



Moderating Impact of Innovation Practices on Logistics Practices of 3PLs Service Provider in Malaysia Context

Omotayo Adebare¹, Melan Mustakim¹ and Alonge O. Richard^{2*}

¹*Department of Logistics, School of Technology Management and Logistics, College of Business, Universiti Utara Malaysia, 06010 Sintok, Malaysia.*

²*School of Housing, Building and Planning, Universiti Sains Malaysia, 11800, Penang, Malaysia.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JEMT/2021/v27i630347

Editor(s):

(1) Dr. Alfredo Jimenez Palmero, University of Burgos, Spain.

Reviewers:

(1) Hoang Thi Lich, Vietnam Maritime University, Vietnam.

(2) Marius Gatta Ouyabaka, Nkumba University, Uganda.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/72091>

Original Research Article

Received 01 June 2021

Accepted 03 August 2021

Published 06 August 2021

ABSTRACT

Innovation consists of making collaborative efforts in term of relationship with other organization and institutions to attain competitive advantage by means of innovative services and products, as well as different relationships with their shareholders and stakeholders. Logistics services includes warehousing, freight, transportation, product return and repairs, inventory management, packaging, order entry/order processing. All these can be managed internally. But the challenges of coping with manufacturing and handling logistics which is not the core of the organization business model result to the outsourcing for logistics service providers, such as third-party logistics service providers. This paper aimed at investigating the moderating effect of innovation on logistics practices, particularly, warehousing, transport and packaging services, of 3PLs service provider in Malaysia manufacturing sector. Quantitative method of research was adopted, and questionnaire was distributed electronically. It was analysed using SPSS and the result indicated that innovation of green logistics moderates the relationship between inventory management and operational performance, packaging and service performance but does not moderate relationship between transportation and service performance.

*Corresponding author: E-mail: olarichy07@gmail.com;

Keywords: Innovation; Warehousing; Packaging; Transportation; services performance and operational performance.

1. INTRODUCTION

Logistics, as well as supply chain innovation are now new topic of discussion on the agenda of international research viz a viz, in practice. In the last couple of decades, new business models rely on new means of designing flow of logistics and supply chains have evolved. Big companies and conglomerate such as Dell, IKEA and Zara, HP are well known in the global for world class business for their innovative notions in supply chain and logistics solutions to reach their various customers. Hence, logistics innovation and logistics are however not about industrial products and production only.

Meanwhile, in the last decades there was an increase in the logistics industry globally which resulted to competition among third party logistics service providers, 3PLs, to be more tensed. According to Gudehus & Kotzab, [1] 3PLs service providers engage in many services, which includes warehousing, inventory management, packaging, transportation, cross-docking and freight forwarding. Logistics operations, as well as the operation service and financial performance of 3PLs service provider is very germane in the global competitive logistics market [2] In the view and perspective of customers, the general performance of Logistics service providers is more important than ever, [3]. It is counted as an obligatory for a logistic service provider to establish value in their services, [4] Specifically, 3PLs and transport service providers discharged a significant role in supply chain and logistics system of goods delivery.

Likewise, service and financial performance of logistics service provider is pivot for both customers and the [5] The reason for this is that, it is not only that transport and 3PLs service providers are affected by logistics performance, many other business stakeholders, as well as customers in logistics and chain field, may as well face the negative impact of logistics performance. Hence, performance measurement is an indicator of work performed and the outcome of it is seen in the activities, operations and process of organization entity, [6] In most cases, the performance of logistics service providers is a major factor in the choice of 3PLs service providers [3,7].

The present trend of things in Malaysia logistics industry is concentrating on logistics operation development and outsourcing of 3PLs as opined by [8] Irrespective, the concern about cost seems to be a significant issue in the development of 3PL with more benefits for both minimum delivery cost and time. It has been established through research that 67.3% organization in Malaysia employ contract logistics services with major focus on their operations at local level [9].

Therefore, it is important that the impact of innovation as a moderating variable on the service and financial performance of logistics services and 3PLs service provider in Malaysia context, be investigated.

