The Mediating Role of Sustainable Supply Chain in the Relationship between ECO-Strategic Orientation and the Reverse Logistic in Thai Electronic Industry

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***Abstract*-The current study provides important insight in the relationship between sustainable supply chain, ECO-strategic orientation and the reverse logistic. The SEM-PLS is used to analyses the data collected from the electronic industry of Thailand's findings of the current research offer alternatives for the managers who are keen to develop sustainable supply chain initiatives. Significance of strategic orientation i.e. eco-innovation and eco-reputation should not be ignored by the firms, if the development of sustainable supply chain initiatives is intended by the organization's decision makers, thus, eco-innovation and eco-reputation are found to be the key enablers of sustainable supply chain initiatives. The obtained results are integrated with the managerial implications. The findings of this study provide empirical validation needed to make investment in sustainable SC initiatives. In addition, a strong evidence is provided about the benefits arising from reverse logistics. The assurance of obtaining benefits from sustainable supply chain provide confidence to the managers. Therefore, ecological requirements are considered as key production and product criteria, specifically for those firms which try to find ways such as staying profitable and maintaining competitiveness to achieve economic sustainability. Therefore, adopting sustainable supply chain initiatives may result in value creation, provide means for achieving competitive advantage, and reverse logistics.**

Keywords: *Sustainability, eco-strategic orientation, supply chain, Thailand*

1. Background

Since 1990s, all emerging economies have been transforming into remarkable global players. Thus, global outsourcing has been significantly reshaping global supply chain systems, for instance, manufacturing jobs were shifted towards the emerging economies, to improve their economic development. Although, the global manufacturing network creates various challenges and risks towards national economies, global, regional, and local environments, and on the safety and health of individuals. Therefore, the point that manufacturing organizations can effectively manage environmental sustainability and profit growth in emerging economies offer major national and global implications [37]. Meanwhile, the sustainable business operations facilitate in the firms' wealth creation process and increase the living standard of emerging economies. [1] stated that un-sustained economic activities result in environmental degradation, which may jeopardize the economic competitiveness and long-term prosperity of emerging economies. Therefore, firms strive to adopt ecological friendly guidelines and strategies from their competitors and business clients, although, this continuous process of environmental deterioration and business development have directed the attention towards environmental sustainability. Particularly, the greater environmental concerns in emerging economies have forced governments to set broader objectives for environmental improvement and for regulating their existing business processes [2]. Contrarily, if ecological tradition is weak and there are strong profit pressures, then firms find no incentive to handle their stakeholders' interests. The electronic industry of Thailand is emerging and the export figures, No. See figure 1) highlights that the Thai electronic industry is competing aggressively with major players.

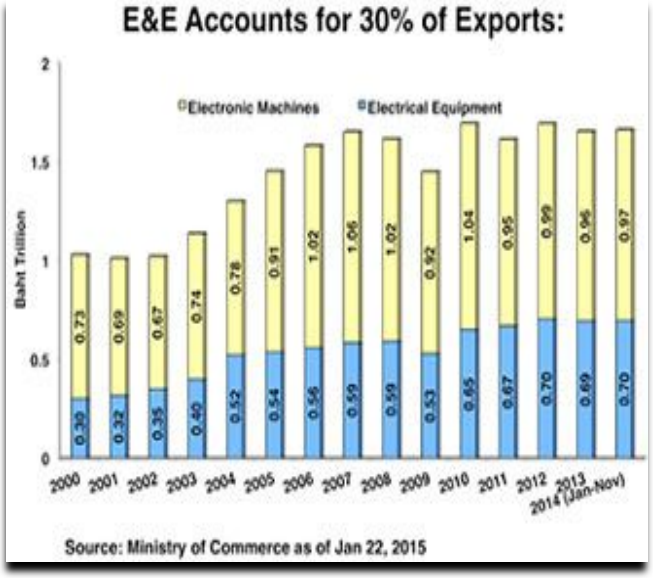

Figure1. Electronic industry of Thailand

The study identified three relevant and important research gaps, these are: firstly, several prior researches have emphasized upon green business processes but only a few researches [3, 4] attempted to address the outcomes or antecedents of sustainable SC activities in emerging markets. Secondly, regardless of the ecological-friendly SC activities debate, the outcomes obtained from sustainable SC activities have not been understood properly, although these outcomes must be measured to navigate and manage global competitive markets [5, 6]. In the same context, in spite of ensuring new value creation and competitive advantage, a few studies Wong and Ngai [7] have surprisingly analyzed the reverse logistics phenomenon [8]. Thirdly, managers lack effective guidelines for initiating green processes, even after making commitments for ecological-friendly SC activities. Some of the researchers have identified external enablers stemming from stakeholder or institutional theories, however, only few studies were able to successfully cite relevant external factors. Such that, the empirical evidence on sustainable SC initiatives cover those organizational capabilities which lead to the sustainable SC processes. Considering the definitions, decision frameworks, and sustainability practices, the previous studies have overlooked the insights into sustainability strategies and means of constructing these strategies [9]. Therefore, incomplete and disintegrated knowledge turned out to be the reason for the failure of properly addressing and identifying the key forces of strategic orientation.

