

THE ROLE OF CUSTOMER RESPONSIVENESS IN IMPROVING THE EXTERNAL PERFORMANCE OF AN AGILE SUPPLY CHAIN

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Abstract: The supply chain agility has emerged as one of the key areas of supply chain research. Therefore, the main purpose of the current study is to examine the role of agile supply chain management in enhancing the external supply chain. In addition to that, the current study is also interested in examining the moderating role of customer responsiveness in the relationship between agile supply chain and external supply chain performance of Indonesian firms. The SEM-PLS is used to analyze the data collected by mean of an adopted questionnaire from operation managers of Indonesian firms. The findings of the study have provided support to the theoretical foundation of the current study. The direct and indirect relation through structural equation modeling appears significant and positive. In author knowledge this is among the pioneering study on this issue and will provide the policy guideline for policy makers and future research endeavors on the issues related to agile supply chain, customer response and external supply chain performance.

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Introduction

Supply chain can be divided into two, namely the external which refers to supply chain across all businesses within the whole supply chain and internal chain which refers to the chain across various departments within the organization. The process of managing supply chain is called Supply Chain Management (SCM) (Sauer and Seuring, 2018; Brown and Ibekwe, 2018). Among those that puts it in a simplistic way is the one that says it is a systemic, strategic coordination of the usual way business runs. It entails tactics across these business functions both internally within the organization and externally across all businesses within the supply chain. The main purpose In SCM is to Improve performance of the organization in particular and the whole supply chain in general, By having improved supply chain performance, an organization can be more resilient against the ever changing and challenging business or economic situation. This was echoed well by who said that

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"adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function". Calamities such as the tsunami in Japan (11th March 2011) are unavoidable disasters, but organizations that have established strong supply chain are able to overcome much better (Gunasekaran et al., 2017; Aslan Efe and Efe, 2018). This can be seen in the case of Toyota where even though the business was badly hit by the tsunami, it was able to bounce back (it was reported that vehicle production at various Toyota plants such as in Australia will return to normal levels earlier than expected after production was reduced to 50 per cent after the Japan earthquake and tsunami). In fact Toyota not only bounce back but it also was actively supporting other organizations (such as the organization in this case study which provides certain crucial parts to Toyota) that are hit so that the supply chain can be restored in the shortest possible time.

SCM is basically a set of well-integrated activities which starts from the procurement of raw material and ends at the delivery of final goods to end users. Simply saying the SCM can be defined as a transformational process which convert the raw material into final useable product and also helps a company in delivering the product to end user. Normally the supply chain is divided into two sub sets namely internal supply chain and external supply chain (Ralston et al., 2015; Ale, 2018). The internal supply chain refers to the activities involves within the organizations whereas the external is linked with the activities related to parties that are not part of the organizations. SCM has drawn increasing attention from many practitioners and academics, due to the benefits evident in operational successes. Despite the fact that the supply chain has become a core strategy and key competitive tool. The focus of the researchers has remained to explore it as a synonym of logistic and purchasing is important to explore the great potential that exist in the other functions such as the internal supply chain in the manufacturing plant where the goods are being transformed from raw material to finished goods. Much non-value-added activities does exist which when reduced or eliminated via strategies such as lean practices, would strengthen the internal supply chain and the reform improve the whole supply chain in general. It is a norm to find cases where the non-value (waste) added activities in the internal supply chain exceeds 50% of total activity time and as such it hold lots of potential for improvement (Duhamel et al., 2016; Basheer et al., 2019).

Another way to express SCM is that it is the management of a set of connected business dealings or processes with purpose of providing the end customers with the desired products and services. It involves customers, suppliers, manufacturers and distributors. A good SCM ensures the efficient execution of these activities so that the supply chain is kept in good state. However, it has to be noted that the bottom-line in any business is important, and that is to make profit. By improving the supply chain, the organization need to do it in such a way that ultimately it

brings down the cost of its products or services (Handfield et al., 2015; Aldulaimi, 2018).