2. LITERATURE REVIEW

2.1 Processes of Logistics Innovation Model

Flint et al. [10] define innovation as not a new thing to the world but instead a new thing to the user. Bessant [11] established that there are four separate types of innovation in interrelated supply chain innovation and learning concepts. These, according to him, are product or services innovations. In logistics, new services are equal to new products and a good example is track & trace of good, products and services. This was an innovative service when it was introduced. Another one is processes; new processes are at the core of logistics which focuses on managing information flows and materials to end users. These are new ways or new logic of doing things such as just-in-time deliveries. Also, positions, this is where known processes or product are developed into contexts or new uses. A good example of positioning of a product into new uses and in new contexts is phone which is mobile phones. It's original purpose as a telephone has long been exceeded several functionalities use such as means of electronic payment, checking in for flight, filming recording, photographing and the likes. The last one is paradigms; this is the most remarkable as it consists of new business models. It is most interested to the general management and the entire global business. A good example are some companies such as Dell Computer, Zara and IKEA, which are most prominent companies that have established different system of running businesses compared to their peer competitors

and attained superior business performances [12].

Aside this dimension of innovation, there are differences established between “do better innovation” and do different innovation”, which indicates that there are two different stages of innovation [11]. A more detail of innovation conception was done by Sawhney et al. [13]. The authors opined that innovation is far beyond product innovation. Their model highlights twelve (12) dimensions of innovation. The major dimensions established are customers, offerings, processes, and presence. They are also referred to as anchors and seen as coherent, a circle instead of independent or distinct categories. In between offering stages and customer stages are subcategories solutions and platforms. Between customers and processes are customer experience and the capturing of experience. Also, between processes and presence are supply chain and organization, while between offering and presence, we have networking and brand. All these different dimensions are connected in a circle and depicted as radar and referred to as supply chain, which is referred to as sourcing and order fulfilment [13]. Even when this was not presented as logistics framework, it may be classified as a supply chain innovation model as the supply chain management consists of all aspects mentioned in the presented model. Since logistics and supply chain management impact services and products offered, then which customers may be possibly reached, the procedure of how to reach customers, as well as how and where they may be reached.

Another important issue is how an organization processes logistics innovation. Flint et al. [14]. submitted some assistance with logistics innovation model for the processes. The model was validated years after whereby the correlation between logistics learning and inter-organization is affirmed [14]. The interface of organization with customers is an integral part of supply chain management and logistics, particularly, the dynamism in the interface forms the prerequisites for innovation, specifically inter-organizational learning. At the same time, the stage settings which propel the overall process of the operations, followed by thorough investigation of the requirement and customer wishes is very germane to attain an attractive innovation.

2.2 Logistics Innovation Capability

This has a long history of research; it was evolved from resource-based view (RBV) theory.

Organization can sustain and gain competitive advantages by emerging and deploying tangible capabilities and resources [15]. The RBV theory affirmed that in an organization, the resources consist of infrastructure, capabilities, technologies, and skills. The resources, as well as the capabilities must be deployed and coordinated to create competitive advantages [16]. Moreso, capabilities are bundles of complex skills and knowledge accumulated, engaged through organizational procedures, which allow organization to make efficient use of their assets and coordinate their activities (Day, 1994). Capability was regarded as the ability to utilize resource to perform some task or various activities and expressed a resource as anything intangible and tangible acquired or owned by an organization [17].

Innovation is a significant logistics capability [18]. It is also considered as a dynamic capability [19]. Meanwhile, Dynamic capabilities theory was developed from the theory of RBV. Innovation capability is termed as the organizations ability to transform ideas and knowledge continuously into new processes, products, and systems for the overall advantages of an organization [20]. Meanwhile, it must be established that a dynamic capability is different from operational capabilities, which is included in the organizations' current operations. Dynamic capabilities on the other hand, is the “capacity of an organization to purposefully create, extend, or modify its resource base” [21]. Two different classes of capabilities were described by Winter, [22] as the ‘zero-level’ or ordinary capabilities as those that permit an organization, in a short term, to make a living, while the other type of capability is dynamic capability. While the latter one is capabilities at higher level, it can be deployed to create, modify, extend the ordinary or ‘zero-level’ capabilities [22]. Logistics innovation capability is observed as a capability at higher level to reconfigure capabilities of operation to attain excellent operations of logistics and alleviate supply chain risk. Innovation can transform and reconfigure both internal and external resources so that the company strategy can be adapted [23]. Logistics innovation depicts the new technology, new processes, new services and new ideas, which are harnessed in enhancing logistics operations [24].

