa empat variabel laten dari model yang diurutkan, berdasarkan prioritasnya dari koefisien Total Effect, dapat diterapkan sebagai strategi untuk meningkatkan kinerja SSCM.*

Kata kunci: *rantai pasok berkesinambungan, pelayaran peti kemas, SEM, SSCM*

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INTRODUCTION

The performance of sustainable supply chain management (SSCM) has proven to give a significant contribution to the superiority of industrial competitive advantage. Several previous studies confirm the positive relationship of SCM/SSCM to competitive advantage in various contexts. Yusuf et al. (2014) confirm that supply chain management influences competitive advantage in the petroleum industry. The issue of sustainability within the triple bottom line (3BL) framework of green supply chain management is also confirmed to positively impact the competitive advantage and performance of container shipping companies (Yang et al. 2013). Supply chain management is also confirmed to positively impact the competitive advantage of the communications network industry (Liao et al. 2017).

Several previous studies specific to shipping and maritime industry have also proved the SSCM performance contribution to the competitiveness of the shipping industry in some countries. Unfortunately, there is no specific research to discuss strategy to improve SSCM performance in strategic maritime industries such as container shipping. The effectiveness of the supply chain influences has proven to contribute to the competitive advantage of the Greek container shipping industry (Lagoudis & Theotokas, 2007). Sustainable supply chain management becomes a new source of competitive advantage (Markley & Davis, 2007). Furthermore, supply chain management has even a positive effect on competitive advantage under "uncertain" conditions (Wu et al. 2017). Green supply chain management has an effect on competitive advantage and industrial economic performance (Rao & Holt, 2005).

Today, more and more business entities are beginning to implement the principles of sustainable business practices both internally and with other companies in their supply chain (Golicic & Smith, 2013). While economic and business considerations will essentially be a consideration for all participants in supply chain management, it has proven unable to guarantee business sustainability (Vasileiou & Morris, 2006). Sustainability is becoming increasingly important in the supply chain, especially in highly competitive industries (Flint & Golicic, 2009) like container shipping industry. In contrast, the principles of business sustainability are empirically and academically proven as highly relevant as a measure of the effectiveness of supply chain management (Vasileiou & Morris, 2006).

Mentzer et al. (2001) state that supply chain management is a systemic strategic and tactical coordination of traditional business functions within a business function within a company and across a company in a supply chain. The goal is to improve the long-term performance of the company individually and its entire supply chain (Mentzer et al. 2001). While the dimension of supply chain management is the integration of key business processes from end users to initial suppliers, providing products, services and information adds value to consumers and other stakeholders (Seymour et al. 2007).

Therefore, what is the difference between supply chain management and sustainable supply chain management? Theoretically, sustainability terminology refers to attempts to realize the optimum performance of the economic-social-economic triple bottom line (Reuter et al. 2010). In the concept of sustainability, social and environmental aspects are as important as economic goals, such as profitability, business growth, and ROI. All three factors have equal weight in decision-making and business performance parameters (Vasileiou & Morris, 2006). Carter & Rogers (2008) argue that the framework of sustainable supply chain management is the integration and strategic achievement of social, environmental and economic goals in the systemic coordination of all major cross-organizational businesses process and SCM.

In strategic management research, Supply Chain Management (SCM) and Sustainable Supply Chain Management (SSCM) strategies tend to be associated with the resource-based view management (Carter & Easton, 2011). SCM and SSCM are associated with internal and company-focused strategies. The scope of this strategy also tends to be limited within the scope of the company (Carter & Easton, 2011). However, from the era of 2000s to present time, SCM and SSCM have been associated with a market-based strategy (market-based view). Dung dan Martin (2016) mentioned that SCM and SCM-Green contribute positively to the economic development cluster in Than Hoa Vietnam especially in the aspect of cost optimization. As it is known, that cluster terminology is associated very closely with market-based view strategy.

Other researchers also linked the concept of SSCM and market-based strategies as in Porter's Diamond thinking framework (1990). Sardy et al. (2009) include SCM and SSCM in their twin Diamonds Model, in the supporting industry and international factors. Seymour et al. (2007) associate the four elements in the porter diamond framework as the basis for the application of RFID-based SCM. Lee & Wilhelm (2010) linked Porter's diamond frame (1990) to a global SCM implementation strategy. Sagheer et al. (2009) prove that the Porter and SSCM diamond frames simultaneously impact each other in the agri-food chain in India. Jin & Moon (2006) show that SSCM has a significant effect on the performance of supporting and related industries of the apparel industry in South Korea.

Indonesia provides a good example of how SSCM performance of the container shipping industry is influenced by other systemic factors. Indonesia is a country that relies on the container shipping industry. The country consists of 70% sea and waters, making economic activities such as international trade and the distribution of goods in Indonesia are highly dependent on sea transportation (Kusumastanto, 1998; Kusumastanto, 2010; Oktaviani and Drynan, 2000). The performance of the business aspects of the supply chain management of the Indonesian container shipping industry is represented in the LPI (Logistic Performance Index). Latest data on the World Bank Indicators website state that in 2016 Indonesia was only able to achieve a score of LPI of 2.93. With that score, Indonesia was in the 63rd position globally. Meanwhile the environmental and social aspects can be represented from the level of CO_2 emissions reaching 1.89 metric tons in 2014 and poverty rate reaching 10.9% in 2016 (World Bank Indicators, 2018).