With a purpose of abridging these gaps in the existing literature, present study made three contributions; 1) the study choose to examine the case of emerging economies. [10] have argued that a few manufacturing firms seek to discover and target ecologically aware buyers for placing and posing their firms image as appropriate supplier for green practices, however, despite the growing concern about sustainability, still most firms have not dropped their production processes. Therefore, manufacturers from emerging economies should seek additional means for executing and adopting the already established SC strategies using sustainable initiatives, since these initiatives are introducing more ecological-friendly programs than what has been offered in past. Therefore, this study chose Thailand specifically, as it is a significant member of Association of Southeast Asian Nations , No. ASEAN). In addition, Thailand suppliers greatly contributes in the global SCs and represents in the global market as a hub of manufacturers, providing organizations a place for outsourcing components or parts. According to the reports , No. United Nations Conference on Trade and Development), Thailand has an inflow of US$11.9 billion in 2011, which has been raised to 30.8% in 2013 , No. World Investment Report, 2013). This has helped in increasing Thailand's rank to 16th position in the Top Prospective Host Economies for 2013-2015 list , No. World Investment Report, 2013). Furthermore, UNCTAD report also declared that the beauty of Thailand makes it a destination place for foreign direct investment. Thailand, as an emerging economy is at an early sustainable development stage, however, most manufacturing firms in Thailand are aiming and prioritizing to achieve profit maximization.

The impact of ecological friendly manufacturing, packaging, and purchasing programs were examined in this research [11]. In addition, reverse logistic advantages can be obtained through sustainable SC initiatives. The empirical findings for this study also suggest that competitive advantage can be achieved by firms through the value creation process. Reverse logistics is defined as a product or packaging returns, for the purpose of recycling, reclamation, or reusing [12]. Firms may involve in reverse logistics by carrying out the remanufacturing or recycling of components and disposing off those parts which cannot be recycled or remanufactured. As a result, a cost-driving area is established [11], thereby leading to greater customer satisfaction, profitability, and sustainable environment.

Specific drivers of strategic orientation are also considered, which triggers successful adoption of sustainable SC initiatives. In particular, the present study identified and analyzed two factors of strategic orientation, which were ignored in prior researches, namely eco-innovation and eco-reputation. These factors take account of the environmental concerns and transform them into business strategies. Therefore, this study provides how eco-innovation and eco-reputation play their role while integrating the sustainable SC initiatives, in addition, this research also examined the mutual effects of

these factors. However, both these factors seem to be significant to fully understand the ecological challenges and the sustainable SC initiatives derived from these challenges, but this has not been the area of prior studies. Thus, firms must primarily establish eco-innovation and eco-reputation strategic orientations to bring sustainability in its SC initiatives.

2. Literature Review

[13] stated that Supply chain management , No. SCM) involves three or more organizations which are closely associated with downstream or upstream exchange of information, services, products, or finances from manufacturer to the end-user. The traditional SCs were established upon production paradigm, whereas, the sustainable SC refers to a collaborative cross-cutting and a multidisciplinary issue. In a social development summit 2005, three sustainability pillars were presented namely, social development or people, environmental protection or plant, and economic development or profit. Although these pillars are mutually reinforcing. Furthermore, in terms of social, environmental and financial performance, a business sustainability measure is offered by triple bottom. Furthermore, during an interview, Peter Senge has pinpoint sustainable SC to be key enablers for the industrial revolution. A global SC sustainability guide has been launched by the United Nations Global Compact, in four area, namely labor, human rights, anti-corruption, and environment. Thus, the present study will help to emphasize upon the sustainable SC practices. Therefore, firms while minimizing the usage of waste, and natural resources must also enhance its energy efficiency to collaborate with SC members, since these factors together with the adverse impact of environment may result in strong bottom line. Furthermore, the sustainable SCs consider the environmental impact caused by the flow of products and services across the SC. In traditional SCs, such eco-friendly extensions also involve reduction in product

The strategic choice theory's literature has indicated strategic orientation of a firm as crucial since it accounts for the obligation of firms' huge resources [14]. Moreover, they are technically complex and likely to demand a set of diverse skills by the top management, technical, and organizational experts. In addition, they depend largely upon external agents, i.e. changing technology, suppliers, and labor unions [15]. Strategic orientation choice is defined as a procedure of selecting those specific actions which may simplify the organizational actions that are taken to establish competitive advantage and profitability. Since strategic orientation depicts the intended or past decisions, therefore it guides organizations to align their external environment with the internal policies and procedures. This may allow firms to simultaneously take multiple decisions for strategic orientation and for satisfying strategic goals and objectives.