The supply chain of an organization can be made clear visually through tools such as Value Stream Mapping (SM) where the material and information flow are drawn. In the work by Singh and Sharma, they explained how important SM is in being a helpful tool for lean implementation. The tool is able to make clear the existing state of the supply chain (giving such information as % of value-add in the supply chain) and the proposed state. Road map to tackle improvement areas to bridge the gap between the two states can thus be generated (Zhou, 2016).

From the SM study, effort would then be made to remove non-value-added processes. Since every organization is unique it is thus necessary to study each individually. As an example a study carried out in India (Punjab) reveals that for a particularly organization it was able to identify through tools such as SM the non-value added components and how it could be improved (Shin et al., 2015). The findings however are limited due to the focused nature of the case, thus making generalization difficult or impossible. It is thus necessary for more cases to be studied so as to strengthen existing findings (or to dispute them) since a case study is an empirical inquiry investigating problems as they occur in the settings in which things happen.

As firms strive to increase their competitiveness in this challenging business world they place more emphasis on the supply chain, thus the importance of SCM. To illustrate this point, a group of researchers conducted a study in Hong Kong among the manufacturers there. They strive to examine the importance of SCM and from there the success factors so as to ultimately reduce cost and improve the customer service level (Ralston et al., 2015). Based on the research done it was found that organizations practicing SCM achieve positive results in term of cost reduction, lead-time reduction, improving customer satisfaction and competitiveness, However such studies cannot be generalized as the scenario is unique for the particular situation, location and condition. This spurs the need for more cases to be studied.

For the academics SCM is an important discipline that is acknowledged, while the practitioners sees the positive impact it creates in their bottom line such as how their supply chain improves due to improved material and information flow (Um, 2017; Ahmad, 2018). Clear performance measurement is needed in enabling organizations to make judgment as to the state of its supply chain. This is important as there is always a danger of making wrong judgment due to the complexity in today's business environment.

In the implementation of SCM previous studies did highlight some issues pertaining to the complexities faced by the organizations. These complexities arose from the standpoint of scenario, interdependency, process and information or communication flow. To counter these issues, the organizations strived to review existing supply chain methods, by identifying the limitations of the methods. Indeed, implementation of supply chain management requires a strong focus to

improve in all functional areas, including sourcing, manufacturing, and distribution. It was found that firms which have a strong focus to improve their supply chain, records high levels of performance (Demeter et al., 2016).

Literature Review

External Supply Chain

External Supply Chain would involve how the organization deals with its interested parties such as suppliers (upstream) and its customers (downstream). It can be seen that most SCM research focus on the external chain. In fact most lay people would view SCM solely from the standpoint of its external chain only (Zhu et al., 2013). Through the years the strength of the external chain has been growing and it is undeniable that much progress can be seen. In order that the external chain functions effectively, the external information flow between all interested parties is of utmost importance. External information flow would be the information flow between people who work for the company and people who don't work for that company or organization (i.e. outsiders involving the suppliers as well as customers). The result of the continuous improvement in the external chain can be seen in developments such as the innovative Vendor Managed Inventory, where adoption of this is spreading in various places and industries (Huo, 2012). This business model has impacted the way business runs in this generation. Basically, it involves the supplier taking full responsibility for providing an agreed level of inventory (material) for the buyer at an agreed location (normally in the buyer's site).

This integration with suppliers can indeed enable the organization to respond more aggressively especially in the face of volatile demand, To achieve this there will need to be an increased information visibility (which is part of visual management) and operational knowledge (Prajogo et al., 2016) By so doing the end result could be a decrease in cost of doing business, apart from the price reduction to the customers. From the perspective of new product development, the benefit would be extensive reduction in time to market the new product, cost reduction customer satisfaction and reduced quality problems among others.

