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PERFORMANCE EVALUATION OF LOGISTICS SERVICE PROVIDER (LSP) IN FMCG COMPANIES USING PHYSICAL DISTRIBUTION SERVICE QUALITY (PDSQ) DIMENSION: CASE STUDY

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ABSTRACT
Increasingly fierce business competition requires companies to be able to meet customer desires on time, in the right amount and in the right quality. FMCG XXX Company is a skin care product manufacturing company that focuses on production activities. Therefore, the company transfers product distribution activities to customers (distributors) to Logistics Service Providers (LSP). FMCG XXX hold consumer's satisfaction in the highest regard. Along with the increasing number of activities being diverted, FMCG XXX companies aim to evaluate LSP performance through appropriate indicators. The indicators evaluated in this study adopt dimensions in Physical Distribution Service Quality (PDSQ) which consist of three dimensions, namely timeliness, availability and condition. Based on the results of the study, 13 indicators were obtained that FMCG XXX Company used to evaluate LSP performance. In general, around 69% of LSP's actual performance has been able to meet the targets set by the company, where two indicators are able to exceed the target and seven indicators are in accordance with the target. However, the company still has to focus on four indicators that have negative deviations because the actual performance value is less than the target set by the company. Negative indicators come from the availability and condition dimensions. The company coordinates with LSP to design improvement projects in order to improve actual performance according to the company's targets
Keywords: *FMCG, Performance, LSP, PDSQ*

1. Introduction

Increased activity in the supply chain has an impact in increasing logistics activities. The complexity and uncertainty that occur along the supply chain of manufacturing industry, requires the integration of appropriate supply chain management. When companies have outsourced production and sales between countries/regions, transportation, distribution, and inventory management activities will become complex, so the demand for logistics players will continue to increase (Lieb & Bentz, 2005). Conceptually, logistics activities are part of the supply chain. Logistics activities include information gathering, transportation, inventory, warehousing, reverse logistics and packaging. The purpose of logistics activities is to get the right goods, at the right time, with the right quantity, the right conditions, at an affordable cost, while still contributing profit to logistics service providers (Yew Wong & Karia, 2010).

Indonesia's logistics performance has been highlighted by the government and stakeholders in recent years. Based on World Bank data, in 2012, Indonesia's Logistics Performance Index (LPI) was ranked 59th, which then rose to 46th in 2018. However, in 2023, Indonesia's logistics performance has decreased significantly, which is ranked 63rd with a score of 3.0 (MLRP FEB, 2023). The downgrade of Indonesia's LPI rating can be caused by several factors. One of them is the problem of delays in the delivery of goods (timeliness). The interpersonal, tactical, and strategic aspects of logistical collaboration have a favorable impact on logistical performance (reliability, transport, and risk) (Vieira & Mergulhao, 2015). Coordination in the supply chain involving relationships between various stakeholders, namely customers, suppliers of goods, third party logistics service providers (3PL) is very important.

This is strategic, because in most industries according to Lieb & Bentz (2005) about 60% of 500 companies in the United States have signed at least one contract with a 3PL. Likewise, in

Europe, the number of companies using 3PLs has almost doubled since 2000 (Langley & Infosys, 2018). In this study Logistics Service Provider (LSP) is defined as a logistics service provider that performs all or part of the company's logistics function (Coyle et al., 1996; Delfmann et al., 2002). Logistics Service Provider (LSP) has an important role in facilitating supply chain integration, even in some cases LSP has proven to be able to manage supply chains (Barker et al., 2021). LSP is a service company that provides delivery of goods from the place of origin of goods to their destination, as well as providing goods storage services (warehousing). Several factors cause manufacturing companies to be interested in using LSP services (Razzaque & Sheng, 1998; Selviaridis & Spring, 2007) because: it can reduce operational costs, transform fixed costs into variable costs, better control logistics costs, and can increase LSP flexibility because of its experience and expertise.

Indonesia's logistics service industry has experienced significant development recently. One of the main causes is the rapid development of online business in Indonesia. Not only well-known marketplaces, even online sales from social media also continue to increase. This also has an impact on the development of Indonesian logistics services. Logistics service providers act as a liaison between producers and consumers. The mechanism between LSP and the manufacturer occurs in the form of partnerships, third-party agreements and integrated service agreements. Along the way, many LSPs were unable to meet producer targets, Langley Jr. & Capgemini (2007) explained that LSP's failure occurred because it could not save logistics costs, its distribution area was limited, and inadequate information technology services. Because most outsourcing organizations are seen as being less dependable and effective, choosing the wrong suppliers or outside sources for outsourcing has proven to be a serious issue. (Sherman, 2013). Impact on employee welfare, financial failure, forecast horizon, delivery delays, and product returns are some of the consequences of the uncertainty factor that LSP must deal with due to changes in demand, government regulations, and supply chain disruptions. (Choi, 2021; Gultekin et al., 2022; McKinsey & Company, 2021). This requires companies to have the mechanisms to measure, monitor and control the quality of LSP services appropriately.