In Malaysia context, logistics service sector attained tremendous achievements in the last decades. It is projected as the largest growth contributor in year 2015 (Bank Negara Malaysia, 2015). In the report, the sector recorded a

contribution of about 55.3% of the overall Gross Domestic Product (GDP). Their services sub-sectors involve intermediate service and final service. Transportation and storage are specific services among the intermediate services that made most contribution based on trade-connected activities. Hence, this paper investigated the moderating factor of logistics innovation on the relationships between logistics operations and service and financial performance of third-party logistics service providers in the context of manufacturing sector of Malaysia.

It is in line with the above that warehouses play a key role in the offering of supply chain services that is with value-added [25] Warehousing processes is germane in the present days operation and the prudent utilization has assisted organization in competitive advantage and profit [26]. It is the interface area in the line of production, suppliers, customers, market and business environment in general. The main objective of majority of warehouses is to facilitate the movement of goods through the chain of supply to the final user or consumer. Warehouses represents basic components of the contemporary supply chain and logistics services. Performance evaluation in warehousing offers visible options in its operations and design which particularly deliberate more advantages, which includes speeding up of supply chain and minimizing costs of order picking [27].

Likewise, efficiency of warehousing cannot play down the benefits of transportation [28]. A serious issue of transport management is the modal selection. It impact how fast and efficient services and goods will flow across supply chain path. Many past research works, such as [29], have acknowledge the most significant capabilities in selection of modal. The studies usually acknowledge transit time, product safety, accessibilities, reliability and product safety as main determinants in the selection of mode. Coyle, et. al. [30] identify 7Rs(the Right product, in the Right quantity, in the Right condition, at the Right place, at the Right time, to the Right customer, at the Right price), that signify effectively, the focus and scope of quality transportation service Key Performance Indicators (KPIs) at the appropriate time, target transit time, in the right condition, focused more on protection of freight and at the right cost, relatively to issues of billing accuracy [31]. Meanwhile, buyers of transportation are constantly looking for high-quality carriers that can provide efficient and flawless services that is

damage free, on time, responsive, accurate and cost efficient [32]. Hence, this paper investigates the impact of moderation of innovation on logistics processes of warehousing and transportation with focus on performance.

In the last few decades, there is a surge in the logistics industry globally hence competition among the third-party logistics (3PLs) service providers are tenses unlike before. The 3PLs offers different services, which include transportation, cross-docking, warehousing packaging, inventory management and freight forwarding [1] The logistics activities and performance of 3PLs is very germane in the contemporary global competitive business [2] Organization obtains a competitive advantage by internal resources accumulation as well as capabilities that are valuable, rare, and difficult to imitate [15] Logistics service providers attempt competing based on their capabilities (Wang, 2016b).

The overall performance of Logistics performance in courier services is important for every customer [3] It is obligatory of transport and logistics service providers to establish value in their services [4] Particularly, 3PLs and transport service providers perform a significant role in logistics and supply chain system of goods delivery and hints in connecting several business partners together in a logistics chain hence the impact of 3PLs' performance plays a very important role.

3. RESEARCH METHOD

The study makes use of Quantitative research which usually includes empirical and methodical examination of phenomena using mathematics, statistics means and numerical data processing. Data is typically designated and analyzed in an arithmetical set-up (Goertz & Mahoney, 2012). The target respondents for this study are senior staffs and all managers from selected manufacturing and logistics companies in Malaysia. This signifies group people or organization from which the researcher selects the participant from which data will be collected. In order to gather enough and sufficient data for this study, the overall number of certified organizations with MS ISO 14001 in Malaysia was collected and it was established 522 organizations duly registered. So, the sample size of the study is calculated using the formular below:

$$S = \frac{(3.841) (522) (0.50) (1 - 0.50)}{(0.05)^2 (522 - 1) + (3.841) (0.50) (1 - 0.50)} = 222$$

From the calculation result and in accordance with Krejcie & Morgan (1970), the calculated, sample size is 222. In order to attain a level of response rate that is appreciable and also make provision for some unreturned questionnaire, it was suggested in the past studies that population size be added with at least fifty percent of the needed sample Hair et al., (2010). In respect of this and in conformity with scholarly study, 50% of 222 is 111, so, 111 number of sample size will be added, then the total is 333. The senior's staff and managers were selected using systematic random sampling, (Hair et al, 2018).