A study [16] presented strategic orientations of two types which support the GSCM adoption. The current study recognized eco-reputation strategic orientation, as a firm's strategy for spreading awareness among all stakeholders about the adoption of eco-friendly programs through the organizational efforts, thus improving the corporate image of a firm. In addition, an eco-innovation strategy is generally used as firms' strategy for providing guidance to the firms in establishing operational processes and innovative products which may enhance the environmental performance of organization. The leading firms of eco-friendly process innovations and product development can create a difference among them and their competitors and can also substantiate leadership.

The ecological friendly strategic orientation of a firm consists of strategic positioning, for instance, establishing positioning strategies, and greater integration enable firms to affect business processes of an organization. Thus, eco-innovation and eco-reputation must be related to each other:

H1.ECO-stsratgic orientation has significant impact on the relationship with the Reverse logistic.

Firms can implement sustainable business processes as a result of stakeholders' expectations. Since consumers must be aware of environmental protection processes, therefore, such efforts demand consumers to improve corporate reputation and extend product's selling points. Moreover, an eco-reputation offers cushion against immediate performance demand. Long-term strategic experimentation can be used by the managers for boosting the reputation of an organization [17]. Meanwhile, [18] stated that eco-friendly investment can be substantial bringing back long-term returns, which may enable firms which adopted eco-reputation strategic orientation to make these types of investment.

Keeping into consideration the significant eco-reputation in Global Green Brands List, Toyota has been enjoying its top position in its ranking [19]. According to scholar, Toyota being an auto-manufacturer, and considers eco-reputation to be its powerful strategic tool, since it has helped Toyota to greatly progress in decreasing its water and energy usage, toxic gases and waste emissions. The company also shared eco-reputation strategic orientation among suppliers through using eco-reputation and by working with these suppliers to establish positive image and to maximize its profits. This has also been revealed through the economically successful collaboration of hybrid-electric Prius to develop all-electric Tesla.

While purchasing a product or service, around 50% of the Americans give consideration to the products' ecological effects [20], therefore, eco-reputation of a

company greatly influence the purchasing decisions of consumers. Consequently, majority of the global firms tend to develop and sustain environmental strategies. Such as, in order to avoid plastic wrappings, 3M has started to manufacture post-it notes through recycled paper and begin to use recyclable cartons for packaging large post-its packs. Furthermore, eco-reputation allows to invest for making these SC programs to become more sustainable and so that it could bring reputation benefits in the long run. Eco-reputation is not considered insignificant or optional rather it acts as a significant factor for establishing image of an organization. Thus, it acts as a key business philosophy which intertwines and outwardly radiates the company across the SC. Therefore, we postulate:

H2: Sustainable supply chain is in significant relationship with the reverse logistic.

Eco-innovation shows the ability of an organization to establish, integrate and reshape internal and external eco-friendly capabilities [21]. In particular, eco-innovation demands new value creation using effective and efficient eco-friendly processes, products and services. Where product eco-innovation primarily emphasizes upon new product development or improving existing goods, with a purpose of satisfying environmental concerns. In addition, [3] stated that eco-innovation also takes account for the creation as well as the adoption of substantially improved or innovative delivery or production methods.

Government and several global enterprises have used eco-innovation for putting emphasis upon businesses to make contribution towards sustainable development. For instance, in 2011 an eco-innovation action plan has been launched by the European Commission, for stimulating eco-innovation development. It is an important breakthrough, which has led European Union towards fostering eco-innovative business processes and eco-friendly technologies. The long-term organizational objectives emphasize to maintain, eco-innovation awareness throughout the European Union. Another important benefit of eco-innovation is that it provides guidance to improve organizational processes and develop products by keeping in view the product-life cycle perspective and by implementing strict guidelines for the suppliers. This eco-innovation strategy demands the integration of relevant ecological processes , No. manufacturing, packaging, purchasing) and environmental competencies for the development of current processes and products. Thus, this strategy stimulates the creation of innovative capabilities and extra resources for SC sustainability development. Therefore, firms are required to establish those innovative technologies which exhibit nature and industry-specific features of businesses [18, 22], and which also tends to deviate from current business practices for enhancing environmental performance.

H3. ECO-strategic orientation has significant impact on the relationship with the sustainable supply chain.