Several previous studies have contributed to elaborate the role of supply chain management performance and container shipping industry in Indonesia. Kusumastanto (2003) constructed the direction of Indonesian maritime policy and economic empowerment based on sea transportation. The study mentioned that the sustainability of supply chain management becomes one element that must be focused. Nugroho et al. (2016) provide the logical background of port selection from the perspective of actors and users of shipping industry services. Zaman et al. (2015) analyze the connectivity of port and supply chain in eastern Indonesia in operational aspect. Unfortunately, there is no specific study of SSCM performance improvement strategy of the container shipping industry in Indonesia in Market Based View paradigm.

Based on previous literature assumptions and studies, this research seeks to fill the academic gap on SSCM performance improvement strategy in the container shipping industry in Indonesia. The first purpose of this study was to assess the sustainable supply chain management performance of container shipping industry in Indonesia. The second was to measure and analyze the factors that significantly impact the performance of SSCM container shipping industry. The third purpose of this research was to formulate recommendations on SSCM performance improvement strategy using SEM-PLS method. In addition, this research will result in a priority set of strategies for SSCM performance improvement in the container shipping industry in Indonesia.

The scope of this research was to develop a strategy based on Market-Based View to improve the SSCM performance of container shipping industry. The focuses of this research were the level of container shipping industry operating in Indonesia and division on the container shipping industry operating in Indonesia: international container shipping and domestic container shipping

METHODS

This research took place in Indonesia, and the research data collection began in early December 2017 and was completed by the end of January 2018. This study considered sample populations with the criteria of the national level managers in container shipping companies as well as users of container shipping services. This study used the primary data collected from questionnaires filled out by operators and users of container shipping services in Indonesia. In December 2017, as many as 350 questionnaires were distributed via LinkedIn social media to middle management levels upward in this container shipping industry. Only 103 were willing to fill in and return the questionnaires. Three of returned questionnaires were invalid due to the homogeneity of the answers. Details of the characteristics of the respondent can be seen in Table 1.

Table 1. The respondent sample

Sample Criteria	Respondent	%
Gender		
Man	78	78%
Women	22	22%
Age		
Under 30 years old	15	15%
30 to 40 years old	39	39%
40 to 50 years old	39	39%
Above 50 years old	7	7%
Type of work		
Practitioner/Business Actor	45	45%
Service User	55	55%
Work Period in the industry		
Under 5 years	17	17%
5 to 10 years	25	25%
10 to 15 years	22	22%
5 to 20 years	24	24%
Over 20 years	12	12%
Level of Position		
Junior Manager/Manager Assistant/Senior Supervisor	35	35%
Manager/Senior Manager	39	39%
General Manager/Head of Division	14	14%
Vice President	3	3%
Director	9	9%
Number of employees		
<50 Employees	26	26%
50 to 100 Employees	13	13%
100 to 250 Employees	17	17%
250 to 500 Employees	9	9%
> 500 Employees	35	35%
Type and Scope of Workplace		
National	18	18%
National and Regional Asia/ Southeast Asia	21	21%
National and Global	61	61%
Number of Samples	100 Respondents	

This research used multi-item measures for constructs for the theoretical framework to improve reliability, reduce measurement error, ensure greater variability among survey individuals, and improve validity (Churchill, 1979). The instrument was pretested before a questionnaire was informed to the respondents through online forms. Each building block consisting of items was assessed using a five-point Likert scale (1932), ranging from '1 = strongly disagree' to '5 = strongly agree'. Also, the sustainable transportation performance that consisted items representing environmental performance, social performance and economic criteria was assessed using a five-point Likert scale, ranging from '1 = very poor' to '5 = very good'.

This research used SEM-PLS methodology developed by Hair et al. (2012). SEM-PLS presupposes that all variables in the model must be latent. Each variable in the model can only be measured through parameters that reflect that variable. There are two academic reasons behind the use of SEM-PLS methodology in this study. First is that the SEM-PLS approach is predisposed to confirmative – Predictive (Hair et al. 2015). In this study, the approach that must be carried out was to combine confirmative and predictive approaches. The confirmative approach is where there is a very strong theory background about measuring the performance of SSCM. On the other hand, this study also used a predictive approach because there is no theory that specifically examines SSCM performance improvement strategies in the container shipping industry in Indonesia. SEM-PLS accommodates these two approaches by allowing data processing based on strong, moderate and weak hypotheses (Hair et al. 2015).

The second reason is the characteristics and availability of respondents. This study used the primary data, taken from the opinion of service users and business actors in the field of container shipping industry through online questionnaires. SEM-PLS has a considerable flexibility in data processing with limited sample quantities (Hair et al. 2012). The number of samples required is equal to ten times the number of parameters on the variable with the largest number of parameters (Hair et al. 2015). Figure 1 shows that the initial structural model of this study had four parameters on the variable of FTS (Fair Trade System). Therefore, the minimum requirement of the sample in this study only amounted to 40 samples. As many as 100 samples were collected in this study and had exceeded the minimum requirement for subsequent processing.

The framework of initial structural model in this study consisted of five latent variables connected and interacted with each other as a system. There are four endogenous variables influenced by other variables, whereas the Technology (TEC) latent variable is an exogenous variable that is not influenced by other variables. The Outer model, consisting of 16 parameters, is entirely reflective of its latent variables. In the reflective based structural model, the manifest variables associated with the latent variables exist to measure the indicators that manifest the parameters. Parameters are the effects of empirically observed latent variables (Hair et al. 2012).

Hypotheses of this structural model are visually represented by a diagram in Figure 1. The structural model resembles five circles of the latent variables connected each other as a system through the single headed arrow. This model was mapping the significant latent variable that is predicted to have a positive influence on SSCM performance in Indonesia container shipping industry. This model hypothetically shows that SSCM performance is influenced by four latent variables i.e. Technology, Integrated Logistic System, Free Trade System, and Sustainable Market Orientation. Table 2 summarizes the parameters for the framework in Figure 1. The parameters were adopted or modified from the parameters established in extant research to avoid scale proliferation.

