

The Impact of Green Supply Chain Management on the Environmental Performance in Private Companies of Bangkok: Mediating Role of Green Innovation

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Abstract-The environmental performance is an essential element for the success of the organization and this could be attained by employing the effective green supply chain practices and its management. Thus, the ongoing study aims to explore the nexus among the green supply chain management (internal environment management, reverse logistic, green purchasing and customer environmental corporation) and environmental performance of the private organizations in Bangkok Thailand. The purpose of the study is also to examine the mediating role of green innovation among the practices of green supply chain management and environmental performance of the private organization in Thailand. The primary data has been obtained by the researchers from the employees that are associated with the management of the green supply chain by using questionnaires and PLS-SEM has been executed for analysis. The results of the present study exposed that the management of the green supply chain has positive along with significant nexus with the environmental performance of the private organization in Bangkok. The results also indicated that green innovation has also positively mediating among the links of management of supply chain and environmental performance of the private firm in Bangkok. These findings have provided the guidelines to the environmental regulation developing authorities that they should spend more intention on the green supply chain that could improve the performance of the environment that is necessary for the success of the organization.

Keywords; Environmental performance, Green Supply Chain, Green innovation

1. Background

The appearing environmental issues and assets depletion issues take the challenge with the trade's governments over the most present years. Being a nation change to progress trade countries in the Asia-Pacific part, Thailand has to manage with many environmental problems and consumption issues by the increasing profitable growth. Since the prefabricate trade in Thailand has continually

supplied as the vital driver for the big trade economy, there is a high requirement to check the trade jobs and their collision on the whole presentation, especially on the surrounding presentation of these trades [7]. This by the significant environmental risk present by these trade jobs, regarding the traffic overcrowding, the discharge of the carbon monoxide, the usage of scrapped materials, nonessential packing things and other pollutants from the trade part. So, environmental such as green improvement and green supply chain management (GSCM) is profitable for these trades' governments to approve to secure greener jobs. The green improvement works and GSCM within the trade jobs are suggested to better their trade's presentation [19].

In reality, the GSCM which is a try for the environmental survivable can be rendered into the high business share and gainfulness. Properly, specified that working the methods of greening the providers and raising their green transformation. In detail, the performance of the GSCM enlarges the grade of green improvement jobs that are carried out to grow green things. The effecting of these works also can reduce the environmental influence from the organization legislations and management as fit as the public [34].

The green improvement is another idea of surrounding management, which has been presently advanced to remove negative part surrounding consequences. To high the future development trades governments; the green improvement is importantly desired to make fresh trades, given its astonishing aspects growth under the below decade, which offers potentials and many chances. The green improvement concept high the performance of GSCM with fresh thoughts and approaches to producers, Likewise, resources the green improvement may improve the performance of the surrounding management, importantly GSCM to complete the environmental needs of governments [11]. The green improvement also shows a common part for the trades' government and their supplier to work together, which possible to raising green

improvement actions and enlarge the green things. However, this needs constant green improvement for the performance of GSCM concerning the recent environmental aims [14].

Accordingly, this part of research studies the impacts of the GSCM and green improvement works on the environmental presentation of governments. Despite, large researches on the positive association of green improvement, GSCM and environmental presentation, the crash of the GSCM on the governmental environmental presentation has remained unproved. So, there is a rising requirement to attention on the Thailand manufacturing trades. To fill out these free parts, the recent researches work to find how the trade governments raise their environmental presentation by the green improvement works and GSCM, addressing the green improvement works and GSCM, these documents give the empirical proof to help the linked government calculate their ideal environmental plans [12].

In extra, this research shows both indirect and direct crash of the GSCM and green improvement on the governmental environmental presentation. Researches that emphasized on the indirect judgment are very less, which give insufficient analysis and information. For example, the connection between GSCM, green improvement and environmental presentation rest vague, importantly in the Thailand manufacturing trade. Importantly, there is a plan connection between green improvement and GSCM when it comes to the importance of the whole life cycle of the things to the betterment of the environmental presentation [24]. Moreover, most empirical researches only attention on the connection between the ideas of the green improvement and the green provider as well as their power on the aggressive returns and environmental presentation, so, the connection between the green improvement works and the GSCM has still stood in the question. However, green providers, which are connected to the provider environmental partnership, are also the sector of the GSCM works. As a result, the idea of the green providers is quite easy to the idea of the green purchasing, it is suggested to expand other GSCM works as fit as the connection of the green method, green managerial and the green thing innovation. There have been incomplete important proves to hold the capacity of the GSCM in making green improvement and bettering the environmental presentation. As an outcome, this research explains the indirect and direct crashes to widely calculate these causal connections [39].