The sampling interval is used as number of population elements between each unit chosen from the entire sample. For this study, the sampling interval is used as the total population/sample size (522/333 = 2). At a starting point, the researcher chosen a number between 1 and 2. Then, the sample would be the sampling elements numbered 2, 4, 6, 8, 10, 12 and so on to the last sample to be selected, which means the sampled element number of 333.

3.1 Data Collection

A questionnaire survey is a major instrument to collect data. In this study, 333 senior staffs and managers were invited to participate. Empirical data was collected by means of a web-based survey. The completed and returned questionnaire were 256, and the return rate was estimated to be 77% approximately.

4. RESULT AND DISCUSSION

4.1 Demographical Information of the Respondents

All the necessary information about the respondent is important to the study so that there would be an indication of the profile of the respondent from whom data was collected. Table 1 shows, the demographical information of the respondents.

The result indicated that most of the respondents were male indicated 53.7% of the respondent, while the remaining respondents were females, indicating 46.3%.

In term of age group of the respondents, 40.2% are of 26-35years age group. This group was

closely followed by age group of 18 – 25 years which recorded 27.5% . Respondents of age group between 36 – 45 years represent 23.1%. Lastly, 46 years and above recorded 9.2% of respondents. In term of qualification of respondents, 25.8% of the respondents had Diploma and below. Respondents that had first degree were 44.1% while those holding Master degree recorded 20.1%. Out all the respondents, those with least percentage are those with PhD, they represent 10%. Respondent position indicates that 74 of the respondents, that is 32.3% were executive officers, Senior Manager/managers were 22.7%, Supervisors were 7.9%. Whereas respondents on Planners position represent 1.7%. Other position recorded 35.4% in total. This translates that most of the respondents were executives and senior managers/managers. This made the data more impactful and meaningful. The outcome may be due to the fact that many of the third-party logistics firm opts for agile and freshly graduated individuals. This particular age and qualification reflect the agile age for high productivity, and is in line with what was obtained in the field especially in the logistics industry.

From the perspective of the services rendered by respondent, it showed that majority of them offers logistics services, which indicate 63.3%, while transportation business accounted for 17.5%. Warehousing and inventory business had 7.9% and manufacturing business recorded 8.3%. In term of business ownership, 40.6% of the respondent with private liability companies. Public liability companies recorded 24.5%, while owned partnership had 22.3%. Sole proprietorship business had 11.4% and limited liability partnership had a total of 1.3%.

Regarding the type of ownership of the business; Table 4.5 indicates that 93(40.6%) of the respondents with private liability companies. Followed by the respondents with public liability companies amounted to 56(24.5%). Next to the respondents that owned partnership business representing 51(22.3%). Those that owned sole proprietorship business are only 26(11.4%). Finally, Table 4.5 indicates those owned limited liability partnership with total number of 3(1.3%). Majority of the respondents with full time employee below 50 in number was 47.6%. Those with 200 employee and above was 27.1%. Those respondent with 50-99 full time employee represents 17%. Likewise, employers with between 100-149 full time employees are 6.6%. Meanwhile, the respondent that owned between

150-200 full time employee was 1.7%. On the factor of operation of business, 36.2% was recorded by respondents owned company which was operated between 6-10years. Company with 21 years and above with 30.1% respondents. Those with 5 years recorded 27.1%. Likewise, 4.8% respondents operating their business between 11-15 years, while those respondents that operates their business below 11 years are only 1.7%. In references to annual business income, respondents that generated below USD500k recorded 43.2%. Respondents that generate over USD50m represent 19.2%. Also,

15/7% was recorded by those respondents generated between USD500K-USD10m. Those respondents generated annual revenue between USD 10.1m-USD10m. recorded 6.1%. Most of the company that served as respondents have annual income, which is below USD 500K, indicating that most of the business are SME. Based on the observations of the authors, it can be established that most of the logistics providers, particularly in Malaysia, are SME group except those that are international in their set up.