Level of technology in the industry in previous research is proven to give a positive influence on another variable. The technological level of the container shipping industry is considered to have an effect on the performance of its supply chain management (Lee-Partridge et al. 2000; Mangina & Vlachos, 2005; Gunasekaran et al. 2006; Boone & Ganeshan, 2007; Dolgui & Proth, 2008; Autry et al. 2010; Tseng et al. 2011; Zhu et al. 2012;Lin, 2014;Marinagi et al. 2014; Diaz-Osborn & Osborn, 2016). The level of technology is also proven to have impacts on the performance of integrated logistics systems. The level of technology impacts the performance of a fair-trade system (Kleine, 2008; Reed, 2009; Heeks, 2013). Level of technology impacts performance Sustainable market orientation (Ozkaya et al. 2015; Kasim & Altinay 2016; Hsu et al. 2016). Thus, this research developed four hypotheses related with level of technology as follows:

H 1 : The level of technology impacts the SSCM performance.

H 2 : The level of technology impacts the performance of integrated logistics systems.

H 3 : The level of technology impacts the performance of a fair-trade system.

H 4 : The level of technology impacts the performance of sustainable market orientation.

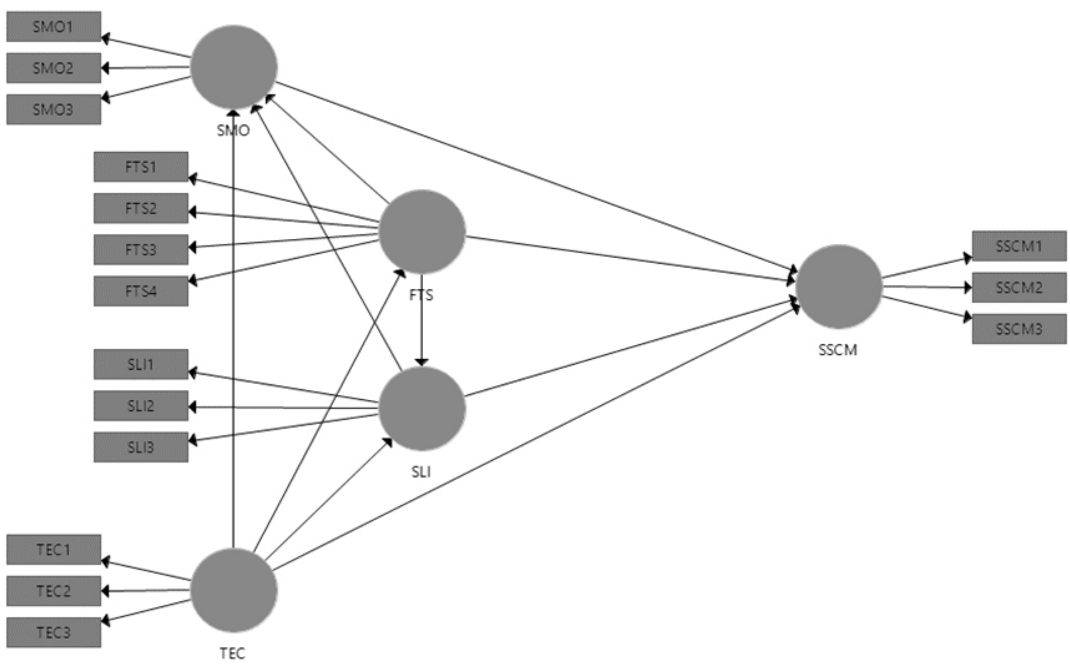

Figure 1. Research framework (SSCM: Sustainable Supply Chain Management; SMO: Continuous market orientation; FTS: Fair trade system; SLI: Integrated logistics system; TEC: Technology Level)

Table 2. Variables and parameters

Latent Variable	Parameter	References
SSCM	Environmental Performance of SCM Social Performance of SCM Economic and Business Performance of SCM	Foerstl et al. (2010); Vasileiou & Morris (2006); Carter & Rogers (2008); Vural (2015)
Fair Trade System	Effectiveness of Anti-Trust Regulations and Consumer Protection Equal In the whole business communities Shipping Container Services Cartel-Free Industry Compelling Action Against Cartel Efforts	McCoy (1983); Rodriguez & Williams (1994); Sagers (2006); UNCTAD (2016); Bureau of Trade Analysis (2012); Moxham & Kauppi (2014);Borrell & Jiménez (2008)
Sustainable Market Orientation	Industry Orientation and Business-Based Markets Industrial Orientation and Environment-Based Markets Industry Orientation and Social-Based Market	Kumar et al. (2011); Cosimato & Troisi (2015)
Integrated Logistic System	National SCM Blueprint SCM Efficiency Effectiveness of SCM Vertically Integrated Shipping Company Connectivity	Bhattacharyay (2010); Reuter et al. (2010); Shepherd and Serafica (2011); Lam & Yap (2011); Kim & Lee (2012);Alam et al. (2014); Özceylan et al. (2016); Herdiawan et al. (2015); Tovar et al. (2015); Shepherd (2016); Li et al. (2016)
Level of Technology	Information Technology Cargo Handling Technology Container Handling Technology	Lee-Partridge et al. (2000); Mangina & Vlachos (2005); Gunasekaran et al. (2006); Boone & Ganeshan (2007); Dolgui & Proth (2008); Autry et al. (2010); Zhu et al. (2012); Tseng et al. (2011): Marinagi et al. (2014); Lin (2014); Diaz-Osborn & Osborn (2016)