Separately from that, this research also adds to innovation actions that potentially better the green improvement of the governments, hence showing a complete work with the reflection of the green improvement in the green provide chain part. In this research, green advertising improvement is assessed in the idea of the green improvement, wherein just green method

innovation green product improvement, and green management innovation where earlier assessed in a little research. Green advertising improvement is less emphasized in the green improvement researches, so, there is an uncertain capacity of such improvement in the jobs manufacturing governments [36]. On the other hand, the capacity adopts by the past researches in the paper of the advertising improvement and the green advertising serve as the instruction for this research, which was agreed to calculate the green advertising improvements in the paper of the green improvement. More importantly, this research is designed to explain the mediating crash of the green improvement on the connection between the environmental presentation and GSCM. In extra, this research also completely discusses the green improvement works and the GSCM as fit as the environmental presentation. An addition that, the recent document is to search the original connection of the GSCM, green improvement and the environmental presentation, lastly, the document is finished with a conversation on the obtain outcomes [32].

2. Hypotheses development

Green supply chain management involves the works that potentially reduce the rate of environmental problems at the stage of creative methods of the last invention in the developing governments. GSCM considerably change the environmental collision of the provide chain jobs, which potentially enlarge the livability presentation of the governments. Most of the researches managed on GSCM are intentioned on various subjects ranging from governmental study to the GSCM works. On the other hand, the ground green provides chain has been just presently introduced, which in detail shows the uncertain answers on the green provide chain works, given that the pertaining thesis in this parts are being industrial in turn to help the successful completion of the GSCM works. The main purpose of the GSCM is to reduce the harmful environmental consequences, for instance, non-sustainable assist consumption, smog and rude produced removal [18].

The idea of the GSCM has been a title of debate since the innovation of the excellence in the 1980s and the innovation of the provide chain in the 1990s. GSCM 116 add green purchasing undo logistics and the method series into the provide chain jobs, or also recognize as ending of the loop. Therefore, it is managed by increasing difficult environmental effects. Separately from the surrounding profits, GSCM also presents profitable consequences to the trades jobs [31].

In slandered, GSCM contains several jobs, counting green purchasing, the inner environmental organization, client environmental collaboration and repeal logistics that have assumed by some empirical searches. During the GSCM works, trades jobs are capable to survive the hard

environmental weight from the organizational management as well as the community [33]. The GSCM works permute the governments to better their whole presentation by the green improvement. On the other hand, there are some empirical proves representing the connection between the green improvement works and the GSCM in bettering the whole governmental presentation. So, ongoing improvements are needed to effectually address the fear of all stakeholders [22].

Green innovation is mentioned as the new environmental improvement of the works, managerial, promotions and methods, which are obtained from the completion of the GSCM that has to bring regarding betterment in the governments environmental presentation. Green improvement is other trade environmental organization idea promoted with the develop governments, which is also the same as the idea of the GSCM. In extra, it collects the results of the GSCM by boosting the presence of the environmental organization with a difference to the needs forced by the resent environmental systems. Green improvements not just decrease the creation costs, but also betters the slandered and reliability of the goods as well as supply productivity [21].

The inner and outer works of the GSCM potentially position off green improvement, which is need for the supply chain management (SCM) of the governments in the aggressive and active environments with a difference to the rising environmental problems and rising pressures from their regulators, players and clients [5]. So, for the winning inner environmental, top and directors of the governments propel the need assets operation for the completion of fresh gaining technologies of fresh information. These improvements typically engage the methods, good and the advertising attributes to make good separation. Therefore, the idea of green improvement is key for successful completion of the GSCM [4].

Researches on the green improvement work in Thailand are rather less, but importantly increasing in the industrial organizations and other industrials organizations. On the other hand, these researches just explained the common idea of the green improvement and were uncap able to underline the multidimensionality of the green improvement works widely. The above researches highlight the approval of the multidimensionality of the green improvement works to the better economic and environmental presentation of the governments, but less to green goods improvement, green methods improvements and the green managerial improvements [1].

Environmental presentation calculates the helpful impacts of the completion of the GSCM and green improvement works on the normal environment, which crash also the inner or outer environment of the governments. There is an important projection in bettering the environmental presentation of trade governments y the

environmental managing plans, for instance, GSCM and the green improvement works [28].