Table 1. Profile of the respondents

Demographic Info.	Details	Frequency	Percentage (%)
Gender	Male	123	53.7
	Female	106	46.3
Age	18 – 25 years	63	27.5
	26 – 35years	92	40.2
	36 – 45 years	53	23.1
	46 – 55 years	21	9.2
Qualifications	Diploma and Below	59	25.8
	Degree	101	44.1
	Masters	46	20.1
	PhD	23	10.0
Position	Senior Manager/Manager	52	22.7
	Executives	74	32.3
	Supervisor	18	7.9
	Planners	4	1.7
	Others	81	35.4
Services Types	Freight Forwarding	7	3.1
	Transportation	40	17.5
	Warehousing and inventory	18	7.9
	Manufacturing	19	8.3
Ownership Types	Logistics	145	63.3
	Public Liability Company	56	24.5
	Private Liability Company	93	40.6
	Sole Proprietorship	26	11.4
	Partnership	51	22.3
Full time Employees	Limited Liability Partnership	3	1.3
	Below 50 employees	109	47.6
	50 – 99 employees	39	17.0
	100 – 149 employees	15	6.6
	150 – 199 employees	4	1.7
Years of Operation	200 employees and above	62	27.1
	0 – 5 years	62	27.1
	6 – 10 years	83	36.2
	11 – 15 years	4	1.7
	16 – 20 years	11	4.8
Annual Revenue	21 years and above	69	30.1
	Below USD 500k	99	43.2
	USD 500k – 1m	36	15.7
	USD 1.1m – 10m	36	15.7
	USD 10.1m – 50m	14	6.1
USD 50m and above	44	19.2	

4.2 Mean and Standard Deviation of Transportation

The descriptive statistics results of the items TRS1 – 4 and TRR1 – 4 of service reliable and responsiveness respectively is presented in Table 2. All the items recorded high mean scores. particularly, immediate response to Shipper's complaints". Meanwhile, accuracy of estimates and calculations had moderate mean score. The implications of this are that, 'immediate response to shippers complaints, is the main factors characterising transportation in logistics services. This result corroborates the existing outcome of the research conducted by Werbińska-Wojciechowska [32]. Whereby it was outlined that 'prompt response to complaints of shippers is a factor in logistics process of transportation. That time factor is a dependencies in supply chain performance process.

4.3 Mean and Standard Deviation of Warehousing

The descriptive statistics of the items WAL1 – 7 and WCS1 – 2 of logistics capacity and warehousing shows that all the nine (9) items recorded high level of mean score. In particular, the ability to retain qualified and skilful personnel, has the highest mean score. The ability to tackle problems and complaints, has moderate mean score. Summarily, the result signifies that ability to retain qualified and skilful personnel, is the main factor indicating the characteristics of warehousing under the operation of logistics services as shown in Table 3. This is corroborated by research conducted by Appiah, & Asare, [33] Whereby it was submitted that in respect of warehouse facilities, equipment and staff needs, organization needs to utilize the decision in their operations as logistics providers to continuously educate and provide job training to their staffs to empower and enhance their skills and knowledge.

4.4 Mean and Standard Deviation of Packaging

The result of descriptive statistics of the items PRB1 – 3 under packaging. The items mean scores are above 3. Hence, collaboration in term of services with other logistics companies, has the highest mean score, collaboration with other downstream organizations, has the moderate mean score. This indicates that collaboration in term of services with other logistics companies is

the key factor of characteristics indicating the packaging operations of logistics services providers. This is shown in Table 4. That means the logistics providers need networking with other companies to gain full competitive advantage.

4.5 Mean and Standard Deviation of Innovation in Green Logistics

The descriptive statistics results of the items ES1 – 6, SM1 – 6, GTO1 – 8, and GPT1 – 4 of green transport procurement, environmental sustainability, green transport operation, and strategic management, are shown in Table 5. The result indicate that all these items have mean scores which is above 3. All the 23 items recorded high level of mean score. Particularly, consideration for procurement and selection of vehicle types based on cost, quality, and environmental impacts, had highest mean score. Meanwhile, the focusing attention on strategic aspects of business, had moderate mean score. The result signifies that, consideration for procurement and selection of vehicle types based on cost, quality, and environmental impacts, is the key factor of references representing the innovation in green management. This implies that attaining warehousing efficiency is pivoted by managers' capacity to concentrate on both inventory management and transportation. Meaning that, companies that aspire to be accurate, in their forecasting techniques, need to ensure consistency in time and ordering quantities, strive towards claims, full truck load delivery on free per transit seems to be means or factor of gaining more competitive advantages. So, they must be environmentally conscious and be prudent in their environmental management.