Integration of logistic system in the industry in previous research is proven to give a positive influence on another variable. Integrated logistics systems impact SSCM performance (Brandenburg et al. 2014; Cosimato & Troisi, 2015). On the other hand, integrated logistics systems also give a positive impact on performance Sustainable market orientation (Cosimato et al. 2016; Hsu et al. 2016). Thus, this research developed four hypotheses related with level of technology as follows:

H5 : Integrated logistics system impacts the SSCM performance

H6 : Integrated logistics system impacts the performance of sustainable market orientation

Fair trading system of the industry in previous research is proven to give a positive influence on another variable. Fair trading system impacts the SSCM performance Teuscher et al. (2006); Seuring & Müller (2008); Vermeulen & Seuring (2009); Moxham & Kauppi (2014). Fair trade system impacts sustainable market orientation (Taylor, 2005; Golding & Peattie, 2005; Bacon, 2010; Raynolds, 2012). Thus, this research developed four hypotheses related with level of technology as follows:

H7 : Fair trading system impacts the SSCM performance

H8 : Fair trade system impacts the sustainable market orientation

Sustainable market orientation impacts the SSCM performance (Carter & Jennings, 2004; Green et al. 2006). The presence or absence of a clear market orientation and pays close attention to the environmental, social and business performance of an industry. Clear market orientation has been shown to have a positive effect on business performance in both short and long-term contexts (Kumar et al. 2011). The superiority of sustainable competitiveness of the business performance of companies with clear market orientation tends to be better compared to others (Kumar et al. 2011). In the micro strategy context, this clear market orientation has a direct impact on the effectiveness of total quality management (TQM) implementation. (Demirbag, 2006). Culturally within the internal organization, the existence of a clear market orientation has a direct impact on financial performance (Homburg and Pflesser, 2000) and the relationship of these two things becomes more intense in dynamic industries such as the container shipping industry.

H9 : Sustainable market orientation impacts the SSCM performance

In the SEM-PLS methodology, there are two steps of analysis i.e. “measurement model”, and “structural model” (Hair et al. 2012). The measurement model is the model that can illustrate the relationship between a latent variable and its parameter. In the measurement model, there are five tests that must be carried out to make sure that the model is valid, reliable and fit with the phenomenon. The tests include convergent validity, discriminant validity, goodness of fit, multicollinearity check, and predictive relevance while the structural model is an illustration for a relationship among the latent variables. This research used the “reflective” measurement model type, indicating that all latent variables are measured by the value that is reflected at its parameters (Hair et al. 2012). Resume of assessment target value of SEM-PLS process can be seen below in Table 3.

RESULTS

SSCM Performance of Container Shipping Industry in Indonesia

In this SSCM optimization model, the SSCM performance of Indonesian container shipping can be measured from 3 parameters. These three parameters had undergone the selection process based on the factor weight of 0.50 or more, so it is considered to have a strong enough validation to explain the latent variables (Hair et al. 2010). These three parameters include business performance, social performance and environmental performance.

In general, the perceptions of industry actors and service users are still perceived to be low at an average of 3.16 of the highest five. In other words, Indonesian container shippers and service users still consider that the industry has not been adequately supported by the good performance of sustainable supply chain management. The lowest score lies in social performance 3.08 followed by the business performance of 3.13 and environmental performance of 3.28. The strategy that will be developed will answer the challenge to improve the performance of sustainable supply chain management of the container shipping industry as reflected in those parameters. One of the three SSCM performance parameters that most reflect the performance of SSCM container shipping industry is a business performance followed by social and environmental performance.

Those three SSCM performance parameter priorities are reflected in the value of outer loading coefficient in Table 3, indicating that the business performance (SSCM3) such as profitability, revenue and return on investment must remain a top priority. Thereafter, it must be continued on social performance (SSCM2) such as employee welfare, stakeholders to the communities involved. Once business and social performance have been fulfilled, the environmental performance (SSCM1) becomes a variable that should not be abandoned. These three parameters make the supply chain management of the container shipping industry more sustainable.

Table 3. Convergent validity checking: outer loading value

Latent Variable	FTS	SLI	SMO	SSCM	TEC
FTS1	0.82				
FTS2	0.85				
FTS3	0.83				
FTS4	0.86				
SLI1		0.96			
SLI2		0.91			
SLI3		0.92			
SMO1			0.83		
SMO2			0.88		
SMO3			0.68*		
SSCM1				0.68*	
SSCM2				0.81	
SSCM3				0.86	
TEC1					0.87
TEC2					0.94
TEC3					0.95

Remarks: * Outer loading under 0.7 but still maintain because the strength of theory

Assessment on Measurement Model

Table 3 shows that of the 16 parameters compiled, only two variables that have outer loading values below 7.00 i.e. SMO3 (Business-based business orientation) and SSCM1 (Performance supply chain environment). However, both parameters are maintained because they are very strong in theory. In the concept of sustainability, sustainable SCM and SMO measurement parameters include the economic performance, social performance and environmental performance of an industry (Carter and Rogers, 2008). Therefore, these three parameters must remain and are calculated simultaneously in a measurement model.

Table 4 shows the result of data processing through Smart PLS 3.0 software in which all variables in this model have been valid. The value of composite reliability and the average extracted variance have exceeded the limits required by Hair et al. (2010) i.e. 0.70 and 0.50.