An FMCG XXX company experienced a crisis of confidence in LSP which had signed a cooperation contract for two years. The key to the success of the FMCG industry lies in two aspects, namely speed and accuracy. Distribution to multiple location points such as retail stores, groceries or outlets and its large number of consumers are challenges for the FMCG industry. Consumer satisfaction and loyalty are at stake. Retail companies who purchase goods from FMCG producers, need to work well with their supply chain partners to ensure timely deliveries and a consistent supply of goods in order to gain a competitive edge. (Neboh & Mbhele, 2021). Therefore, to ensure LSP's performance met the agreed contract, FMCG XXX Company conduct service quality evaluations using indicators that match the Physical Distribution Service Quality (PDSQ) dimension. Physical distribution includes transportation activities, facility management (ex: warehouse location), inventory management and material handling (ex: packing and loading unloading) (Williamson, Spitzer, & Bloomberg, 1990). Mentzer, Gomes, & Krapfel (1989) developed the concept of the PDSQ model which involves three dimensions, namely: availability, timeliness and quality. The research shows that consumers have a more accurate perception with respect to the evaluation of LSP, so the three dimensions are considered to represent consumer expectations and needs. FMCG XXX Company as consumers of LSP have an interest in conducting performance evaluations, this is supported by Mentzer et al. (1989) who explained that consumer perceptions have a higher level of accuracy in appraising LSP.

There are quite a lot of studies related to LSP performance evaluation. LSP performance assessments related to environmentally friendly issues receive attention in the literature (Liu et al., 2010; McKinnon, 2005). Then Centobelli et al. (2016) explained that environmentally friendly initiatives in LSP have an impact on three main types of performance: environmental performance related to the company's alignment with specified sustainability standards (Colicchia et al., 2013; Isaksson & Huge-Brodin, 2013), economic performance, namely the alignment between business processes between organizations with the achievement of economic goals (e.g. cost reduction, revenue increase) (Perotti et al., 2012), as well as operational performance related to the alignment of the company with standards or process indicators determined efficiency and effectiveness (e.g. cycle time, productivity, flexibility) (Bai & Sarkis, 2013; Min & Ko, 2008).

This research will focus on how an FMCG company in Indonesia assesses the performance of LSP which operationally helps product delivery and storage (warehousing). Goods come from finished product warehouses owned by producers, while the destination is consumers of FMCG XXX Company that is distributors. Therefore, this study aims to identify LSP performance evaluation indicators based on PDSQ dimensions in FMCG companies and conduct LSP performance evaluations to determine the quality of the service.

2. Literature Review

FMCG Company Logistics

Today, the global economic environment is becoming increasingly competitive and full of uncertainty. Companies must remain competitive and efficient even without cooperating with external parties. The concept of SCM then emerged with the aim of efficiently managing physical, informational, and financial flows. All SCM actors can coordinate intra- and inter-organizationally (Chopra & Meindl, 2016).

Products made by Fast-Moving Consumer Goods Manufacturers (FMCG) are those that sell quickly without being costly. They can also be described as often purchased necessary or non-essential items (Mandrinos, 2014). The distribution chain for FMCG is the interdependent collection of processes and related resources between manufacturers, warehouses, suppliers, logistics service providers, wholesalers and distributors and all the other parties within the supply chain network (Jepherson et al., 2021). The geographical condition of Indonesia which has around 17,000 islands (Sumantri & Lau, 2011) is a challenge for the logistics of a company, including the FMCG sector. The company must be able to distribute products throughout the region according to consumer demand. The need to control land and water to deliver goods between cities is a big challenge. Therefore, many logistics provider services (LSP) have sprung up. FMCG companies are helped by LSP because the increase in material movement in the form of imports of raw materials, spare parts and finished goods increases pressure on FMCG companies.

Logistics Service Provider

A logistics service provider (LSP) is a logistics company that helps other companies both related to logistics activities and supply chains to support their business activities. The services offered by LSP are generally in the form of handling and moving goods ranging from trucking to end to end processes. This third logistics service provider company emerged and became known to the public in the early 1980s (Premkumar et al., 2021).

Maloni & Carter (2006) and Heiyantuduwa (2015) mentions several reasons companies prefer to use third-party services, namely: LSP expertise and economies of scale leading to cost reduction, LSP focus and efficiency leads to service improvement and engaging LSP allows companies to focus on their core competencies. The use of third party model is effective in enhancing the delivery of products, enabling fulfillment of forecasted demand and thus effectively serve the markets without stock outs, improving client's performance in meeting consumer needs, exploiting market opportunities and being innovative by letting the client fully focused on improving quality of service to the consumers (Njambi & Katuse, 2013).

Physical Distribution Service Quality (PDSQ)

Physical Distribution (PD) is part of the outbound logistics of a company. The activity is in the form of delivery of finished products to consumers. This activity also connects companies with consumers by providing time and place utilities, which are important indicators for customer service (Lambert et al., 2006).

Service Quality (SQ) is an important research topic found in marketing literature because SQ can strengthen a company's brand and contribute to consumer satisfaction. Gupta et al. (2022) provides clear implications to LSPs for improvement of service quality, because five service quality constructs have direct relationship with customer satisfaction. They also have indirect relationship with customer loyalty, implying the full mediation of customer satisfaction. There has been a lot of research on SQ in the field of service retail. As well as previous research related to PDSQ (Mentzer et al., 1989; Bienstock et al., 1997) and electronic PDSQ (e-PDSQ)

(Rabinovich & Bailey, 2004; Xing et al., 2010). But research on PDSQ in physical goods retail is relatively less.