It is well said that the strength of a chain is determined by the weakest point which in an organization's supply chain could be the upstream or downstream network (Ralston et al., 2015). This concept is put forward in the theory of constraint, with this in mind it is thus important to strengthen the supply chain from the view point of the whole supply chain. This means that if the weakest point is at the internal chain then it is most appropriate to focus on how it can be strengthened there so that ultimately the whole chain is strengthened. Generally, in terms of attention given in research, there is an ever increasing emphasis on the external supply chain (networking outside the boundaries of the organization) and a lack of emphasis on the internal supply chain of which this paper aims to focus on (Prajogo et al., 2016)

Customer Responsiveness

Many authors suggest that achieving customer responsiveness involves the entire supply chain. They explain that the overall objectives of an organization's supply chain management should be, to become increasingly responsive to customer needs, and to create value for the customer (Recker et al., 2017). Various approaches such as implementing lean practices have been found effective in satisfying the customer request and at the same time preserving or even enhancing the profitability of the business. The performance or effectiveness of the supply chain must be measured by its responsiveness to customers, However there is always the real potential of being over sensitive towards the customer's request which ultimately would encroach into the profit of a business (Anand and Grover, 2015). Which shows his work that one has to judge and balance up on being customer responsive and being volume focused. He concluded that a firm (at least in the context of Swedish firms since the research was carried out there) may find an efficient customer responsiveness being more critical in a growing market (such as clean technology markets) situation compared to a mature market (miscellaneous market). This is in line with the contingency approach which suggests a fit between customer responsiveness and the market context.

Changes in customers' operating systems due to forces shaping competition are among the reasons why there is a need to work more closely with them. The markets in which manufacturers compete are increasingly affected by intense competition, rapid technological changes shorter product life-cycles etc. This is why organizations need to recognize the changing environment by being more responsive (Harraf et al., 2015).

Customer responsiveness is strongly linked to information, in which appropriate use of it is essential. The modern-day customers, are those expects greater responsiveness to an ever changing set of requirements, and a new competitive environment, which exposes most companies to competition internationally and form a new situation that has challenged firms in most industries (Harraf et al., 2015).

To justify this argument, conducted an empirical study to explore the relationship between information availability and customer responsiveness. The result of their study suggest that information availability and customer responsiveness are positively related which resulted in improving firm performance (Kumar and Singh 2017). Despite this finding it has to be noted that the infrastructure in that organization need to be in place in order for it to take advantage of the information available. Inefficient processes need to be reengineered so as to make it more efficient from the business point of view, even if it means to use new technology. However in the process, caution must be taken to avoid overzealous spending on technology to improve the supply chain performance as there are many disappointed firms who learnt the hard way.

Customer responsiveness should include value add activities such as customized services. This could take the form of committing to a short order-to-delivery cycle time even at the expense of having to reduce batch size. Having said this any

business organization would want to make sure that their strategy brings tangible benefits. (Copley, 2018) defined it well when they said that value add activities (both tangible and intangible) are those that customers are willing to pay money for. This in general would be a good guideline for those having difficulty in categorizing value add and non-value adds activities.

Customer responsiveness IS defined as a firm's ability to respond in a timely manner to customers' needs and wants as well as responsiveness to changing market requirements (Kumar and Singh, 2017). In organizations while implementing lean. the practices adopted often time will have impact on the internal supply chain such as in the area of customer responsiveness, measured by KPIs such as lead time, total response time etc.

Lean Manufacturing

Lean manufacturing has potential of improving many aspects of an organization. By implementing lean manufacturing an organization concerns itself with how it could improve its entire supply chain both internal as well as external (Souza and Alves 2018). Many organizations have attempted lean practices, but not all have succeeded in implementing it correctly and thus did not benefit in its supply chain, nevertheless to appreciate the lean initiatives one has to go back to History.

The concepts of lean manufacturing started way before Toyota practiced it (Singh and Singh, 2018). The root of this concept can be traced to. Ford automobile manufacturers as traced by Holweg, in his work on "The genealogy of Lean Production". It was there that the concept was used even in the manufacturing of the famous model T automobile, In that plant, Henry Ford started to practice ideas such as continuous assembly lines, and flow systems. These are important lean concepts even in this modern time (Souza and Alves 2018). In fact there are more concepts developed such as pull production, Kanban's, batch-size reduction, kaizen activities, quality circles etc.