4.6 Result of Moderating Effect of Innovation of Green Logistics on Logistics Services and Operational Performance

Table 6 shown the result of hierarchical regression of moderating impact of innovation on logistics services and operational performance. It can be observed that innovation of green logistics failed to moderate the relationship between transportation services and operational performance. Likewise, investigating of the interaction of warehousing services with innovation of green logistics, the result indicated that innovation of green logistics failed to moderate the relationship between warehousing services, as well as operational performance.

Relative to the interaction of packaging services with innovation of green logistics, the result implied that innovation of green logistics indeed moderates the relationship between packaging services and operational performance. The summary of the results is shown in Table 6.

Table 2. Mean and standard deviation of the transportation

Constructs	Mean	SD
Accuracy of service documents which includes billing, transit, delivery information	3.85	.714
Accuracy of estimates and calculation	3.82	.851
All services and products are up to standard and meet requirement of customer	3.84	.774
Consistency in performance and procedures	3.98	.891
Service Reliable		
Response to unforeseen circumstance while cargo is on transit	3.88	.769
Prompt response to cargo claims	3.95	.880
Immediate response to Shippers complaints	4.13	.785
Availability of cargo space	4.13	.743
Responsiveness		

Table 3. Mean and standard deviation of the warehousing

Constructs	Mean	SD
Offering operation simplicity	3.83	1.096
Offering standard operations	3.83	1.148
Ability to keep a very low rate of freight damages	3.85	1.137
Ability to maintain timely delivery for all category of customers	3.82	1.081
Ability to tackle problems and complaints	3.81	1.011
Ability to retain qualified and skilful personnel	3.90	1.110
Ability to offer routine services	3.88	1.124
Logistics Capability		
Response to unforeseen circumstance while cargo is on transit	3.82	1.104
Prompt response to cargo claims	3.83	1.051
Cargo Safety		

Table 4. Mean and standard deviation of the packaging

Constructs	Mean	SD
Collaboration in term of services with other logistics companies	4.00	.934
Collaboration with other downstream organizations	3.96	1.008
Competences of sales personnel	3.98	1.100
Relationship Building		

Table 5. Mean and standard deviation of the innovation in green logistics

Constructs	Mean	SD
Level of environmental compliance	3.77	1.160
The purchased products are friendly to environment and environmental harmful products are avoided	3.75	1.125
The purchased raw material can be reused or recycled	3.76	1.081
The purchased raw material are produced from excess and environmental friendly	3.76	1.148
The computer network is used instead of papers in marketing between vendor and factory	3.80	1.125
Environmental Sustainability		

Learning existing work practices	3.78	1.122
Strategic planning (formulation)	3.80	1.145
Strategy implementation/execution	3.80	1.207
Focusing attention on strategic aspects of business	3.72	1.189
strategic decision making	3.79	1.163
Strategic capabilities	3.97	1.059
Strategic Management		
Managing strategic change	3.89	1.101
The concern on environmental management of provider	3.91	1.082
The concern of carbon dioxide releasing of provider	3.89	1.090
The distance between vendor and factory is minimized in order to reduce pollution and cost	3.87	1.088
The factory is concerned about the fuel consumption in distribution includes measuring the carbon dioxide emission	3.93	1.090
The delivering vehicles are well checked and maintenance plan are available.	3.94	1.091
The full truck load system is applied to increase the effectiveness of product delivering	3.91	1.074
The delivering routes are determined to safe the fuel and reduce the pollution	3.92	1.105
Green Transport Operation		
Consideration for procurement and selection of vehicle types based on cost, quality, and environmental impacts	3.97	1.122
Strategic planning the preventive maintenance of all vehicles	3.90	1.088
The pollution reducing system is paramount in transport procurement	3.86	1.173
The clean energy technologies are applied	3.83	1.175
Green Transport Procurement		

Table 6. Innovation on green logistics as a moderating effect on logistics services and operational performance