3. Research Methods

The completion of this research uses a Mixed Method approach, namely qualitative and quantitative approaches simultaneously. This method combines the advantages of quantitative and qualitative methods with the aim of producing a more complete and in-depth picture of the phenomenon of LSP service quality (Bazeley, 2018; Fetters, 2020; Nygrén, 2019). Quantitative methods are used to obtain the actual average and average target values for each indicator on all dimensions. Then qualitative methods to answer the questions: why there are still indicators that have not reached the target, how this can happen and what actions are taken by FMCG XXX companies as the object of case studies.

In FMCG XXX companies, logistics activities are part of supply chain activities including customer service and quality. However, only the logistics part is directly in charge related to LSP. Fig.1 describes the flow of research completion. In total there are 10 people in the logistics department involved in this research, both as a team of validators for indicators of each dimension and LSP performance assessors through indicators on three dimensions in the PDSQ model, namely: timeliness, availability, and condition. The ten people are senior logistics manager, transport manager &; staff and warehouse manager & staff.

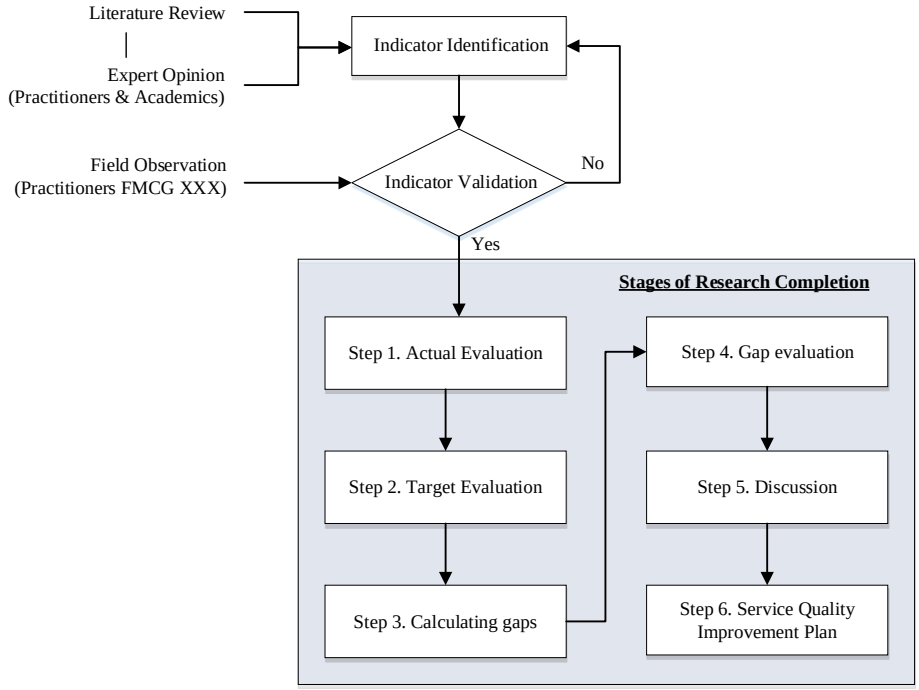


Fig. 1. Research completion flow

In summary, the Fig. 1 explains that after the indicator is validated by the experts involved, then the gap value is calculated. The gap value is obtained by calculating the difference between the actual average value and the target average value of each indicator. Analysis related to deviations that occur is carried out to be able to design quality services that can improve the performance of LSP from FMCG XXX companies.

4. Results and Discussions

Results and Discussion is a section that contains all scientific findings obtained as research data. This section is expected to provide a scientific explanation that can logically explain the reason for obtaining those results that are clearly described, complete, detailed, integrated, systematic, and continuous.

The discussion of the research results obtained can be presented in the form of theoretical description, both qualitatively and quantitatively. In practice, this section can be used to compare the results of the research obtained in the current research on the results of the research reported

by previous researchers referred to in this study. Scientifically, the results of research obtained in the study may be new findings or improvements, affirmations, or rejection of a scientific phenomenon from previous researchers.

Depiction of The Role of LSP in The Supply Chain of FMCG Companies

FMCG XXX Company produces products that belong to the skin care category. The company has push production system, so the planning of the production process depends on the mechanism of forecasting consumer demand. This FMCG Company has customers (distributors) across Indonesia. Because the company wants to focus on its core business, that is producing skin care products, the management of product delivery and storage activities are handed over to a third party, namely LSP.

In general, LSP's duties in FMCG XXX Company are to provide operational transport services, operational distribution centers, and add services value. In operational transport services, LSP's duties include providing transport operations management that supports shipping activities from LSP's warehouse to customers and vice versa; Provide capable transport vendors, provide control towers and their needs, and complete all operational points according to government's requirements. While the duties as an operational distribution center include providing a modern warehouse for goods receiving, storing goods and shipping goods; provide facilities in the warehouse to carry out value added services activities; provide man power and needs from the distribution center; and complete all operational points according to government's requirements. The following in Fig. 2 is an overview of the logistics mechanism in the supply chain of FMCG XXX Company.