In Japan the lean manufacturing concept took on a more successful mode compared to the United States, It was here that the Toyoda family, shifted from their textile business to automobile. After World War II, the automobile industry in Japan faces a tough market. This is due to their rather small and diversified market. Players like Ford outperformed the small players such as Toyota.

In the light of literature reviewed in this section we have drawn the following hypothesis

H1: Agile supply chain has significant impact on external supply chain performance.

H2: Customer responsiveness has significant impact on external supply chain performance.

H3: Customer responsiveness moderates the relationship between AGSC and external supply chain performance.

Figure 1 depicts the theoretical framework of this study. The coordination-theoretic is used to conceptualize the framework shown in figure 1. The underpinnings theory used in this study is coordination-theoretic perspective in supply chain

management. The theory has been widely used to analyze inter organizational dependencies and alternative mechanism's influence in the supply chain activities through prior studies

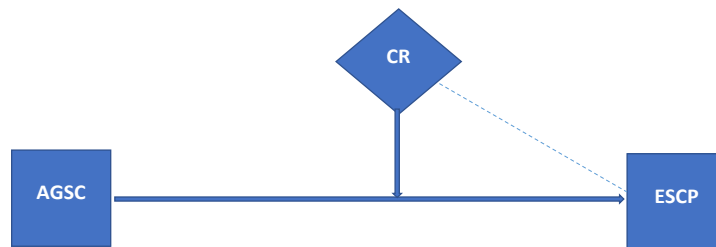


Figure 1. Conceptual framework

Methodology

The current study is quantitative study carried out on the sample of the operational managers and the production managers of Indonesian operation and production firms. The total number of respondents chosen were 475 and the required number was sent to the departments for the distribution. Respondents were stiff-necked. The filled questionnaires were returned within time which were around six weeks. Three hundred twenty-nine questionnaires were received out of 298; the response rate was 91 per cent and hence accepted for further evaluation. Respondents' average age was 47 years, and around 60 percent of them were working in operation departments from last 15 plus years. The greater part of the respondents was held highest degrees; the response rate is above the threshold of 45-50 percent. Male respondents were 252 and the female was 45. The average working experience was 13.5 years.

Research Analysis and Discussion

The study which is s surveys-based study and has employed survey-based questionnaire method has used the SEM on smart PLS to analyse the data, The SEM on smart PLS. (Xu et al., 2018) argued that the PLS-SEM is a two-step equation, which is an advance form of multiple regression and accounts for two assessments namely the inner model assessment and the outer model assessment. The core difference between the multiple regression and SEM is that the later handles the multiple equations simultaneously and can produces results with a simultaneous operation by producing a relationship with all direct and intervening phenomena. Many researchers such as smart PLS-SEM is one of the robust and most reliable statistical technique which can handle any innovation in the model as well as advance testing of any existing phenomena (Sarstedt et al., 2019). Therefore, following the suggestions of these studies, the current study has adopted the smart PLS-SEM to examine the relationship between dependent, dependent and moderating variable. Therefore, this study adopted PLS SEM to analyses the data. Before testing the hypothesis, data reliability and validity was scrutinized. These steps were taken through PLS 3. It is revealed in Table 1 which shows that factor

loading is more than 0.5, average variance extracted (AVE) is more than 0.5 and composite reliability is also more than 0.7. Therefore, it is revealed that the current study attained convergent validity.

Table 1. Composite Reliability

	CR	AVE
AGSC	0.915	0.812
CR	0.895	0.772
ESCP	0.932	0.617

The discriminant validity is shown in Table 2. Discriminant validity is attained through the square root of average variance extracted (AVE). It is shown in Table 2 that square root in bold form is more than all other values.

Table 2. Discriminant Validity

	1	2	3
CR	0.948		
AGSC	0.731	0.798	
ESCP	0.518	0.550	0.801

After the assessment of measurement of model, the next step is to access the structural model which includes the confirmation of reliability and validity the next step is to estimate the structural equation modelling. In the structural equation modelling the direct and indirect effect are examined. Indirect effect was examined to check the moderation. In this process, the p-value was considered. While analysing the data, 0.05 minimum level of p-value was considered to test the hypothesis. According to the direct results, it is shown that all hypothesis has a p-value less than 0.05. Therefore, it accepts H1, and H2 are accepted.