Indirect Hypotheses	B	t	Sig.	Decision
Interaction Transportation -> Inn -> Operational Performance	.015	.203	.839	Not Moderated
Interaction Warehousing -> Inn -> Operational Performance	-.023	-1.094	.275	Not Moderated
Interaction Packaging -> Inn -> Operational Performance	.208	3.391	.001	Moderated
Interaction Inventory Management -> Inn -> Operational Performance	-.352	-5.188	.000	Moderated

Table 7. Innovation on Green Logistics as a Moderating Effect on Logistics Services and Financial Performance

Indirect Hypotheses	B	t	Sig.	Decision
Interaction Transportation -> Inn -> Financial Performance	.080	1.158	.248	Not Moderated
Interaction Warehousing -> Inn -> Financial Performance	-.129	-1.973	.050	Moderated
Interaction Packaging -> Inn -> Financial Performance	.170	2.965	.003	Moderated
Interaction Inventory Management -> Inn -> Financial Performance	.244	3.822	.000	Moderated

4.7 Innovation on Green Logistics as a Moderating Effect on Logistics Services and Financial Performance

In Table 7, it can be observed that the interaction of transportation services with innovation of green logistics showed that innovation of green logistics failed to moderate the relationship between transportation services and financial performance. The result of interaction of warehousing services with innovation of green logistics shows that innovation of green logistics moderates the relationship between warehousing services and financial performance. Likewise, the interaction of packaging services with innovation of green logistics shows that innovation of green logistics has moderating impact on the relationship between packaging services and financial performance. The result of interaction of inventory management with innovation of green logistics indicated that innovation of green logistics moderates the relationship between inventory management and financial performance. This means that the growth green packaging, warehousing, sustainable economic development promotion have become the consensus in the globe, hence, it is germane that innovation becomes paramount in the logistics industry so that both services and financial performance can be effective and fruitful. This corroborates past research result [34].

5. CONCLUSION

It can be observed that most of the respondents are male and majorly of age 26-35 and mostly of degree qualification. All items under warehousing, transportation and packaging have high mean scores, signifying their importance. Generally, in term of the moderating effect of innovation of green logistics on the relationship between transport and operational performance, no moderation effect at all. Meanwhile, there was also no mediating impact of innovation of green logistics on the relationship between warehousing services and operational performance. But innovation of green logistics moderates the relationship between packaging services and operational performance.

In term of financial performance and interaction of transportation services, innovation of green logistics does not moderate the relationship between financial performance and transportation. While innovation of green logistics

moderates the relationship between warehousing services and financial performance. In a like manner, innovation of green logistics moderates the relationship between packaging services and financial performance.

In conclusion, it can be deduced that innovation of green logistics has some moderating impact on some relationship some logistics processes and operation performance and service performance.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Gudehus T, Kotzab H. Comprehensive logistics. Springer Science & Business Media; 2012.
2. Wang M, Jie F, Abareshi A. Evaluating logistics capability for mitigation of supply chain uncertainty and risk in the Australian courier firms. *Asia Pacific Journal of Marketing and Logistics*. 2015;27(3):486-498.
3. Ho JSY, Teik, DOL, Tiffany F, Kok LF, Teh TY. Logistic service quality among courier services in Malaysia. *International Journal of Trade, Economics and Finance*. 2012;3(4):113-117.
4. Lai KH, Ngai EWT, Cheng TCE. An empirical study of supply chain performance in transport logistics. *International journal of Production Economics*. 2004;87(3):321-331.
5. Wilding R, Juriado R. Customer perceptions on logistics outsourcing in the European consumer goods industry. *International Journal of Physical Distribution & Logistics Management*. 2004;34(8):628-644
6. Cohen S, Roussel J. Strategic supply chain management: the five disciplines for top performance. McGraw-Hil; 2005.
7. Thai VV. Logistics service quality: conceptual model and empirical evidence. *International Journal of Logistics Research and Applications*. 2013; 16(2):114-131.
8. Mustaffa NH, Potter A. Healthcare supply chain management in Malaysia: a case study. *Supply chain management: An International Journal*; 2009.