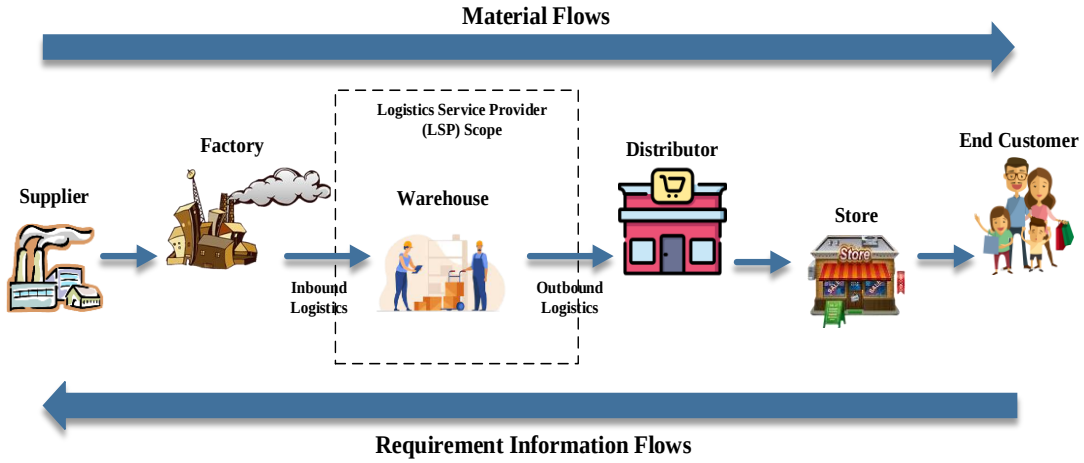


Fig. 2. Logistics mechanism in the supply chain of FMCG companies

Fig. 2 shows the material movement of all FMCG XXX Company's supply chain players. In addition, it can also be seen the work area of LSP which helps companies distribute products to customers (distributors). The company has an interest in customer satisfaction, so it does not tolerate LSP not achieving the performance targets set by the company. Periodically, the company evaluates LSP's performance. The evaluation will compare the actual performance of LSP with the targets set by the company. In detail, the targets of FMCG XXX Company for LSP are (1) ensuring all operational processes are zero accident, (2) ensuring all operational processes included in the scope services have followed the standards set together, (3) ensuring all cost components are in accordance with those stated in the agreement, there are no hidden costs, (4) ensuring continuous improvement, to ensure all operations have balanced efficient costs and increased productivity, (5) ensuring the ability to adapt according to changes and developments that occur in the business world.

To ensure the achievement of these targets, the company has an interest in evaluating LSP's performance.

Identification of LSP Performance Evaluation Indicators

This research focuses on evaluating LSP performance which helps FMCG XXX Company to distribute products to customers. Based on the research completion flow in Fig. 1, the first step

that must be done is to identify LSP performance indicators based on PDSQ dimensions, namely timeliness, availability and condition / quality. Indicator identification is done in two ways, the first by searching from reputable scientific journals references, and the second by conducting interviews with logistics experts. The results of searches through reputable journals and discussions with experts obtained seven indicators on the timeliness dimension, nine indicators on the availability dimension, and four indicators on the condition / quality dimension.

The case study of this research is on FMCG XXX Company, so the next step is to validate these indicators within the logistics operations of FMCG XXX Company. Based on information from the logistics of the FMCG Company, it was obtained that the LSP performance evaluation was carried out on 13 indicators divided into five indicators on the timeliness dimension, four indicators on the availability dimension, and four on the condition / quality dimension (Table 1). There are two additional indicators obtained from the input of logistics FMCG XXX Company.

Table 1 - LSP Performance Evaluation Indicator Validation

No	Dimension	Indicator		Source
1.	Timeliness	Dimensions related to the accuracy of the arrival of the order to the destination, the duration from the delivery of the order to the receipt of the order		
		a	Speed of order service time	(Nguyen, 2019) (Bienstock et al., 1997)
		b	Speed of product delivery time	(Nguyen, 2019) (Sarabi & Darestani, 2021)
		c	Timeliness of product delivery	(Nguyen, 2019) (Tu, Lv, Zhang, & Cao, 2021) (Sarabi & Darestani, 2021)
		d	Speed of complaint handling time	(Sarabi & Darestani, 2021)
		e	Speed of order processing time in the Warehouse	Observation
2.	Availability	Dimensions related to availability, starting from the availability of information needed by buyers to the submission of purchase documents		
		a	Availability of information about products sold	(Bienstock et al., 1997)
		b	Availability of information regarding inventory status	(Nguyen, 2019)
		c	Document availability	(Bienstock et al., 1997)
		d	Availability of information regarding product self-life	Observation
3.	Condition	Dimensions related to the overall condition of the goods, and the services that follow them		
		a	The condition of the delivered product is in good condition	(Nguyen, 2019) (Bienstock et al., 1997) (Tu et al., 2021) (Sarabi & Darestani, 2021)
		b	The condition of the delivered products according to consumer's orders	(Bienstock et al., 1997) (Sarabi & Darestani, 2021)
		c	The condition of the delivered product packaging is in good condition	(Nguyen, 2019) (Bienstock et al., 1997) (Tu et al., 2021)
		d	All products are shipped at the same time	(Nguyen, 2019) (Sarabi & Darestani, 2021)

Evaluation of Actual Performance and Targets

The evaluation of LSP's performance in FMCG XXX Company is directly carried out by the logistics department. Performance evaluation on each indicator is carried out on a scale of four, namely value 1 for very bad performance, value 2 for bad performance, value 3 for good performance and value 4 for excellent performance. There are ten people who are directly in-charge on LSP-related logistics, including senior logistics managers. Table 2 is the actual average and target of the indicator value results on the three PDSQ dimensions of ten respondents of FMCG XXX Company.