Table 3. Direct Effect

	(β)	SD	T-value	P-Values
H1	0.111	0.035	3.161	0.002
H2	0.207	0.043	4.810	0.000

Moreover, Table 4 highlights the moderating effect of customer response in the relationship between the agile supply chain and external supply chain performance. These results of moderation show that for both moderation hypothesis, the t-value is above 1.96 and p-value is below 0.05 which accept H3

Table 4. In-Direct Effect through Mediation

	(β)	SD	T-value	P-Values
H3	0.109	0.018	4.319	0.000

Moreover, variance extracted is shown in Table 5. R-square value is 0.441 which is moderate according to Chin (1998). It indicates that all the independent variables are expected to bring 44.1% change in the dependent variable, namely; supply chain performance.

Table 5. Expected Variance

	R ²
ESCP	44.1%

The results of the current study have shown a great deal of agreement with the hypothesized results.

The findings of the hypothesis 1 in this study are providing support to the prior findings of (Handfield et al., 2015; Harraf et al., 2015; Ralston et al., 2015) which argues that agile supply chain has significant impact on the external performance of the supply chain and confirming the view point broached by Ralston et al., (2015) that agile supply chain is a significant determinant of external supply chain performance the results are also in line with the proposition of the coordination-theoretic perspective in supply chain management . Similarly, the findings of the hypothesis 2 are in line with the previous studies as in our sample the customer responsive is in positive and significant relationship with external supply chain performance. The findings of the study reveal the fact that in Indonesian manufacturing firms the agility of supply chain is an important factor to be considered to improve the external supply chain performance. Meanwhile the customer responsiveness also places significant impact on firm supply chain performance. The customer responsiveness appears a significant positive moderator in the relationship between agile supply chain and external supply chain performance, the results are in line with the proposed hypothesis of the study and theoretical foundation laid by (Cheung et al., 2018). The findings of third hypothesis reveals the fact that customer responsiveness not only significantly affect the supply chain performance but also strengthen the relationship between supply chain agility and firm external supply chain performance.

Conclusion

In order that the external chain functions effectively, the external information flow between all interested parties is of utmost importance. External information flow would be the information flow between people who work for the company and people who don't work for that company or organization (i.e. outsiders involving the suppliers as well as customers). Few of them are agility of a performing supply chain. The main purpose of the current study is to examine the role of agile supply chain management in enhancing the external supply chain. In addition to that, the current study is also interested in examining the moderating role of customer responsiveness in the relationship between agile supply chain and external supply chain performance of Indonesian firms. The SEM-PLS is used to analyze the data

collected by mean of an adopted questionnaire from operation managers of Indonesian firms. The findings of the study have provided support to the theoretical foundation of the currents study. The result of the continuous improvement in the external chain can be seen in developments such as the innovative Vendor Managed Inventory. As firms strive to increase their competitiveness in this challenging business world. They place more emphasis on the supply chain, thus the importance of SCM. To illustrate this point, a group of researchers conducted a study in Hong Kong among the manufacturers there. They strive to examine the importance of SCM and from there the success factors so as to ultimately reduce cost and improve the customer service level. Based on the research done it was found that organizations practicing SCM achieve positive results in term of cost reduction, lead-time reduction, improving customer satisfaction and competitiveness, However such studies cannot be generalized as the scenario is unique for the particular situation, location and condition. This spurs the need for more cases to be studied.

The study, which is among the few pioneering studies on the issues related to the supply chain agility, supply chain performance and customer responsiveness on the Indonesian manufacturing sector, has tried to highlight the link between customer responsive and supply chain performance. However, due to time and resource constrains the study is not able to conceptualize the full range of variables such as supply chain integration, and supply chain governance, which can be seen as solution to issues broached in the literature review section. Therefore, following the proposition of agency theory and stakeholder theory it is recommended to incorporate the supply chain governance and supply chain integration in the existing model.

