THE IMPACT OF LOGISTICS PERFORMANCE ON THE SALES LEVEL
An Empirical Study in Retail Sector

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Abstract—**The aim of this research is to assess the impact of logistics performance on retail sector. This research was conducted in Palu in Central Sulawesi Province. There are several indicators involve in this study, such as, customer service, operation metric, and logistics cost. This research is categorized as explanatory research and multiple regression method was used to analyze the hypotheses. Simultaneously, this research found that logistics performance has significant contribution to sales level. However, customer service has not had positive contribution to sales level compare to operation metric and logistics cost. In addition, logistics cost has big impact on the sales level of retail groceries. The result of this research can be used by academicians and professionals who intent to deal with logistics in retail sector. This research also identifies that logistics performance need further study in different region and sector with the aim to improve the understanding of dimensions.**

Keywords-*Customer Service; Operational Metrics; Logistic Cost; Level of Sales*

I. INTRODUCTION

Business organization has obligation to sustain their business in high competition. Therefore, organization needs support from all functions. Basically, operation is one of the functions that create product based on customers need. However, activities in operation are difficult to gain their objective without fully support of logistics performance. Logistics has different form of support to business organization. Logistics support business to distribute raw materials from suppliers to the main company. In addition, logistics support the company to ensure the quality and quantity of raw material arrive on time.

Logistics is focusing on strategic application system on dynamic goods flow from company to customer [5], [17]. In contrast, Sudalaimuthu and Anthony [15] claim that logistics is focusing on several processes, such as, planning, implementation and control. These processes should be fit to the customers need and effective accordingly.

Logistics performance is one of the critical factors on business performance. All activities in business organization are depended on logistics performance, such as, inventory, material handling, and procurement. Therefore, business organization needs to have proper logistics management in order to gain profit and low cost in operations.

Customers orientation is implemented in logistics operations to improve satisfaction of the customers. Retail as a customer of logistics company provides several services, such as, fast in delivery, maintain quality, and low cost. These services will impact retail operation. For example, retail is providing service to their customers with available stock of goods. This availability will create good experience for the customer. Providing better experience in purchasing process will create good relationship with customers. This situation will impact the customers to repeat their purchase. Therefore, it is clear that logistics has significant impact on retail operation.

This paper contributes to provide information related to the relationship between logistics performance on the sales level in retail sector. The study involves several variables, such as, customer service, operational, and logistics cost. The study applies several constructs from previous research to obtain generalization related to this field.

The structure of this paper is started by literature review in related to logistics performances and sales level. Then, the method of research is described in depth and it is followed by result and discussion. Finally, conclusion is illustrated with several recommendations for future research.

II. LITERATURE REVIEW

A. The context of Logistics

There are many roles that have been done by logistics, such as, improve supplier and customer relation, and support product development. Logistics is integrated in large entities and support the flow of the goods and services, as well as information from upstream to downstream side CLM [4]. The raw material should be delivered to the focal company on time, maintain proper quality and quantity. Similarly, logistics should also manage the flow of final product to the end of customer on time, maintain proper quality and quantity. Based on this context, logistics play an important role to maintain business performance.

B. Customer Service

Customer service is one of the critical aspects in logistics with the aim to add value and optimize utility of the product

[17]. There are several indicators in measuring comprehensive performance in logistics, such as, customer service, response, satisfaction, productivity, flexibility, and time [2], [3]. Customer service delivers value added to the customers and support competitive advantage. The aim of customer services is to provide high value information to the customer. For instance, customer able to control inventory status, order status, expected shipping and delivery dates, and back order status [7]. All of these abilities could impact the customer's performance. In this case, IT plays as enablers with the aim to share this information and maintain buyer-supplier relationship [16]. In addition, customer service can be used by the company to maintain their relationship with their customer. In fact, their customer may transfer their experience to the potential customer. In other words, customer service is a foundation of all customer relationship management. Therefore, customer service has strong correlation to business performance.

C. Operational Metric

Oke and Long [1] posit that the generic factors have strong relationship to logistics operation. The generic factors include the distinctive of the shipped product, capacity utilization, skills, and better communication. These generic factors should be properly managed in order to maintain efficiency in logistics operation. In addition, time is the basis of operational metric that can be used to identify theoretical logistics performance. The less time in operation means logistics performance is operating in high performance. The indicator of time includes the speed in delivery, availability of the product on time, data sharing, and the average of delay [8]. Furthermore, Sople [17] argue that there are several operational items in logistics function, for instance, inventory management, transportation, and storage. These items can be nominated as tools to measure logistics performance.

D. Logistics Cost

The main goal of logistics is to provide certain level of service in efficient and effective way to the customers [9]. Logistics play as central of the total cost which includes all expenses in logistics operation. Logistics cost has strong correlation to the service level policy, for instance, high availability, maintain capability, and quality. The higher of these aspects, the more logistics operation should be expended. What is more, maximize capacity utilization is another method that can impact the cost of logistics [1].

According to Schram and Morschett [9] argue that service quality and logistics cost can be used to measure the logistics performance. The forms of logistics cost, for example, cost related to buffer stock, packaging, transportation, documentation, brocker. All these costs should be properly managed with the aim to reduce risk in operation. In addition, there are many studies conclude that IT has strong relationship to reduce logistics cost. For example, Redwood Systems is a logistics company that can guarantee their customer to save for 15 to 30 percent in

logistics cost [14]. This company has successuffly implemented EXE software suite. The software is easily to organize and operate in different locations as well as provide many features. In short, this application creates more benefits for their customers. Thus, logistics cost has strong correlation to business performance.