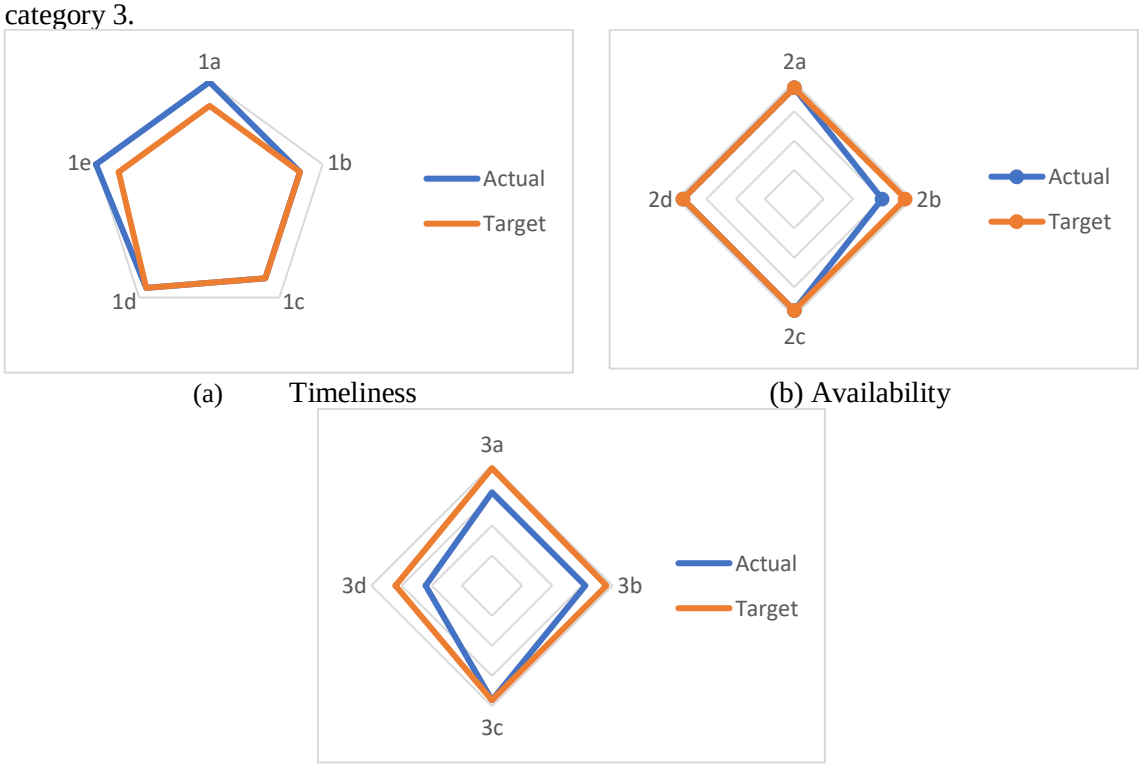
Table 2 - Average Indicator Value

No	Dimension	Indicator		Actual Average	Target Average
1.	Timeliness	a	Speed of order service time	4	3.8

No	Dimension		Indicator	Actual Average	Target Average
		b	Speed of product delivery time	3.8	3.8
		c	Timeliness of product delivery	3.8	3.8
		d	Speed of complaint handling time	3.9	3.9
		e	Speed of order processing time in the Warehouse	4	3.9
2.	Availability	a	Availability of information about products sold	3.8	3.8
		b	Availability of information regarding inventory status	3	3.8
		c	Document availability	3.8	3.8
		d	Availability of information regarding product self-life	3.8	3.8
3.	Condition	a	The condition of the delivered product is in good condition	3.1	3.9
		b	The condition of the delivered products according to consumer's orders	3.1	3.8
		c	The condition of the delivered product packaging is in good condition	3.8	3.8
		d	All products are shipped at the same time	2.2	3.2

Managerial Implications

Analysis of the results of the LSP average performance evaluation shows that there are three categories. The first category where LSP performance successfully exceeds the targets set by the company, then the second category of LSP performance is right according to the company's target and the third LSP performance is still below the target set by the company. Based on Fig. 3, it can be seen that of the 13 indicators, there are two indicators (15%) that fall into category 1, then seven indicators (54%) that fall into category 3 and four indicators (31%) that fall into category 3.



(a) Timeliness (b) Availability

(c) Condition

Fig. 3. (a)-(c) Radar Diagram for LSP Evaluation Indicator Gap on Three Dimensions

Fig. 3 shows the deviation in LSP performance of FMCG XXX companies expressed in the form of a radar diagram. In the timeliness dimension, there are three out of five indicators whose actual performance is in line with the target, with an average deviation of +0.06. Then in

the availability dimension there are three of the four indicators whose actual performance is in accordance with the target, with an average deviation of -0.2. And in the condition dimension there is only one of four indicators whose actual performance is in accordance with the target, with an average deviation of -0.625.