These environmental works show the governments to raise their strength to survive in the business. Governments would become mush compliant and flexible to the alters when they snatch how to continually overcome the costs, better their methods, observe with the narrow needs and stakeholders' outlooks and discover fresh market chances [35]. When governments meet environmental issues, inspiring maintainability standards to them has full direct crashes on the bettering maintainability financial success. Separately from the present rising environment problems, the environment input presentation checks and indicators critical parts of the environmental management system (EMS) as these parts show the big term victory of a government [3].

Since this research give attention on the connection of GSCM and the green improvement in the develop governments, the environmental presentation of these governments was measured as the main order following the completion of the green improvement works and the GSCM [17]. However, only the fresh governments are ready to create their environmental presentation information nearby. Moreover, common reporting events are unclear. So, the comparisons of the services, goods firms, facilities and even organizations become importantly testing and different kinds of the approaches accepted in the reporting environmental presentation [25].

Numerous researches have measured the connection between the GSCM works and the environmental presentation. Furthermore, the text contains researches arguing above the connection between these two problems. So, the problem of the weather the GSCM works change negatively or completely the environmental presentation of the GSCM works, the governments are positive to better and maintain their connection with the providers and the clients to get the environmental presentation [10]. With that, the governments have to manage and make sure their providers to provide environmentally responsive materials in a method to reduce the harmful environmental collisions in the time of creation methods. Besides, governments have to perform in a method to enlarge and complete the clients, stress for the environmentally responsive goods. Furthermore, the connection between the partners, clients and the providers, as well as together study and innovation will better the environmental presentation [8]. Separately from bettering the environmental presentation, the completion of the GSCM works also make sure that the governments and their providers match to the environmental systems. In detain words, the acceptance of a maintainable approach, for instance, GSCM, decrease waste dangerous materials and reduce the jobs costs and the transition, promote the works of recycling and reclaiming the raw goods, betters efficient operation of the services, and the resources

governments to match among the environmental systems [6]. Therefore, the following hypothesis can be formulated:

H1. The green supply chain has positive nexus with the environmental performance of the private organization in Bangkok.

The connection between the GSCM works and the green improvement is maintained by the two theses, namely, improvement loom and innovation by the co-production model. Both theses assumed that the relationships among stakeholders and parties that are concerned in the organizations, provide chain method will create more environmental improvement to fulfil the high stress from the outer parts, importantly from the organization managers and the legislation [20]. Green providers add to more green improvements, which supposed that the GSCM works are the solution drivers in suggesting green improvement works. Several types of research have established the position of the GSCM in creating green improvement, but they have not measured the complete crashes of the GSCM on the green improvement [16].

The research described that the green improvement can be motivated by the environmental support with organizations and their significant providers in bettering a fresh green well. In extra, research in Thailand indirect that trades environmental system, for instance, GSCM is connected to the green good and the methods innovation. The motivation behind the connection between green evolution and the GSCM can be right [40]. The increasing fear of the environmental regulations and problems from various stakeholders, clients urge organizations to work to gather with them in good growth methods. This teamwork will be profitable to the originations in making the advancement, increasing the good design and develop methods, and rising overall agreement with the environmental systems. Green advancements idea can help out the completion of the GSCM by offering the fresh concepts, approaches and methods to produce in developing fresh goods. Lastly, green evolutions are helped to give continuous methods to advance each plan of the provide chain to get aggressive benefits and reduce the environmental issues in the trade [13]. So, it postulated that:

H2. The green supply chain has positive nexus with the green innovation of the private organization in Bangkok.

In observe to green evolution, researches groping the environmental presentation as a result variable are less. So, these observed researches were incapable to believe how green methods evolution and the green management advancement power the environmental presentation. Furthermore, the point to which the green management power the environmental presentation was out the range of these researches [40]. On the further hand, these three methods of green evolution and the green good

advancement, but the important connection was found among the management advancement and the environmental presentation drivers, importantly to decrease toxic fog, which reduces the cost of stricter gathering among the organization and the companies, NGO and the clients to decrease the smog to support victory full burden for the environmental presentation [15].

Moreover, the acceptance of the green advancement potentially minor the pollution, harmful toxic waste and the rate of the harmful waste removal, while capably deal with the outer environmental stress from the further stakeholders [27]. So,

H3. The green innovation has positive nexus with the environmental performance of the private organization in Bangkok.