Before the hypothesis testing, the final examination of the model that had been prepared included goodness of fit, multicollinearity test and predictive relevance. Testing a goodness of fit hypothesis is a hypothesis testing to determine whether a model has the expected frequency equal to the frequency obtained from a distribution, such as the binomial, Poisson, normal distribution, or from other comparisons. The predicted reference value is the Standardized Root Mean Square Residual (SRMR) of 0 to 0.10 (Hu & Bentler, 1999) while the multicollinearity test is checking to ascertain whether within an arranged model there is inter-correlation or collinearity between its latent variables. The reference value for the multicollinearity test is Variance Inflation Factor) VIF less than 5.0 for moderate tolerance, in this case of social science (Hair et al. 2012)(Table 5).

Table 6 shows the result of Q2 value test on the predictive relevance. Q2 value for the structural model measures how well the observed value is generated by the model and its parameter estimation. The result obtained by this structural model for Q2 testing of predictive relevance is 0.913. This shows that the structural model built has reached a predictive relevance degree of 91% of the actual phenomena occurring in the field.

Assessment on the Structural Model

When the measurement model is convergent and discriminant, the next step is to test the validity of the inner model. Table 7 shows the result of the test of Bootstrapping. The bootstrapping method is a method based on resampling the sample data with the condition of returning the data in completing the statistics of the size of a sample in the hope that the sample represents the actual population data, and usually resampling size takes thousands of times to represent the population data. Resampling using 500 times sample should be sufficient for bootstrapping (Hair et al. 2015).

Table. 4 Discriminant validity test: composite reliability & average variance extracted (AVE)

Latent Variable	Composite Reliability	Average Variance Extracted (AVE)
Fair Trade System (FTS)	0.91	0.70
Integrated Logistic System (SLI)	0.95	0.87
Sustainable Market Orientation (SMO)	0.84	0.64
Sustainable Supply Chain Management (SSCM)	0.83	0.62
Technology (TEC)	0.94	0.85

Table. 5 Variance Inflation Factors (VIF)

Variables	FTS	SLI	SMO	SSCM	TEC
Fair Trade System (FTS)		1.62	1.62		
Integrated Logistics (SLI)				1.44	
Sustainable Market Orientation (SMO)				1.44	
Sustainable SCM (SSCM)					
Level of Technology (TEC)	1.00	1.62	1.62		

Table. 6 Predictive Relevance Value (Q^2)

Latent Variable	R2	(1-R2)
FTS	0.38	0.62
SLI	0.45	0.55
SMO	0.53	0.47
SSCM	0.46	0.54
Q2 = 1 – (1-R12)(1-R22)….(1-Rn2)	0.94	0.85
Q2	0.9134542 (91%)	

Table 7. Bootstrapping result: T-Statistics

	Hypothesis	Direct T- Statistics	Indirect T-Statistics	Original Sample
H 1	Sustainability market orientation →SSCM performance	2.920		0.38
H 2	Fair trade system→ SSCM performance	0.981*	4.62	0.32
H 3	Integrated logistics system → SSCM performance	2.976		0.39
H 4	Technology level → SSCM performance	1.699*	7.72	0.47
H 5	Technology level → Integrated logistics system	3.637		0.38
H 6	Technology level → Fair trade system	9.988		0.62
H 7	Technology level→ Sustainability market orientation	2.687		0.34
H 8	Integrated logistics system → Sustainability market orientation	1.451*		
H 9	Fair trade system → Sustainability Continuous market orientation	3.951		0.46
H 10	Fair trade system → Integrated logistics system	3.010		0.37

Remarks: * Direct hypotheses rejected

In this research, the resampling is 1,000 times i.e. two times than normal resampling in Bootstrapping process. In this bootstrapping process tested is the T-Statistic value of each prepared hypothesis. With an expectation of 95% confidence level, the T-Statistic value that is required is at least 1.96. A hypothesis with a minimum value of 1.96 will be maintained. Hypotheses with values less than 1.96 are rejected and will be temporarily excluded from the existing structural model.

However, it does not mean those hypotheses are automatically excluded from the model. In the next phase, in Total Factor analysis, the hypotheses will be re-tested. The total factor test is not testing the direct influence but using intermediate variables. This intermediate variable will either enhance or weaken the relationship between endogenous and exogenous variables. The result of bootstrapping test is to divide the hypotheses into accepted and rejected ones, based on the T-Statistics value of the hypotheses. There are six hypotheses accepted and 3 hypotheses rejected. To ensure that the rejected hypotheses still can be put in the structural model, we rechecked the in-direct T-Statistic value.

The result is Hypotheses H2 and H4 still can stay put in the structural model. The cause is that SMO and SLI can be intermediate variables of those H2 and H4. In this bootstrapping test, the value of original sample was also measured. This original sample value represents the relation of hypothesis, whether it is positively influential or negative. In this model, we can see that all hypotheses are positive. Considering the bootstrapping test and looking for the significance level of each variable, this research finalized the structural model. The final structural model in Figure 2 consisted of 5 latent variables with 16 parameters. Within the model, there were five straight lines representing the direct relation of the latent variables.

Besides, there are two dotted lines representing the indirect relation among the latent variables. This model has been validated in measurement model and structural modal. The results confirm that the SSCM Performance measurement model was reflected in three sustainability parameters: business, social and environmental. Of the three parameters, the one that most reflects the performance of SSCM Container shipping industry in Indonesia is a business performance followed by social and environmental performance.

The business performance included profitability, revenue and return on investment that must remain a top priority. Thereafter, it must be continued on social performance such as employee welfare, stakeholders to the communities involved. Once business and social performance have been fulfilled, then environmental performance becomes a thing that also should not be abandoned. These three parameters make the supply chain management of the container shipping industry more sustainable.