For indicators that have met the target, FMCG XXX Company give appreciation to LSP. Two indicators that successfully exceeded the target were the speed of order service time (1a) and the speed of order processing time in the warehouse (1e). However, the company focuses more on indicators that have not been achieved by LSP, because it will indirectly affect the company's service level, namely customer satisfaction, operational efficiency and overall business competitiveness. It can be seen from Fig. 3 that there are four indicators that have not reached the target, namely the availability of information about inventory status (2b), the condition of the delivered product is in good condition (3a), the condition of the delivered products according to consumer's orders (3b) and all products are shipped at the same time (3d). One indicator is derived from the availability dimension and the other three from the condition dimension.

Based on the statement of the logistics department related to the availability of information regarding inventory status, there has been a difference in the number of goods between those listed in the system and the physical ones in the warehouse. This certainly makes it difficult for the company and becomes an important record during the audit process. When tracing the cause of the problem, it was found that LSP at that time was moving the warehouse but was not proper in handling changes in the system. In addition, through the product delivery report, information is often obtained that there is a difference in the number of goods during delivery. Not only the difference in less goods but also the difference in excess goods. Related to this, the logistics department of FMCG companies encourages LSP to make improvements. Then about the unachieved target on the condition dimension, the logistics department provides an explanation if there has been a truck accident that causes the condition of the product to be damaged or lost. The company receives complaints from customers, both about the condition of damaged products and inaccuracies in the quantity of products received. This is certainly detrimental to the company because it has an impact on the company's logistics operations and customer satisfaction. In this case, the company filed a claim to LSP against the losses it faces.

The challenge for LSP is how to have good service performance from the three dimensions of the PDSQ model: timeliness, availability and condition. FMCG companies need to add LSP selection criteria related to the availability of information facilities and technology owned. The criteria for ICT availability in LSP are supported by several studies (Aguezzoul & Paché, 2018; Aguezzoul & Pires, 2016; Guarnieri et al., 2015; Hwang et al., 2016; Solakivi & Ojala, 2017). The availability of good ICT from LSP can reduce the occurrence of misinformation, both related to inventory status and demand information from consumers. Furthermore, the evaluation of LSP's performance indicators can affect the sustainability of contracts between FMCG XXX Company and LSP. Contracts are usually made for 2-3 years, depending on the results of LSP's performance evaluation. The results of the evaluation are followed up with project improvements related to indicators that have not reached the target. Then the evaluation in the following year becomes the basis for the sustainability of the contract.

In general, this LSP performance appraisal can apply generally, not only to FMCG companies. The indicators involved such as stock accuracy, delivery accuracy, service level agreement (SLA) are also critical points in the logistics of every company. The slight difference is like in coal companies whose shipments are periodic not daily like FMCG

5. Conclusion

The case study of LSP performance evaluation shows that FMCG XXX Company have three dimensions of PDSQ indicators to assess LSP performance. LSP's role focuses on providing operational transport services, operational distribution centers, and adding service values. LSP is an extension of the company, especially in product distribution activities to customers (distributors). The logistics department of the company must ensure that LSP can improve service levels through the achievement of measured indicators. FMCG XXX Company must concentrate on the dimensions of availability and conditions that have the potential to receive claims from customers. This can be seen from the difference between the actual performance value of LSP

and the target that has been set. Consumer satisfaction (distributor) will increase when the target value in each indicator set by the company can be achieved by LSP. This research has the potential to be developed by conducting an LSP evaluation from the perspective of LSP customers. This is especially important for LSPs who have more than one customer.

References

Aguezzoul, A., & Paché, G. (2018). A Decision Making Tool for Selection of LSPs. *International Journal of Business and Management*, *13*(5). https://doi.org/10.5539/ijbm.v13n5p95

Aguezzoul, A., & Pires, S. (2016). 3PL performance evaluation and selection: a MCDM method. *Supply Chain Forum: An International Journal*, *17*(2), 87–94. https://doi.org/10.1080/16258312.2016.1176302

Bai, C., & Sarkis, J. (2013). Flexibility in reverse logistics: A framework and evaluation approach. *Journal of Cleaner Production*, *47*, 306–318. https://doi.org/10.1016/j.jclepro.2013.01.005

Barker, J. M., Gibson, A. R., Hofer, A. R., Hofer, C., Moussaoui, I., & Scott, M. A. (2021). A competitive dynamics perspective on the diversification of third-party logistics providers' service portfolios. *Transportation Research Part E: Logistics and Transportation Review*, *146*(December 2020), 102219. https://doi.org/10.1016/j.tre.2020.102219

Bazeley, P. (2018). *INTEGRATING ANALYSES IN MIXED METHODS RESEARCH*. SAGE. https://www.torrossa.com/gs/resourceProxy?an=5018133&publisher=FZ7200

Bienstock, C. C., Mentzer, J. T., & Bird, M. M. (1997). Measuring Physical Distribution Service Quality. *Journal of The Academy of Marketing Scence*, *25*(1), 31–44.

Centobelli, P., Cerchione, R., Esposito, E., & Raffa, M. (2016). The revolution of crowdfunding in social knowledge economy: Literature review and identification of business models. *Advanced Science Letters*, *22*(5–6), 1666–1669. https://doi.org/10.1166/ASL.2016.6721

Choi, T. M. (2021). Risk analysis in logistics systems: A research agenda during and after the COVID-19 pandemic. *Transportation Research Part E: Logistics and Transportation Review*, *145*, 102190. https://doi.org/10.1016/J.TRE.2020.102190

Chopra, S., & Meindl, P. (2016). *Supply Chain Management: Strategy, Planning, and Operation*, *Global Edition 7th Edition*. Pearson.