According to [23] manufacturing firms have shown more concern and responsibility towards dismantling, collecting, and upgrading of packaging materials and used products. Basically, reverse logistics is ecological friendly, since product recycling, repairing and refurbishing seem to protect and restore the environment. Returning of goods through reverse logistics can be resold, broken down for re-sale, or put back to inventory [7]. However, author have suggested that all those steps which reduce costs are also tend to increase profits, minimize liabilities, enhance customer relationship, and reduce the adverse effects upon environment. According to [24] resource commitment must be taken as a priority, as it has the potential to improve performance by providing strategic means for establishing long-lasting association among firm's positive image and customers, in addition it can also enhance performance in the form of value creation. Although, these reverse flows are not similar to outbound and standard operations, since they are required to be handled more specifically and may require resource allocations across the whole product cycle. Sufficient resource allocation comprises of primary reverse logistics programs which provide assistance for sustainable SC initiatives. Furthermore, reverse logistics is heavily dependent upon reversing the SC processes, for enabling organizations to involve in identification and correct classification of returned components, packaging materials, and products to dispose them off.

Thus, in view of [25] it is a continuous process which demands for a built-in process. The reverse logistics tend to extend the supply chain responsibilities even further by influencing several manufacturing components. Therefore, a thorough reconsideration for product lifecycles is needed for estimating the amount of waste generated and energy consumed at each stage of product development. Thus, a comprehensive review must be carried out regarding the operational processes at company level i.e. procurement of raw materials to the product packaging, which would result in successful adoption of reverse logistics [26, 27]. Thus, we hypothesize as follows:

H4. Sustainable supply chain. mediates the relationship between ECO-strategic orientation and the reverse logistic.

3. Method and measures

Eco-reputation strategic orientation refers to an organizational extent of maintaining environmental reputation of its organization across the lifecycle of its product. [16] have presented five measuring items. In terms of strategic orientation, eco-innovation acts as on organizational awareness which can also be identified through the adoption of new strategies and ideas in SC

activities. The items for measuring eco-innovation were extracted from [16] study. Five-point Likert scale was employed for eco-innovation and eco-reputation where 1 represents strongly disagree and 5 represents strongly agree. The green purchasing involves content restrictions and requirements for components and raw materials, supplier questionnaires, content disclosure and labeling, supplier compliance audit, and supplier EMS certification. These items are extracted from a study. In addition, green manufacturing involves manufacturing processes, in particular, inputs that create less adverse impacts on the environment turns out to be more efficient and create relatively less pollution. Seven measuring items are extracted by current research from [28]. Besides, four measurement items for characteristics are also adopted, namely weight, size, used materials, and shape. Sustainable SC initiatives are also measured using a five-point Likert scale, where 1represents not at all and 5 represents very high extent. As reverse logistics involve recovering of used products for ensuring their proper disposal or reusing its value. The study by [28] has been considered for extracting seven measuring items, and a five-point Likert scale was used for analyzing reverse logistics' implementation.

4. Data Analysis

Due to the number of reasons the current study is using Structural Equation Modelling , No. SEM). SEM assumes that variables assed without any errors and have equal capability of consideration with linear and multiple regression analysis. Although SEM is very effective for the estimation of instrument with many distinct equations of multiple regression and also involve in factor analysis and multiple regression. For collecting sample, we have employed the cluster sampling technique. [29], have presented the Five-technique approach is used for calculating sample size in current study. First step is estimation of total population, [30] have presented the table for estimating the sample size of population. The total population size is 310. SEM is commonly used and most powerful measure in social sciences because it can test many associations at a time. For collecting sample, we have employed the cluster sampling technique. [29], have presented the Five-technique approach is used for calculating sample size in current study. First step is estimation of total population, [30] have presented the table for estimating the sample size of population. The total population size is 310. SEM is commonly used and most powerful measure in social sciences because it can test many associations at a time [31]. Though in past many scholars have their emphasis for using AMOS which is co-variance-based technique. Though for the CB-SEM approach PLS-SEM is a good alternate because of its different methodological features. SEM is most suitable methodology due to many reasons like its best between the present techniques it is more advance and provide vigorous solution for the problems of researchers which may not be achieved by using multiple regression. [31] stated that for obtaining explanation and forecasting the constructs PLS approach is very helpful. For this study we have used PLS-SEM technique pretend to flexible, in terms of sample size demand less and due to its capability of handling multiple structural modeling. Furthermore, model is established for formation and reflecting the constructs. The purpose of current study is to intimate and forecast between constructs. [31] also supported this reason of using Partial Least Square approach. It involved in two models that is measurement model and structural model.