Moreover, this study is carried out in the manufacturing sector, whereas the customer responsiveness can not be generalized in all manufacturing sector, therefore a separate stream of research is recommended to investigate the above-mentioned issues in different manufacturing sectors such as fashion, textile, rubber, tin etc.

References

- Ahmad S.D., 2018, *Legal Protection Carried Out by the Financial Service Authority in a Dispute between Consumers and Insurance Companies in Indonesia*, "International Journal of Social and Administrative Sciences", 3(1).
- Aldulaimi S.H., 2018, *The Influence of National Culture on Commitment that Produce Behavioral Support for Change Initiatives*, "International Journal of Applied Economics, Finance and Accounting", 3(2).
- Ale A.S., 2018, *Assessment of Dual Carriageway for Sustainable Socio-Economic Development in Ado Ekiti, Nigeria*, "International Journal of Sustainable Development & World Policy", 7(1).
- Anand N., Grover N., 2015, *Measuring retail supply chain performance: Theoretical model using key performance indicators (KPIs)*, "Benchmarking: An International Journal", 22(1).

- Aslan Efe H., Efe R., 2018, *The Relationship between Academic Procrastination Behaviors of Preservice Science Teachers and Their Attitudes toward Social Media*, "Journal of Education and e-Learning Research", 5(2).
- Basheer M., Siam M., Awn A., Hassan S., 2019, *Exploring the role of TQM and supply chain practices for firm supply performance in the presence of information technology capabilities and supply chain technology adoption: A case of textile firms in Pakistan*, *Uncertain Supply Chain Management*, 7(2).
- Brown E.D., Ibekwe E.E., 2018, *Effect of Institutional Factors on Foreign Direct Investment in Nigeria*, *The Economics and Finance Letters*, 5(1).
- Cheung W., Chiang A.H., Sambamurthy V., Setia P., 2018, *Lean vs. Agile Supply Chain: The Effect of IT Architectures on Supply Chain Capabilities and Performance*, "Pacific Asia Journal of the Association for Information Systems", 10(1).
- Copley P., 2018, *The experiential learning process on the small enterprise marketing/logistics and supply chain management interface—a conceptual model for the practical classroom*, CABS Learning, teaching and student experience conference, 24-25 April 2018, Glasgow, UK.
- Demeter K., Szász L., Rác B.G., 2016, *The impact of subsidiaries' internal and external integration on operational performance*, "International Journal of Production Economics", 182.
- Duhamel F., Carbone V., Moatti V., 2016, *The impact of internal and external collaboration on the performance of supply chain risk management*, "International Journal of Logistics Systems and Management", 23(4).
- Gunasekaran A., Papadopoulos T., Dubey R., Wamba S.F., Childe S.J., Hazen B., Akter S., 2017, *Big data and predictive analytics for supply chain and organizational performance*, "Journal of Business Research", 70.
- Handfield R.B., Cousins P.D., Lawson B., Petersen K.J., 2015, *How can supply management really improve performance? A knowledge-based model of alignment capabilities*, "Journal of Supply Chain Management", 51(3).
- Harraf A., Wanasika I., Tate K., Talbott K., 2015, *Organizational agility*, "Journal of Applied Business Research", 31(2).
- Huo B., 2012, *The impact of supply chain integration on company performance: an organizational capability perspective*, "Supply Chain Management: An International Journal", 17(6).
- Kumar R., Kumar Singh R., 2017, *Coordination and responsiveness issues in SME supply chains: a review*, "Benchmarking: An International Journal", 24(3).
- Prajogo D., Oke A., Olhager J., 2016, *Supply chain processes: Linking supply logistics integration, supply performance, lean processes and competitive performance*, "International Journal of Operations & Production Management", 36(2).
- Ralston P.M., Blackhurst J., Cantor D.E., Crum M.R., 2015, *A structure–conduct–performance perspective of how strategic supply chain integration affects firm performance*, "Journal of Supply Chain Management", 51(2).
- Recker J., Holten R., Hummel M., Rosenkranz C., 2017, *How agile practices impact customer responsiveness and development success: A field study*, "Project Management Journal", 48(2).
- Sarstedt M., Ringle C.M., Cheah J.H., Ting H., Moisescu O.I., Radomir L., 2019, *Structural model robustness checks in PLS-SEM*, *Tourism Economics*, XX(X).