Total Effect Coefficient

Total Effect is equivalent to the direct + indirect effects of constructs through mediation (Hair et al. 2012). The total effect coefficient is the measurement used as the main reference to know whether a variable has more dominant influence than other variables in the structural model. The purpose of the analysis of the total effect coefficient is to perform priority ranking. Based on these ratings in Table 8, strategies were then formulated and planned for implementation. Based on data processing through SEM PLS method, and data of total influence directly and indirectly were obtained as presented in Table 8.

Priority of Strategy

Level of supporting technology (TEC) has been confirmed to be the most significant role to increase SSCM performance. This SSCM optimization model further confirms that technological improvement not only positively impacts business parameters but also other sustainability aspects such as social and environmental parameters (Lee-Partridge et al. 2000; Mangina & Vlachos, 2005; Gunasekaran et al. 2006; Dolgui & Proth, 2008; Boone & Ganeshan, 2007; Autry et al. 2010; Tseng et al. 2011; Zhu et al. 2012; Lin, 2014; Marinagi et al. 2014; Diaz-Osborn & Osborn, 2016). In this study, it is proven that the aggregate of the average perception value of business actors and service users to supporting technology variables is 3.00 out of 5. This reflects a still low assessment of the level of Technology supporting the shipping industry.

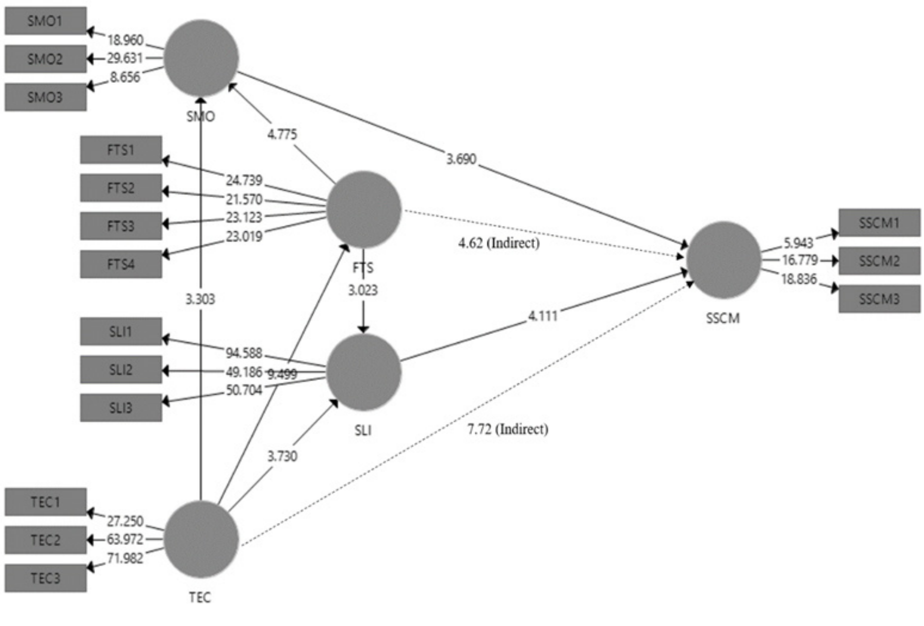

Figure 3. Structural Model for Improvement Strategy of SSCM of container shipping industry in Indonesia

Table 8. Total effect coefficient

Latent Variable	FTS	SLI	SMO	SSCM	TEC
Level of Technology (TEC)	0.62	0.60	0.63	0.47	
Fair Trade System (FTS)		0.37	0.46	0.32	
Integrated Logistic System (SLI)				0.39	
Sustainable Market Orientation (SMO)				0.38	

Three parameters that reflect the level of technology in the supply chain management of container shipping industry. The first one is information technology, and this includes the traceability and integration of information systems. Elvandra et al. (2017) also mention that disintegration of information comes with additional risk in supply chain. For information technology parameters, the combined value provided by business actors and service users is 2.89 out of five, with a loading factor value of 0.87.

The second parameter is container-handling technology. This parameter is used to measure perceptions about how high the level of technology used by a country container shipping industry in handling containers. The scope ranges from micro level handling technology in the loading area to macro level in the port area. The operational level scope is from automation software, management up to infrastructure technology as mentioned by (Gharehgozli et al. 2017). The combined assessment provided by business and user is 3.07 out of five with a loading factor value of 0.94.

The third parameter that reflects the level of technology in supply chain management of Indonesia container shipping industry is cargo-handling technology. Unlike the two previous technologies, cargo-handling technology involves a longer value chain and supply to the owner of the goods. Therefore, the involvement of all stakeholders to focus and improve the use of cargo handling technology is necessary.

Increasing the level of supporting technology should be the top priority in the strategy of optimizing the performance of sustainable supply chain management of the container shipping industry. In the structural model, it has been proven that technology positively influences as an enabler in the supply chain management system of Indonesia container shipping industry to become sustainable. Supporting technologies influence other significant factors in the model: improved integrated logistics system (0.60), improvement of sustainable market orientation (0.63) and fair-trade system (0.62).

Integrated Logistic System (LSI) is the second variable that should be a priority in SSCM optimization efforts of Indonesia container shipping industry. The results of this study reinforce the results of previous studies suggesting that integrated logistics systems positively influence the sustainability of supply chain management in an industry. In previous research, it also has been proven that integrated logistics systems improve the efficiency and effectiveness of SSCM operations (Sanberg & Abrahamsson, 2011), encourage trade performance (Shepherd and Serafica, 2011), improve supply chain performance (Alam, 2014) and indirectly contribute on economic growth and distribution of welfare (Özceylan et al. 2016).