Valuation of inner model and valuation of outer model are the two steps of SEM, and the outer model valuation is identified as measurement model and finally known as structural model. The measurement model follows the different criteria like in structural models' variance and validity, reliability. By nature, items are dynamic therefor a robust correlation is predictable between variables which are combined to forming a construct. For measurement model the confirming the validation like how variables are experimented the current study has used the confirmatory factor analysis. All the variables analyzed distinctly by using formative reflective and structural modeling for estimating the measurement model throughout.

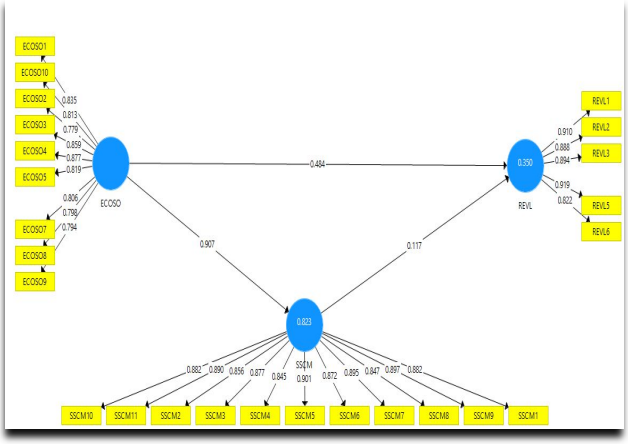

Figure 2. Measurement Model

To start with internal reliability typically measure the reliability of findings in the same test items. It checks either projected items measured the constructs are providing same scores [32]. So, in the current study internal reliability is evaluated with examine [31], stated that differently with Cronbach's alpha CR isn't except for loading of construct as equal indicator. The value of CR contrasts between 0-1: the minimum value should be more than 0.60, and the values 0.70 and greater are desirable [32]. Therefore, value of CR between 0.6- 0.7 shows average internal reliability, whereas the value between 0.70 and 0.90 is observed as more satisfactory.

Convergent validity is the next one which state at wot extent measurement of any construct which is theoretically associated with each other. Henceforth, between the measures of same constructs it shows the degree of correlation. Value of AVE is used with

	, No. O)	, No. M)	, No. STDEV)	T Statistics	P Values
ECOSO -> REVL	0.492	0.497	0.192	2.561	0.005
ECOSO -> SSCM	0.908	0.909	0.015	61.956	0.000
SSCM -> REVL	0.561	0.564	0.069	8.145	0.000

minimum of 0.50 and above in the measurement of construct regarding to identify converging elements. If the value of AVE is 0.50 it indicates satisfactory convergent validity. In other words, half of variance of its indicators is explained by the latent constructs and shows satisfactory convergent validity [32].

Table 1. Reliability

	Cronbach's Alpha	rho_A	CR	, No. AVE)
ECOSO	0.939	0.943	0.949	0.673
REVL	0.932	0.941	0.949	0.788
SSCM	0.970	0.971	0.973	0.769

Formerly, discriminant validity is considered as the extent at which one construct is change from another and in other words the measurement of construct which are distinct from each other. The assessment of discriminant validity is the most conventional approach [32]. Others comprises method of cross-loading inspection. Which considered to be more generous. Meanwhile it has more constructs for show discriminant validity.

Table 2. Validity matrix

	ECOSO	REVL	SSCM
ECOSO	0.820		
REVL	0.789	0.887	
SSCM	0.807	0.755	0.877

The predicted value of reliability index is more than or equal to 0.70. in current study the evicted values of cross-loading and outer-loading are same. Whereas the presence of correlation between variable constructs is analyzed by cross loading. So, this study will observe the discriminant validity among variables and in their constructs as per below table 3

Table 3. Factor Loading

	ECOSO	REVL	SSCM
ECOSO1	0.835		
ECOSO10	0.813		
ECOSO2	0.779		
ECOSO3	0.859		
ECOSO4	0.877		
ECOSO5	0.819		
ECOSO7	0.806		
ECOSO8	0.798		
ECOSO9	0.794		
REVL1		0.910	
REVL2		0.888	
REVL3		0.894	
REVL5		0.919	
REVL6		0.822	
SSCM10			0.882
SSCM11			0.890
SSCM2			0.856
SSCM3			0.877
SSCM4			0.845
SSCM5			0.901
SSCM6			0.872
SSCM7			0.895
SSCM8			0.847
SSCM9			0.897
SSCM1			0.882

Assessment of measurement model included valuation of validity and reliability after that valuation this study will valuate structural model with assessment of structural paths among moderating, dependent and independent variables. SEM-PLS is different from the other techniques. PLS-SEM method detects valuation of all he constructed variables at the same time. So, it analyzes the indirect and direct impacts of variables in structural model.