9. Sadiq Sohail M, Bhatnagar R, Sohal AS. A comparative study on the use of third-party logistics services by Singaporean and Malaysian firms. *International Journal of Physical Distribution & Logistics Management*. 2006;36(9):690-701.
10. Flint DJ, Larsson E, Gammelgaard B, Mentzer JT. Logistics innovation: a customer value-oriented social process. *Journal of business logistics*. 2005;26(1):113-147.
11. Bessant J, Birkinshaw J, Delbridge R. Innovation as unusual. *Business Strategy Review*. 2004;15(3):32-35.
12. Moody K. Labour and the contradictory logic of logistics. *Work Organisation, Labour & Globalisation*. 2019;13(1):79-95.
13. Sawhney M, Wolcott RC, Arroniz I. The 12 different ways for companies to innovate. *MIT Sloan Management Review*. 2006;47(3):75.
14. Flint DJ, Larsson E, Gammelgaard B. "Exploring processes for customer value insights, supply chain learning, and innovation: an international study", *Journal of Business Logistics*. 2008; 29(1):257-81.
15. Olavarrieta S, Ellinger AE. Resource-based theory and strategic logistics research. *International Journal of Physical Distribution & Logistics Management*; 1997.
16. Talib M, Hamid AB., Zulfakar M, Jeeva A. Halal logistics PEST analysis: the Malaysia perspectives. *Asian Social Science*. 2014; 10(14):119-131.
17. Hafeez K, Zhang Y, Malak N. Determining key capabilities of a firm using analytic hierarchy process. *International Journal of Production Economics*. 2002;76(1):39-51.
18. Yang YH, Hui YV, Leung LC, Chen G. An analytic network process approach to the selection of logistics service providers for air cargo. *Journal of the Operational Research Society*. 2010;61(9):1365-1376.
19. Lawson B, Samson D. Developing innovation capability in organisations: A dynamic capabilities approach. *International journal of innovation management*. 2001;5(03):377-400.
20. Yang C-C. Assessing the moderating effect of innovation capability on the relationship between logistics service capability and firm performance for ocean freight forwarders. *A Leading Journal of Supply Chain Management*. 2012;15(1): 53-69.
21. Helfat CE, Finkelstein, S., Mitchell, W, Peteraf M, Singh H, Teece D, Winter SG. *Dynamic capabilities: Understanding strategic change in organizations*. John Wiley & Sons; 2009.
22. Winter SG. Understanding dynamic capabilities. *Strategic Management Journal*. 2003;24(10):991-995.
23. Teece DJ, Pisano G, Shuen A. Dynamic capabilities and strategic management. *Strategic management journal*. 1997;18(7):509-533.
24. Scott JG. Logistics innovation: a literature-based conceptual framework. *The International Journal of Logistics Management*. 2009;20(3):360-377.
25. Sainathuni B, Parikh PJ, Zhang X, Kong N. The warehouse-inventory-transportation problem for supply chains. *European Journal of Operational Research*. 2014; 237(2):690-700.
26. Varila M, Seppänen M, Suomala P. Detailed cost modelling: a case study in warehouse logistics. *International Journal of Physical Distribution & Logistics Management*; 2007.
27. Johnson A, Mc Ginnis L. Performance measurement in the warehousing industry. *IIE Transactions*. 2010;43(3):220-230.
28. Burman J. *Supply chain logistics management*. McGraw-Hill; 2002.
29. Monczka R, Trent R, Handfield R. *Purchasing: An integrated supply chain approach*. Cincinnati, OH: South-Western; 2005.
30. Coyle JJ, Gibson BJ, Langley CJ, Novack RA. *Managing supply chains: A logistics approach*. South-Western Cengage Learning; 2013.
31. Shapiro RD, Heskett JL. *Logistics Strategy: cases and concepts*. West Group; 1985.
32. Werbińska-Wojciechowska S. Time dependencies in supply chain performance process. *Logistics and Transport*. 2010; 10:113-121.
33. Appiah A, Teye R, Asare J. Precursors of Warehousing Efficiency: An Empirical Study and Evaluation within an Industrialized Hub of a Developing Economy, Ghana. *Int. J. Sup. Chain. Mgt*. 2018;7(5).

34. Zhang G, Zhao Z. Green packaging enterprises. Physics Procedia. management of logistics 2012;24:900-905.

© 2021 Adebare et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/72091>