An analysis of the text argues that the completion of the GSCM works in a government finally power the governmental environmental presentation. On the other hand, to calculate the straight collision of the GSCM on the governmental environmental presentation, it needs to get into concern a third variable. Green advancement has been named as a director in the connection between the SCM and the governmental environmental presentation. In the further word, it is a place of a straight power from the GSCM on the governmental presentation, GSCM first collision green advancement that, in the role, powers the governmental environmental presentation [26]. These are recognized as indirect and straight collisions. According to this hypothesis, firm environmental systems that draw advancement poise the rates of obeying with these systems and helpful collision the trade's presentation systems, not just collision the trade's presentation of the governments, but as well not straight these governments to accept the green innovation plan. This type of collision is frequently referred to as the arbitrated collision, so, these hypotheses perhaps show as a mediation hypothesis, where the green advancement plans suit the mediator among the environmental system and the environmental presentation of the governments. Using these as standard, this research suggested that green advancement is potentially an important mediator between the GSCM and the environmental presentation [23].

Although the fewer amounts of the researches created in this document, these researches measured the diverse aspects of the governmental trades' presentation and argued the mediating part of the green advancement. This research explained the connection between the acceptance of the environmental advancement plan and the governmental business presentation in the compound trades in Thailand, which established that the environmental advancement plan mediates the connection between the related environmental stress forced and governmental business presentation [2]. In extra, this study explained the helpful collisions of the business

environmental morals on the aggressive benefits by the mediating collision of the green advancement presentation in the development industry in Thailand. The answers set that the green good advancement mediates the helpful connection between the business environmental morals and the aggressive benefits, with the exclusion for the green methods innovation. In further detail words, this argues that the aggressive benefit is straightly exaggerated by the business environmental morals and the opaquely affected by the green good advancement in the developing industry of Thailand [9]. So, the following hypothesis can be formulated:

H4. Green innovation mediates the relationship between environmental performance and GSCM.

3. Methodology

The aim linked with the existing study is to explore the nexus among the green supply chain management (internal environment management, reverse logistic, green purchasing and customer environmental corporation) and environmental performance of the private organizations in Bangkok Thailand. The purpose of the study is also to examine the mediating role of green innovation among the practices of green supply chain management and environmental performance of the private organization in Thailand. The primary data has been obtained by the researchers from the employees that are associated with the management of green supply chain by using questionnaires. Thus, quantitative methods were adopted along with technique of simple random sampling to select the respondents. The questionnaires were sent to the employees of a supply chain associated employees by personal visit and forwarded around 460 surveys but after ten days only 290 were returned and represented approximately 63.04 per cent rate of response. The effective statistical tool has been employed by the study for data analysis named as smart-PLS due to the complexity of the framework along with the hypotheses testing nature of the present study.

The constructs that have been taken by the study include one predictive variable named as environmental performance (EP) that has four items. In addition, only one mediator constructs have been taken by the existing study named as green innovation (GI) and have five items. Finally, the green supply chain management (GSCM) has been used as a predictor that has four dimensions such as internal environment management (IEM) that has five items, reverse logistic (RL) that has three items, green purchasing (GP) that also has three items and customer environmental corporation (CEC) that has six items. These constructs are highlighted with relationships in Figure 1.