This SSCM optimization model further confirms that integrated logistics system not only positively impacts business parameters but also other sustainability aspects of social and environmental parameters. In this study, it is significantly proven that, on an aggregate basis, the average perception value given by business actors and service users to LSI variable is 2.92 out of five. This reflects the level of the Indonesian container shipping logistics system perceived to be low.

This will be a huge task for all stakeholders in Indonesia container shipping industry because empirically, this study proves that this integrated logistics system aspect is one of the most important aspects in SSCM optimization strategy of Indonesia container shipping industry. The value of the loading factor of these three parameters is entirely subject to the SLI variable of above 0.91 while the total effect value of this variable on SSCM is 0.39.

The clarity of the blueprint of the national logistics system is the first parameter and has the highest perception value of 3.04 out of five. This gives an indication that generally the business actors and service users are not sure whether the Indonesian container shipping industry has had a good blueprint, and even this value tends to be less agree that the blueprint of national logistic system is clear enough.

The second parameter is the efficiency of the supply chain system. Slightly lower than the first parameter, the combined perceptions value of actors and users tend to be steadier on this point. With a combined average value of 2.90 out of five, the perceptions of actors and business users tend to disagree that the supply chain system of Indonesia container shipping industry has been efficient.

The third parameter is connectivity. In line with the efficiency parameter, the perceptions of the combined assessment of Indonesian container shippers and service users tend to be low on this point. The given value is 2.83 of five. This perceptual value is the lowest among the three parameters in this SLI variable. Level of connectivity are still considered low.

Fair Trade System (FTS) is the third variable that should be a priority in strategy to optimize SSCM Indonesia container shipping industry. The results of this study reinforce the results of previous studies suggesting that a fair-trade system positively influences the sustainability of supply chain management in an industry (Moxham and Kauppi, 2014). The combined perception of business actors and service users towards the fairness in trading system variables tend to be low. The combined value given is 2.90 out of 5. Business actors provide a value of 3.03 out of 5 and service users provide a value of 2.80 out of 5.

This becomes a government homework as the regulator of the container shipping industry in Indonesia because empirically this research proves that this aspect of fair trade system is one of the most important aspects in efforts to optimize SSCM of Indonesia container shipping industry. The value of the loading factor of these three parameters is subject to the FTS variable of 0.81 to 0.86 while the total effect value of this variable on SSCM is 0.32.

The discussion on the perception of fair trade system in the Indonesian container shipping industry is one of the most interesting aspect in this research. Not just because of its strategic role, this theme is also a quite sensitive discussion in trying to uncover some rumors circulating in the industry for a long time. Issues concerning fair competition, equality of treatment, cartel and law enforcement are the four parameters that reflect the variables of this fair-trade system. As previously discussed, the four variables are valid discriminant with the loading factor value of 0.82 to 0.86.

The first parameter of this variable is the existence of effective regulation related to fair competition and consumer protection. Represented by a value of 3.24 out of 5, Business actors assess that Indonesia container shipping industry is sufficiently implementing effective regulation. On the other hand, the users of container shipping industry services perceiving the value of 3.02 out of 5 give a lower perception value. Therefore, in total, the combined value is 3.12 out of 5. This value represents the perceptions of actors and users who disagree that the existing regulation is effective enough to regulate fair business competition and protect consumers.

The second parameter of this variable is equality among all business actors and users of container shipping services. Represented by a value of 3.24 out of 5, business actors tend to assess that Indonesia container shipping industry is sufficient to treat business actors and service users equally without discrimination. On the other hand, the users of container shipping industry services, which is 3.00 out of 5, give a lower perception value. Therefore, in total, the combined value is 3.11 out of 5. This value represents the perceptions of actors and users who disagree that the business actors and users receive the same treatment in the container shipping industry. In other words, business actors and service users still argue that governments tend to be discriminatory against some business actors and service users.

The third parameter of this variable is the perception of cartel/mafia free industry. Represented by a value of 2.67 out of 5, business actors tend to assess that Indonesia's container shipping industry is still not free from cartel and mafia practices. On the other hand, the users of the container shipping industry services of 2.53 out of 5 gave even lower perceptual values. Therefore, total the combined value is 2.59 out of 5. As a special note, this value is the lowest value of all parameters in this search. This value represents the perceptions of actors and users who do not agree that the Indonesian container shipping industry is free of cartel and mafia practices.

The fourth parameter is the firm commitment against the cartel's practice. Represented by a value of 2.98 out of 5, business actors tend to disagree that there is now a firm takeover of cartel and mafia practices in Indonesia's container shipping industry. On the other hand, users of container shipping industry services of 2.64 out of 5 gave even lower perceptual values. Thus, the total combined value of 2.79 out of 5. This value represents the perceptions of actors and users who disagree that the present container shipping industry Indonesia has adopted a firm action against cartel and mafia practices.

Orientation on sustainable markets (SMO) is the last variable that should be a priority in SSCM optimization strategy of Indonesia container shipping industry. The results of this study reinforce the results of previous studies suggesting that sustainable orientation has a positive impact on long-term and short-term business performance (Kumar et al. 2011), total quality management (TQM) (Demirbag, 2006), and culturally on business financial performance (Homburg dan Pflesser, 2000).

The combined perceptions of business actors and service users towards this sustainable market orientation variable tend to be low. However, it is still better than the other latent variables. The combined value provided is 3.40 out of 5. The Indonesian container shipping industry provides 3.18 out of 5 and the service user gives a value of 3.18 out of 5. It can be concluded that the perceptions of business actors and service users towards the sustainable market orientation of the container shipping industry the Indonesian pack is reasonably good . However, this does not diminish the fact that Indonesia's container shipping industry still has sufficient development space to increase up to the perception value of 4 out of five.