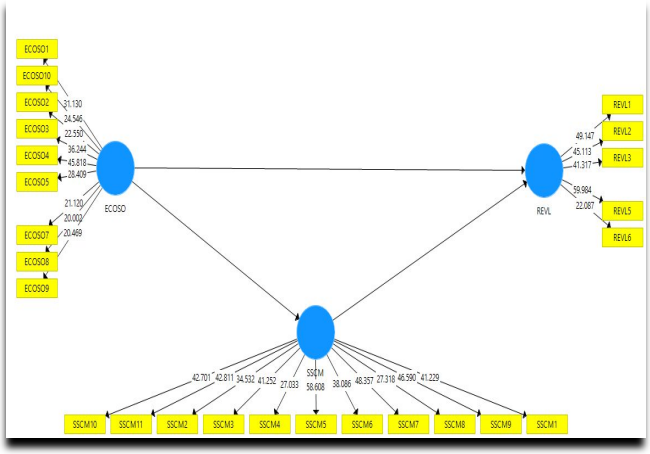

Figure 3. Structural Model

The examination of inner model starts with association of dependent and independent variables. PLS-SEM procedure valuates the size of path coefficients, through PLS-SEM bootstrapping process importance and association is evaluated in Smart PLS 3.0. We have use sample of 5000 cases as bootstrapping samples [31]. First model focus on the te direct association

between dependent and independent variables. And in second model we introduced a mediator and explain the association among dependent variable, independent variable and mediator.

Table 4. Direct Results

Table 5. Mediation

	, No. O)	, No. M)	, No. STDEV)	T Statistics	P Values
SSCM -> SCDC -> SUSP	0.446	0.451	0.174	2.566	**0.005**

The coefficient of determination that is R^2 explain expected power of endogenous variables in structural modelling. The value of path coefficient which is close to 0 show the insignificance of coefficients. the value of R^2 is between 0-1 if the value is close to 1 its shows high expected accuracy and so on. If the value is 0.75 it shows enough expected power and 0.50 shows moderated expected power and if the value is 0.2.

Table 6. R-Square

	R Square
REVL	0.350
SSCM	0.823

There is need for the research to apply the measures that reflect the analytical significance for quality evaluation of the model during the use PLS-SEM as per the recommendation of [31]. the test of Stone-Geisser has been used for the blindfolding procedure. This test has been used in this study for testing the goodness of fit in PLS method [33].

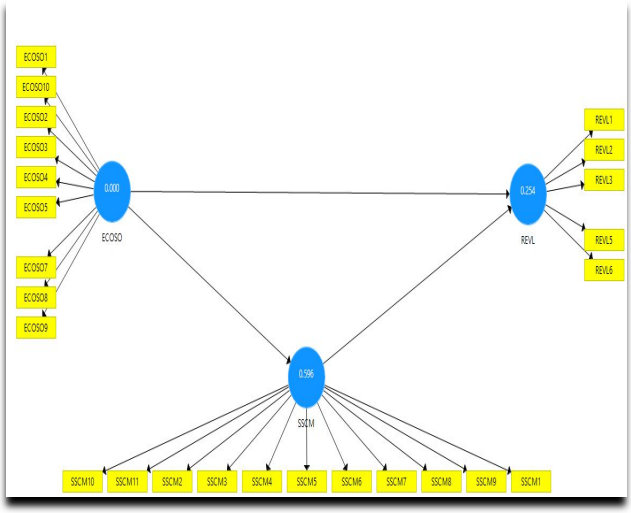

Figure 4. Q-Square

Blindfolding procedure is the only estimate of the dependent latent variables having a model with multi dimensions [34].

Table 7: Q-Square

	SSO	SSE	Q^2 , No. =1-SSE/SSO)
ECOSO	1,953.000	1,953.000	
REVL	1,085.000	809.422	0.254
SSCM	2,387.000	964.309	0.596

5. Discussion and Conclusion

The current study provides important insights. The obtained results are integrated with the managerial implications. The findings of this study provide empirical validation needed to make investment in sustainable SC initiatives. In addition, a strong evidence is provided about the benefits arising from reverse logistics [35]. The assurance of obtaining benefits from sustainable SC provide confidence to the managers. Therefore, ecological requirements are considered as key production and product criteria, specifically for those firms which try to find ways such as staying profitable and maintaining competitiveness to achieve economic sustainability. Therefore, adopting sustainable SC initiatives may result in value creation, provide means for achieving competitive advantage, and reverse logistics [8].