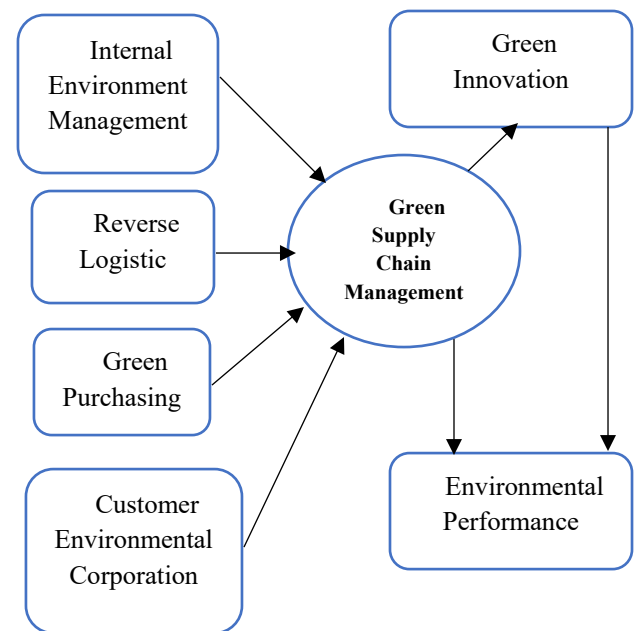


Figure 1. Theoretical model

4. Results

The findings section include the measurement assessment model along with structure assessment model. The measurement model assessment has been executed first in the analysis. The convergent validity along with discriminant validity have been examined in the measurement assessment model. The convergent validity checked first in the analysis that is about items correlation. The values of Alpha and CR are larger than 0.70 on the other hand the values of AVE and loadings are bigger than 0.50. These values enlighten that the items are highly correlated and valid convergent validity. These are shown in Table 1.

Table 1. Convergent validity

Items	Loadings	Alpha	CR	AVE
CEC1	0.799	0.869	0.902	0.607
CEC2	0.708			
CEC3	0.678			
CEC4	0.826			
CEC5	0.812			
CEC6	0.837			
EP1	0.782	0.827	0.898	0.747
EP2	0.909			
EP4	0.896			
GI1	0.797	0.773	0.803	0.512
GI2	0.517			
GI3	0.738			
GI5	0.774			
GP1	0.865	0.798	0.882	0.715
GP2	0.898			
GP3	0.769			

IEM1	0.795	0.802	0.865	0.565
IEM2	0.846			
IEM3	0.824			
IEM4	0.615			
IEM5	0.650			
RL1	0.850	0.775	0.821	0.605
RL2	0.743			
RL3	0.735			

The discriminant validity has been examined second in the analysis that is about variables correlation and the part of the measurement assessment model. The discriminant validity has been checked firstly by using Fornell Larcker along with cross-loadings. The values show that links with variable itself are higher than the relationship with other variables. These values enlighten that the variables are not highly correlated and valid discriminant validity. These are shown in Table 2 and Table 3.

Table 2. Fornell Larcker

	CEC	EP	GI	GP	IEM	RL
CEC	0.779					
EP	0.670	0.864				
GI	0.531	0.597	0.715			
GP	0.509	0.594	0.540	0.846		
IEM	0.472	0.513	0.452	0.521	0.752	
RL	0.464	0.504	0.483	0.498	0.406	0.778

Table 3. Cross-loadings

	CEC	EP	GI	GP	IEM	RL
CEC1	0.799	0.351	0.547	0.501	0.482	0.395
CEC2	0.708	0.495	0.412	0.550	0.521	0.409
CEC3	0.678	0.367	0.441	0.377	0.344	0.402
CEC4	0.826	0.446	0.353	0.469	0.461	0.331
CEC5	0.812	0.400	0.348	0.457	0.417	0.340
CEC6	0.837	0.466	0.374	0.474	0.430	0.292
EP1	0.537	0.782	0.422	0.539	0.514	0.554
EP2	0.607	0.909	0.484	0.497	0.514	0.410
EP4	0.589	0.896	0.469	0.500	0.532	0.392
GI1	0.393	0.404	0.797	0.406	0.404	0.389
GI2	0.275	0.270	0.517	0.304	0.229	0.264
GI3	0.463	0.465	0.738	0.479	0.339	0.364
GI5	0.354	0.345	0.774	0.323	0.296	0.349
GP1	0.498	0.514	0.451	0.865	0.423	0.332
GP2	0.552	0.534	0.440	0.898	0.437	0.365
GP3	0.491	0.455	0.477	0.769	0.459	0.563

IEM1	0.452	0.426	0.343	0.371	0.795	0.297
IEM2	0.512	0.478	0.377	0.414	0.846	0.289
IEM3	0.472	0.523	0.353	0.370	0.824	0.309
IEM4	0.329	0.393	0.281	0.374	0.615	0.317
IEM5	0.362	0.439	0.339	0.437	0.650	0.324
RL1	0.437	0.480	0.471	0.490	0.383	0.850
RL2	0.267	0.357	0.319	0.298	0.235	0.743
RL3	0.354	0.369	0.314	0.342	0.307	0.735

The discriminant validity has also been examined by using Heterotrait Monotrait (HTMT) ratio. The values show that links with variable itself are higher than the relationship with other variables due to less than 0.90 values of HTMT ratio. These values enlighten that the variables are not highly correlated and valid discriminant validity. These are shown in Table 4.