Colicchia, C., Marchet, G., Melacini, M., & Perotti, S. (2013). Building environmental sustainability: Empirical evidence from Logistics Service Providers. *Journal of Cleaner Production*, *59*, 197–209. https://doi.org/10.1016/j.jclepro.2013.06.057

Coyle, J. J. (John J., Bardi, E. J., & Langley, C. J. (1996). *The management of business logistics*. 631.

Delfmann, W., Albers, S., & Gehring, M. (2002). The impact of electronic commerce on logistics service providers. *International Journal of Physical Distribution and Logistics Management*, *32*(3), 203–222. https://doi.org/10.1108/09600030210426539

Fetters, M. D. (2020). The Mixed Methods Research Workbook: Activities for Designing, Implementing, and Publishing Projects. In *The Mixed Methods Research Workbook: Activities for Designing, Implementing, and Publishing Projects*. SAGE Publications, Inc. https://doi.org/10.4135/9781071909713

Guarnieri, P., Sobreiro, V. A., Nagano, M. S., & Marques Serrano, A. L. (2015). The challenge of selecting and evaluating third-party reverse logistics providers in a multicriteria perspective: a Brazilian case. *Journal of Cleaner Production*, *96*, 209–219. https://doi.org/10.1016/J.JCLEPRO.2014.05.040

Gultekin, B., Demir, S., Akif Gunduz, M., Cura, F., & Ozer, L. (2022). *The logistics service providers during the COVID-19 pandemic: The prominence and the cause-effect structure of uncertainties and risks*. https://doi.org/10.1016/j.cie.2022.107950

Gupta, A., Singh, R. K., Mathiyazhagan, K., Suri, P. K., & Dwivedi, Y. K. (2022). Exploring relationships between service quality dimensions and customers satisfaction: empirical study in context to Indian logistics service providers. *International Journal of Logistics Management*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/IJLM-02-2022-0084/FULL/XML

Heiyantuduwa, M. (2015). *A Strategic Analysis of the use of Third Party Logistics Providers (3PLs) in Fast Moving Consumer Goods (FMCG) Industry: A Systematic Review of Literature*. http://ssrn.com/link/12th-ICBM-2015.html

Hwang, B. N., Chen, T. T., & Lin, J. T. (2016). 3PL selection criteria in integrated circuit manufacturing industry in Taiwan. *Supply Chain Management*, *21*(1), 103–124. https://doi.org/10.1108/SCM-03-2014-0089/FULL/XML

Isaksson, K., & Huge-Brodin, M. (2013). Understanding efficiencies behind logistics service providers' green offerings. *Management Research Review*, *36*(3), 216–238. https://doi.org/10.1108/01409171311306382

Jepherson, E. M., Patrick, K. N., & Moronge, M. (2021). LOGISTICS MANAGEMENT SYSTEMS AND PERFORMANCE OF FAST-MOVING CONSUMER GOODS MANUFACTURERS IN NAIROBI, KENYA. *International Journal of Supply Chain Management*, *6*(1), 29–63. https://doi.org/https://doi.org/10.47604/ijscm.1232

Lambert, D., Stock, J. R., Ellram, L. M., & Grant, D. (2006). Fundamentals of Logistics Management: First European Edition. In *International Journal of Logistics Research and Applications* (Vol. 10, Issue 4). McGraw-Hill. https://researchportal.hw.ac.uk/en/publications/fundamentals-of-logistics-management-first-european-edition

Langley Jr., C. J., & Capgemini. (2007). *Third-party logistics: Results and findings of the 17th Annual Study*. Capgemini Consulting.

Langley, C. J., & Infosys. (2018). The State of Logistics Outsourcing Results and Findings of the 22 nd Annual Study. *22nd Annual Third-Party Logistics Study*. https://mymaritimeblog.files.wordpress.com/2017/10/3pl_2018_study.pdf

Lieb, R., & Bentz, B. A. (2005). The use of third-party logistics services by large American manufacturers: The 2004 survey. *Transportation Journal*, *44*(2), 5–15. https://doi.org/10.5325/TRANSPORTATIONJ.44.2.0005

Liu, X., Grant, D. B., McKinnon, A. C., & Feng, Y. (2010). An empirical examination of the contribution of capabilities to the competitiveness of logistics service providers: A perspective from China. *International Journal of Physical Distribution and Logistics Management*, *40*(10), 847–866. https://doi.org/10.1108/09600031011093232

Maloni, M. J., & Carter, C. R. (2006). Opportunities for Research in Third-Party Logistics. *Transportation Journal*, *45*(2), 23–38. https://doi.org/10.2307/20713632

Mandrinos, S. (2014). Internationalisation processes of fast moving consumer good (FMCG) products. *Journal of Entrepreneurship in Emerging Economies*, *6*(2). https://doi.org/https://doi.org/10.1108/JEEE-04-2014-0012

McKinnon, A. C. (2005). The economic and environmental benefits of increasing maximum truck weight: The British experience. *Transportation Research Part D: Transport and Environment*, *10*(1), 77–95. https://doi.org/10.1016/j.trd.2004.09.006

McKinsey & Company. (2021, November 8). *COVID-19: Implications for business*. Https:// Www.Mckinsey.Com/Business-Functions/Risk-and-Resilience/Our-Insights/Covid-19-Implications-for-Business.