The results of current research offer alternatives for the managers who are keen to develop sustainable SC initiatives. Significance of strategic orientation i.e. eco-innovation and eco-reputation should not be ignored by the firms, if the development of sustainable SC initiatives is intended by the organization's decision makers, thus, eco-innovation and eco-reputation are found to be the key enablers of sustainable SC initiatives. Similar findings were obtained by [36]. When a firm prioritize ecological strategic orientation or when the eco-friendly practices are emphasized by the top managers for improving the organizational image, then it is easier to make investments for the sustainable SC [5]. In addition, careful attention must be given by the managers on the bi-directional association among eco-reputation and eco-innovation. The existence of eco-innovation and eco-reputation makes it easier for the managers to focus more effectively upon green SC activities. The benefits of reverse logistics arising from sustainable SC initiatives indicate that it does not merely involve recovery of products from the end-users but the sorting, unsold merchandising, reassembling, and recycling of products. The recovered products can generate revenue through re-selling of these used products in secondary channels. Thus, instead of taking reverse logistics to be center of cost, managers must also focus upon the strategic benefits of sustainable SC initiatives and environmental sustainability to encourage environmental sensitivity among organizations.

References

[1] M.D.K. Zaman, "*Business, ethics and the environment,"* Journal of ASIAN Behavioural Studies, Vol. 3, No. 8, pp. 9-16, 2018.

[2] S. Liu, H. Webb and W. Zhou, "*Green innovation in challenging institutional contexts: A case study on Landsea's environmental projects,"* Ekoloji Dergisi, , No. 107), 2019.

[3] C. Bai and J. Sarkis, *Green supplier development: a review and analysis*, in *Handbook on the sustainable supply chain,* Edward Elgar Publishing, 2019.

[4] W. Yu, "*Environmental scanning, supply chain integration, responsiveness, and operational performance,"* International Journal of Operations & Production Management, 2019.

[5] K.A. Tannous and S. Yoon, "*Summarizing risk, sustainability and collaboration in global supply chain management,"* International Journal of Supply and Operations Management, Vol. 5, No. 2, pp. 192-196, 2018.

[6] D.I. Prajogo, "*The strategic fit between innovation strategies and business environment in delivering business performance,"* International Journal of Production Economics, Vol. 171, pp. 241-249, 2016.

[7] D.T. Wong and E.W. Ngai, *Critical review of supply chain innovation research , No. 1999–2016).* Industrial Marketing Management, 2019.

[8] J. O. Ajibike and F. Fagbemi, *"Finance-growth nexus: The primal case for the role of governance in Nigeria,"* American Journal of Social Sciences and Humanities, Vol. 4, No. 2, pp. 288-301, 2019.

[9] P. Cousins, "*Investigating green supply chain management practices and performance: The moderating roles of supply chain ecocentricity and traceability,"* Management , No. DOI: 10.1108/IJOPM-11-2018-0676), 2019.

[10] L. Annala, P.E. Polsa and G. Kovács, "*Changing institutional logics and implications for supply chains: Ethiopian rural water supply,"* Supply Chain Management: An International Journal, Vol. 24, No. 3, pp. 355-376, 2019.

[11] Z. Ma, "*Satellite-based spatiotemporal trends in PM2. 5 concentrations: China, 2004–2013,"* Environmental Health Perspectives, Vol. 124, No. 2, pp. 184-192, 2015.

[12] M. Schenkel, "*Vicious cycles that hinder value creation in closed loop supply chains: Experiences from the field,"* Journal of Cleaner Production, Vol. 223, pp. 278-288, 2019.

[13] B.L. Hart and M.E. McMurtrey, "*Supply chain management: Managing the supply chain in pediatric healthcare,"* Journal of Strategic Innovation and Sustainability, Vol. 13, No. 3, 2018.

[14] D. Leończuk, "*Categories of supply chain performance indicators: An overview of approaches,"* Business, Management and Education, Vol. 14, No. 1, pp. 103-115, 2016.

[15] E. Akpan and S. Waribugo, "*The impact of structure on strategy implementation among telecommunication firms in Nigeria,"* European Journal of Business and Management, Vol. 8, No. 14, 2016.

[16] N.W. Githinji, *Effect of green supply chain practices on sustainable competitive advantage of cement manufacturing companies, Kenya*, KCA University, 2018.

[17] B. Fahimnia, J. Sarkis, and H. Davarzani, "*Green supply chain management: A review and bibliometric analysis,"* International Journal of Production Economics, Vol. 162, pp. 101-114, 2015.

[18] M.A. Camilleri, "*The rationale for responsible supply chain management and stakeholder engagement,"* Journal of Global Responsibility, Vol. 8, No. 1, pp. 111-126, 2017.

[19] C.-C. Hsu, K.-C. Tan and S.H. Mohamad Zailani, "*Strategic orientations, sustainable supply chain initiatives, and reverse logistics: Empirical evidence from an emerging market,"* International Journal of Operations & Production Management, Vol. 36, No. 1, pp. 86-110, 2016.