Table 4. Heterotrait Monotrait ratio

	CEC	EP	GI	GP	IEM	RL
CEC						
EP	0.791					
GI	0.684	0.700				
GP	0.729	0.731	0.726			
IEM	0.679	0.742	0.607	0.658		
RL	0.593	0.691	0.697	0.659	0.545	

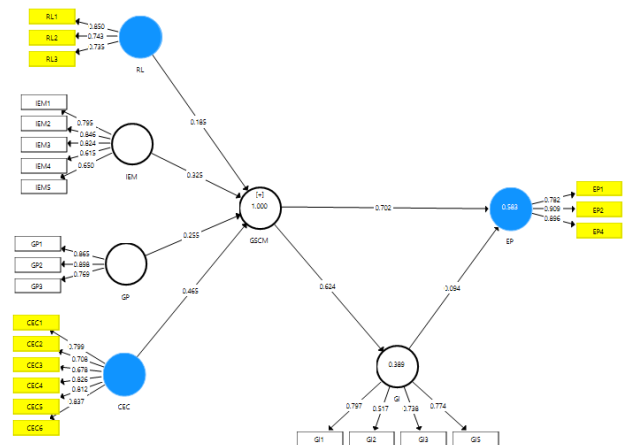


Figure 2. Measurement assessment model

The path analysis has been used for the testing of the hypotheses and the results of the present study exposed that management of green supply chain has positive along with significant nexus with the environmental performance and green innovation of the private organization in Bangkok and accept H1 and H2. In addition, the results also exposed that green innovation has a positive linkage with environmental performance and accept H3. Finally, the results also indicated that green innovation has also positively mediating among the

links of management of supply chain and environmental performance of the private firm in Bangkok and accept H4. These relationships are mentioned in Table 5.

Table 5. Path analysis

Relationships	Beta	S.D.	t-statistics	p-values
GI -> EP	0.094	0.030	3.125	0.002
GSCM -> EP	0.702	0.027	26.208	0.000
GSCM -> GI	0.624	0.022	28.585	0.000
GSCM -> GI -> EP	0.059	0.019	3.046	0.003

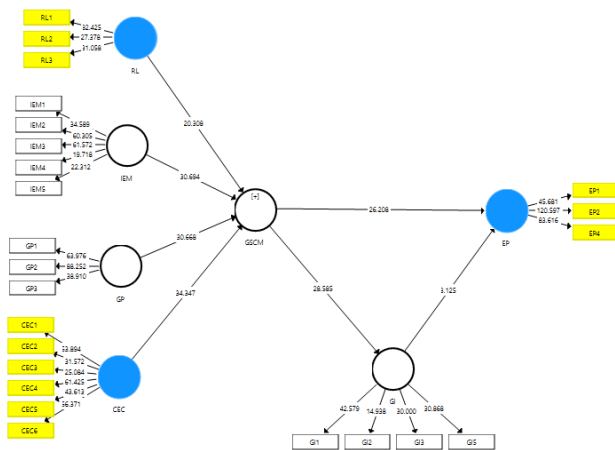


Figure 3. Structural model assessment

5. Discussion and conclusion

The results indicated that green supply chain management positively linked with the environmental performance that could be matched with the outcome of Zhou, Xia [37] who also exposed that supply chain practices could enhance the performance of the firm. In addition, the results also indicated that green supply chain has a positive impact on the green innovation and this outcome in line with the results of Shafique, Asghar [29] who also exposed that supply chain could force the owners to bring innovation in the business. Moreover, the output of the existing study also exposed that green innovation has positive linkage with the environmental performance of the firm and this is similar to the output of Singh, Del Giudice [30] who also investigated that innovation could improve the business process and enhance the environmental performance. Finally, the present study found the green innovation positively mediates among the nexus of the green supply chain and environmental performance and this could be in line with the outcomes of Zhu, Feng [38] who also exposed that innovation has to boost up the process and performance of supply chain that enhance the environmental performance. Thus, the present study concluded that the private firms in Bangkok maintain the high practices of supply chain and effectively manage it that is the reason for high environmental performance in the organizations. These

findings have provided the guidelines to the environmental regulation developing authorities that they should spend more intention on the green supply chain that could improve the performance of the environment that is necessary for the success of the organization. This study has some limitations that could be the future directions for upcoming studies such as it takes mediation in the model and suggested that future studies should take moderation in their model. In addition, it is also recommended that the future studies should take more factors to predict environmental performance. Finally, only private organizations are investigated in this study and recommended that future studies should add more organizations in their analysis.

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