- Sauer P.C., Seuring S., 2018, *A three-dimensional framework for multi-tier sustainable supply chain management*, "Supply Chain Management: An International Journal", 23(6).
- Shin H., Lee J.N., Kim D., Rhim H., 2015, *Strategic agility of Korean small and medium enterprises and its influence on operational and firm performance*, "International Journal of Production Economics", 168.
- Singh A.N., Singh A., 2018, *Lean IT-Principles to Practice: Toyota Way to Create Value for the Customer & Wealth for IT Organization*, Notion Press.
- Souza J.P.E., Alves J.M., 2018, *Lean-integrated management system: A model for sustainability improvement*, "Journal of Cleaner Production", 172.
- Um J., 2017, *The impact of supply chain agility on business performance in a high level customization environment*, *Operations Management Research*, 10(1-2).
- Xu L., Diket R., Brewer T., 2018, *Predicting student performance via NAEP secondary art analysis using partial least squares SEM*, *Arts Education Policy Review*, 119(4).
- Zhou B., 2016, *Lean principles, practices, and impacts: a study on small and medium-sized enterprises (SMEs)*, *Annals of Operations Research*, 241(1-2).
- Zhu Q., Sarkis J., Lai K.H., 2013, *Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices*, "Journal of Purchasing and Supply Management", 19(2).

ROLA ODPOWIEDZIALNOŚCI KLIENTA W POPRAWIE ZEWNĘTRZNEJ WYDAJNOŚCI ELASTYCZNEGO ŁAŃCUCHA DOSTAW

Streszczenie: Elastyczne łańcuchy dostaw stały się jednym z kluczowych obszarów badań łańcucha dostaw. Dlatego głównym celem artykułu jest zbadanie roli sprawnego zarządzania łańcuchem dostaw w zwiększaniu zewnętrznej elastyczności łańcucha dostaw. Ponadto, obecne badanie również dotyczy badania moderującej roli reagowania klientów w relacji między sprawnym łańcuchem dostaw a wydajnością łańcucha dostaw w przedsiębiorstwach w Indonezji. SEM-PLS służy do analizy danych zebranych za pomocą przyjętego kwestionariusza od kierowników operacyjnych firm indonezyjskich. Wyniki badania dostarczyły wsparcia dla teoretycznych podstaw badania trendów. Relacja bezpośrednia i pośrednia poprzez modelowanie równania strukturalnego wydaje się istotna i pozytywna. Wiedza autora jest jednym z pionierskich badań w tej kwestii i zapewni wytyczne dla polityków i przyszłych badań w kwestiach związanych ze zwinnym łańcuchem dostaw, reakcją klientów i wydajnością zewnętrznego łańcucha dostaw.

Słowa kluczowe: SCI, zarządzanie łańcuchem dostaw elastyczności, Indonezja.

客户反应在提高敏捷供应链外部绩效中的作用

摘要: 供应链敏捷性已成为供应链研究的重点领域之一。因此，本研究的主要目的是研究敏捷供应链管理在增强外部供应链中的作用。除此之外，目前的研究还有兴趣研究客户响应能力在敏捷供应链与印尼公司外部供应链绩效之间关系中的调节作用。

SEM-

PLS用于分析通过印尼公司运营经理采用的调查问卷收集的数据。该研究的结果为当前研究的理论基础提供了支持。通过结构方程模型的直接和间接关系显得显著且积极。在作者的知识中，这是关于这个问题的开创性研究之一，将为决策者和未来的研究工作提供政策指导，以解决与敏捷供应链，客户响应和外部供应链绩效相关的问题。

关键词: SCI, 灵活性供应链管理, 印度尼西亚