[20] L.R. Kidd, "*Messaging matters: A systematic review of the conservation messaging literature,"* Biological Conservation, Vol. 236, pp. 92-99, 2019.

[21] L. Akgun and F. Tektufekci, *"Audit in Russian Federation and the research toward the determination of the functioning of audit mechanism,"* Asian Journal of Economic Modelling, Vol. 5, No. 1, pp. 23-34, 2017.

[22] T. Semrau, T. Ambos and S. Kraus, "*Entrepreneurial orientation and SME performance across societal cultures: An international study,"* Journal of Business Research, Vol. 69, No. 5, pp. 1928-1932, 2016.

[23] H. Garg and R. Arora, "*Maclaurin symmetric mean aggregation operators based on t-norm operations for the dual hesitant fuzzy soft set,"* Journal of Ambient Intelligence and Humanized Computing, pp. 1-36, 2019.

[24] S. Irum, "*A review of green supply chain management practices in Asian countries,"* International Journal of Engineering & Technology, Vol. 7, No. 2.29, pp. 1094-1096, 2018.

[25] A. Azadeh, M. Zarrin and N. Salehi, "*Supplier selection in closed loop supply chain by an integrated simulation-Taguchi-DEA approach,"* Journal of Enterprise Information Management, Vol. 29, No. 3, pp. 302-326, 2016.

[26] N. Zarbakhshnia, "*A novel multi-objective model for green forward and reverse logistics network design,"* Journal of Cleaner Production, Vol. 208, pp. 1304-1316, 2019.

[27] P. Sureeyatanapas, P. Poophiukhok and S. Pathumnakul, "*Green initiatives for logistics service providers: An investigation of antecedent factors and the contributions to corporate goals,"* Journal of Cleaner Production, Vol. 191, pp. 1-14, 2018.

[28] G. Scur and M.E. Barbosa, "*Green supply chain management practices: Multiple case studies in the Brazilian home appliance industry,"* Journal of Cleaner Production, Vol. 141, pp. 1293-1302, 2017.

[29] M.I. Ullah, *Individual, organizational, technological and industry factors effects on innovation capability of dairy SMEs in Pakistan: knowledge sharing as mediated*. Universiti Utara Malaysia, 2017.

[30] R.V. Krejcie and W. Daryle, "*Morgan., No. 1970). Determining Sample Size for Research Actives,"* Journal of Education and Psychological measurement. สืบค้น เมื่อ กุมภาพันธ์, Vol. 25, pp. 2558, 2015.

[31] Hair, *A primer on partial least squares structural equation modeling, No. PLS-SEM)*. Sage Publications, 2016.

[32] M. S. AlAli, *"Forecasting-based carry trade using pegged currency: A case of Omani rial,"* The Economics and Finance Letters, Vol. 3, No. 2, pp. 21-29, 2016.

[33] S.I.U. Shah and N.A. Rahim, "*Effect of ethical climate on corporate financial performance in Pakistan: An application of confirmatory tetrad analysis , No. CTA-PLS) approach,"* Journal of Studies in Social Sciences and Humanities, Vol. 5, No. 2, pp. 53-67, 2019.

[34] M. Sarstedt, "*Estimation issues with PLS and CBSEM: Where the bias lies!,"* Journal of Business Research, Vol. 69, No. 10, pp. 3998-4010, 2016.

[35] S.I. Hallstedt and J.W. Nylander, "*Sustainability research implementation in product development-learnings from a longitudinal study,"* in *Proceedings of the Design Society: International Conference on Engineering Design*. 2019. Cambridge University Press, 2019.

[36] S.A. Yawar and S. Seuring, *27 A framework for managing social issues in supply chains.* Handbook on the Sustainable Supply Chain, pp. 479, 2019.

[37] Kasayanond, A., Umam, R., & Jermsittiparsert, K. (2019). Environmental Sustainability and its Growth in Malaysia by Elaborating the Green Economy and Environmental Efficiency. International Journal of Energy Economics and Policy, 9(5), 465-473.

[38] Kerdpitak, C. & Jermsittiparsert, K. (2020). Influence of Engineering Education and Integrated Quality & Environmental Management on Quality, Firm and Environmental Performance. Test Engineering and Management, 82, 3452-3463.

[39] Chetthamrongchai, P. & Jermsittiparsert, K. (2020). Ensuring Environmental Performance of Pharmaceutical Companies of Thailand: Role of Robotics and AI Awareness and Technical Content Knowledge in Industry 4.0 Era. Systematic Reviews in Pharmacy, 11(1), 129-138.