This becomes the homework for all of the stakeholders of the container shipping industry in Indonesia. Therefore, the results of this study prove that this aspect of sustainable market orientation becomes one of the most important aspects in efforts to optimize the performance of SSCM Indonesian container shipping industry. The total effect of this latent variable on SSCM performance is 0.38. On the other hand, SMO is also an intermediate variable on sustainable trading technologies and systems to positively and indirectly impact SSCM performance of the container shipping industry.

As with SSCM, the latent variables of sustainable market orientation (SMO) are represented by parameters on a triple bottom line basis that is market orientation based on business, social and environment. The combined assessments given by the respondents to these three parameters also varied. For business-oriented market orientation parameters, the respondents gave a reasonably good score of 3.60 out of 5. Business actors rated 3.76 and service users rated 3.47 out of five. This parameter is the highest of the other three parameters. Therefore, it can be concluded that the current market orientation that becomes the priority of business actors and service users is still on the business side.

On the social-market orientation parameters, the combined value given by respondents is 3.23 out of five. It is slightly lower and can be perceived that respondents argue that the social-market orientation of the Indonesian container shipping industry is still not good enough. The perceptions of business actors tend to be higher than the perception of service users of 3.31 compared with 3.16 of scale five.

The environmentally oriented market orientation parameter is the lowest of the three parameters in the latent variables of SMO. The combined value given by the respondents is 3.01 out of 5. It can be perceived that respondents argue that the environment-based market orientation of Indonesia's container shipping industry is still not good enough. The perception value of business actors tends to be higher than the perception of service users of 3.13 compared with 3.91 of scale five. From the three parameters, Indonesian container shipping industry is still not very concerned about the orientation of the environment-based market.

Managerial Implication

The managerial recommendation from this research is the level of priority that all container shipping industry stakeholder need to focus on the increase of the performance of SSCM. The first is Level of Technology. This research supports previous research in SSCM area that found the strategic role of Technology as enabler of the SSCM is a system. There are three aspect of technology that must be focused to improve, namely: information, container handling and cargo handling. The most impactful enhancement will come from container handling technology improvement including the automation technology and the infrastructure technology in container port area.

The second managerial recommendation is to improve the integrated logistic system of container shipping industry in Indonesia. There are three aspects of this latent variable, including the clarity of the national logistic blueprints, efficiency of logistics, and connectivity of logistic network. With the priority, the outer loading value will be Connectivity and Efficiency, followed by the clarity of national logistic blueprint.

Third managerial recommendation is maintaining both Sustainable Market Orientation (SMO) and Fair-Trade System (FTS). The empirical reason to put these two aspects as together is because all stakeholders of Indonesia container shipping industry must apply these two aspects together and simultaneously. Sustainable market orientation requires all stakeholders to put same attention at 3BL (Business, Social and Environment) together. On the other hand, the Fair-Trade System can only be achieved through mutual commitment from the government as regulator, business actors at supply side, and users at demand side.

The government needs to put its highest commitment to design and implement the effective regulation that can protect all stakeholders' needs for fairness. This includes the regulation, implementation of regulation and the regulation enforcement. On the other hand, the business actors and users of container shipping industry in Indonesia also must put their highest commitment to ensure the market is competitive to gain efficiency.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The first conclusion of this research is a valid information that sustainable supply chain management performance of container shipping industry in Indonesia is still under expectation for the business actors and the users. In general, the perceptions of the industry actors and service users are still low at an average of 3.16 of five. In other words, Indonesian container business actors and service users still consider that the industry has not been adequately supported by well-performed sustainable supply chain management. The lowest score lies in social performance 3.08 followed by business performance of 3.13 and environmental performance of 3.28.

The second conclusion is that improvement strategy of SSCM of container shipping industry in Indonesia must be conducted through a holistic approach and seen as a system. There are two empirical reasons behind this conclusion. First, SSCM performance optimization model shows that all latent variables give significant and positive impacts to SSCM performance of container shipping industry in Indonesia. The second is that all latent variables also give significant and positive impacts to other latent variables in the model even though, not all latent variables can be impactful to other latent variables directly. Technology and Fair-Trade System can only give significant impact to SSCM performance through its intermediate latent variable.

The third conclusion of this research is in the context of strategy. SSCM improvement model empirically shows that performance of sustainable supply chain management can be enhanced by prioritizing the strategy. The priority of this strategy is based on the value of total effects calculated in the structural model. The following latent variables recommended to be implemented as a strategy gradually and sequentially based on its major impacts include the improvements of the technological support, integration of logistics systems and fair trade, and maintenance of a sustainable market orientation.

Recommendations

Academic recommendation for the next research is that it should be based on contribution and limitation of this research. In the academic aspect, this research has contributed to the development of strategic concept of enhancing the SSCM performance in the industrial scope of container shipping in Indonesia. However, this study also has limitations. The limitations of this study are the focus on the container shipping industry in Indonesia. Therefore, there is still much room for the development of previous researchers to test, give criticisms or develop concepts that have been prepared in this study. Researchers can then focus on the same model but with a broader context such as Southeast Asia and Asia. The next researcher can also draw the focus of the development of this research on a more specific sphere, for example, only industry players focusing on global shipping alone or domestic shipping alone.

ACKNOWLEGEMENT

This research was supported by LPDP of Republic of Indonesia. We thank our colleagues from Department of Transportation of Republic of Indonesia and all anonymous experts who provided insights and expertise that greatly assisted the research, although they may not agree with all the interpretations and conclusions of this paper.

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