Mentzer, J. T., Gomes, R., & Krapfel, R. E. (1989). Physical Distribution Service: A Fundamental Marketing Concept? *Journal of the Academy of Marketing Science*, *17*(1), 53–62. https://doi.org/10.1007/BF02726354

Min, H., & Ko, H. J. (2008). The dynamic design of a reverse logistics network from the perspective of third-party logistics service providers. *International Journal of Production Economics*, *113*(1), 176–192. https://doi.org/10.1016/j.ijpe.2007.01.017

MLRP FEB. (2023, July 20). *Kondisi Logistik Indonesia 2023: Tantangan yang Dihadapi dan Upaya Peningkatan*. Https://Mlrp.Feb.Ugm.Ac.Id/2023/07/Kondisi-Logistik-Indonesia-2023-Tantangan-Yang-Dihadapi-Dan-Upaya-Peningkatan/.

Neboh, N. D., & Mbhele, T. P. (2021). Supply chain design dimensions for supply chain resilience in the South African fast-moving consumer goods retail industry. *Africa Journal of Management*, *7*(S1), 58–81. https://doi.org/10.1080/23322373.2021.1930742

Nguyen, T. D. A. (2019). The effect of physical distribution service quality on customer perceived value in Omni-channel. *International Journal of Research Studies in Management*, *8*(1), 101–115. https://doi.org/10.5861/ijrsm.2019.4011

Njambi, E., & Katuse, P. (2013). Third party logistics in distribution efficiency delivery for competitive advantage in fast moving consumer goods companies in Kenya. *International Journal of Social Sciences and Entrepreneurship*, *1*(8), 15–27.

Nygrén, N. A. (2019). Scenario workshops as a tool for participatory planning in a case of lake management. *Futures*, *107*, 29–44. https://doi.org/10.1016/J.FUTURES.2018.10.004

Perotti, S., Zorzini, M., Cagno, E., & Micheli, G. J. L. (2012). Green supply chain practices and company performance: The case of 3PLs in Italy. *International Journal of Physical Distribution and Logistics Management*, *42*(7), 640–672. https://doi.org/10.1108/09600031211258138

Premkumar, P., Gopinath, S., & Mateen, A. (2021). Trends in third party logistics – the past, the present & the future. *International Journal of Logistics Research and Applications*, *24*(6), 551–580. https://doi.org/10.1080/13675567.2020.1782863

Rabinovich, E., & Bailey, J. P. (2004). Physical distribution service quality in Internet retailing: service pricing, transaction attributes, and firm attributes. *Journal of Operations Management*, *21*(6), 651–672. https://doi.org/10.1016/J.JOM.2003.11.004

Razzaque, M. A., & Sheng, C. C. (1998). Outsourcing of logistics functions: A literature survey. *International Journal of Physical Distribution & Logistics Management*, *28*(2), 89–107. https://doi.org/10.1108/09600039810221667

Sarabi, E. P., & Darestani, S. A. (2021). Developing a decision support system for logistics service provider selection employing fuzzy MULTIMOORA & BWM in mining equipment manufacturing. *Applied Soft Computing*, *98*, 106849. https://doi.org/10.1016/j.asoc.2020.106849

Selviaridis, K., & Spring, M. (2007). Third party logistics: A literature review and research agenda. *The International Journal of Logistics Management*, *18*(1), 125–150. https://doi.org/10.1108/09574090710748207

Sherman, R. J. (2013). *Supply Chain Transformation : Practical Roadmap to Best Practice Results*. John Wiley and Sons.

Solakivi, T., & Ojala, L. (2017). Determinants of carrier selection: updating the survey methodology into the 21st century. *Transportation Research Procedia*, *25*, 511–530. https://doi.org/10.1016/J.TRPRO.2017.05.433

Sumantri, Y., & Lau, S. K. (2011). The Current Status of Logistics Performance Drivers in Indonesia: An Emphasis on Potential Contributions of Logistics Service Providers (LSPs). *Business Innovation & Technology Management*, *001*, 34–050. http://apbitm.org

Tu, L., Lv, Y., Zhang, Y., & Cao, X. (2021). Logistics service provider selection decision making for healthcare industry based on a novel weighted density-based hierarchical clustering. *Advanced Engineering Informatics*, *48*(December 2020), 101301. https://doi.org/10.1016/j.aei.2021.101301

Vieira, J. G. V., & Mergulhao, R. C. (2015). Sustainable supplier selection: the effect of logistical collaboration on logistical performance. *International Journal of Engineering Research and Applications*, *5*, 118–127.

Williamson, K. C., Spitzer, D. M. Jr., & Bloomberg, D. J. (1990). Modern Logistics Systems: Theory and Practice. *Journal of Business Logistics*, *11*(2).

Xing, Y., Grant, D. B., McKinnon, A. C., & Fernie, J. (2010). Physical distribution service quality in online retailing. *International Journal of Physical Distribution and Logistics Management*, *40*(5), 415–432. https://doi.org/10.1108/09600031011052859/FULL/XML

Yew Wong, C., & Karia, N. (2010). Explaining the competitive advantage of logistics service providers: A resource-based view approach. *International Journal of Production Economics*, *128*(1), 51–67. https://doi.org/10.1016/j.ijpe.2009.08.026