E. The Sales Level

The sales level contributes to decrease and improve the profit of businesses [14]. Sales include all integrated activities that delivering goods or services from producer to the customers. Logistics performance has strong relationship to marketing performance [6]. Most of studies conclude that dimension of sales is a part of marketing performance [10]. Therefore, this study adopts the previous research with focusing on sales as a part of marketing performance measurement.

During delivery process, there are many entities involve, such as, merchandisers, agents, and salesman. Logistics performance is oriented to provide customers neeed, while sales is focused on create profit. So, the role of retailers is to improve the sales level. The reason for this is that retailers provide the end customers need in daily basis. Retailers have to ensure that all customer need is always available on the shelf. Thus, logistics performance should running well if retailers have to maintain availability of goods on the shelf. In short, the logistics process in each entity should be done in effective and efficient way in order to increase the sales level.

Based on the teoritical and the research framework, the hyphoteses in this research as follows:

H1: Logistics performance (customer service, operational metric, and logistics cost) have simultaneous impact on the level of sales in retailers in Palu.

H2: Customer service has partial impact on the level of sales in retailers in Palu.

H3: Operational metric has partial impact on the level of sales in retailers in Palu.

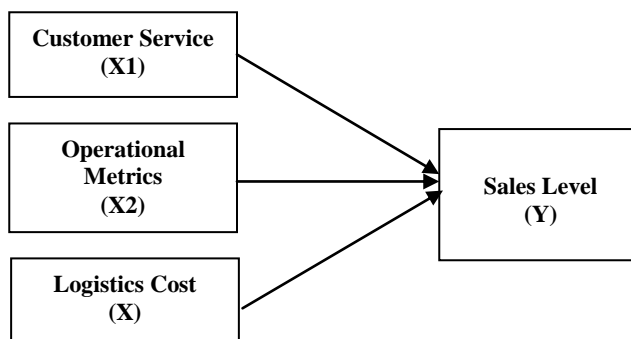H4: Logistics Cost has partial impact on the level of sales in retailers in Palu.

Figure 1. Research Framework

III. RESEARCH METHODOLOGY

This research is categorized as explanatory research with the aim to assess the causal relationship between the constructs. Population in this research is all retail grocery stores that have been established their business after five years in Palu, Central Sulawesi, Indonesia. The number of population in this study is 37 retail groceries. The charactheristics of the sample involved in this study can be seen in the following Tab. 1.

TABLE I. SAMPEL CARACTHERISTICS BY NUMBER OF SUPPLIERS, LEAD TIME OF DELIVERY, AND ICT SUPPORT

Charactheristics	Number of Retailers
Number of suppliers	
1 - 20 suppliers	17 Retailers
21 - 40 suppliers	8 Retailers
41 - 60 suppliers	6 Retailers
> 61 or more suppliers	6 Retailers
Lead time of delivery	
1 - 3 weeks	36 Retailers
One month or more	1 Retailer
ICT support	
Phone	28 Retailers
EDI	3 Retailers
Others (salesman visitation)	34 Retailers

As the number of population is small, all members in population are included in the sample. Data is gathered by two methods: primary and secondary data. The primary data is collected by delivering questionnaire to the respondents with Likert scale 1-5, while secondary data is collected by collecting information from retailers and government report as well as other sources. The charactheristics of sample involved in this study can be seen in the following table.

A multiple regressions are applied in this research to identify the correlation between logistics performance (X) and sales level (Y). The independent variables in this research include customer service (X_1), operational metric (X_2), and logistics cost (X_3). Meanwhile, the sales level is dependent variable (Y). These constructs are included in the following formula.

$$Y = a + b_1X_1 + b_2X_2 + \ldots\ldots\ldots\ldots\ldots bnXn + e$$

The two main variables in the study are logistics performance and sales level. Tab. 2 summarises variables and indicators used in this study that are adopted from previous literature.

TABLE II. VARIABLES AND INDICATORS USED IN THIS STUDY

Variables	Indicators	Items
Customer service (X_1)	▪ Distribution	4
	▪ Trading	4
Operational Metrics (X_2)	▪ Inventory management	3
	▪ Transportation	2
	▪ Storage	4
Logistics Cost (X_3)	▪ Inventory	3
	▪ Packaging	3
	▪ Transportation	3
Sales Level (Y)	▪ Sales Metrics	10

IV. RESULTS

The multiple regression analysis explains that logistics performance has a positive significant impact on the sales level. The value of multiple R is 0,311 means that the relationship between logistics performance and the sales level is 31.10 percent. This also means that the relation between the construct is lower. Meanwhile, adjusted R square is counted 0.248. Thus, the relationship between logistics performance and the level of sales is 24.8 percent. This proportion means that independent variables have low correlation and the rest of proportion is influenced by other variables out of the model. The following Tab.3 summarises the results of multiple regression analysis to assess the relationship between logistics performance on the sales level.

According to analysis of varians (ANOVA), the result of F-test 4.965 and F-table is 2.892. This can be seen that independent variables have a simultaneous correlation to sales level. This study applies 95 percent confidence level so that the significant level (α) is 5 percent. Tab. 1 shows that customer service has low t-test compare to t-table. The partial determination of this variable is 0.014. Therefore, it cannot be concluded that variable X1 has positive correlation to the sales level. In addition, operational metric and logistics cost have high t-test compare to t-table. The partial determinations of these variables are 0.339 and 0.369 respectively. It means that operational and logistics cost have significant relation to the sales level. In short, the constructs have simultaneously positive impact on the sales level.

TABLE III. MULTIPLE REGRESSIONS ANALYSIS

Independent variables	Koefisien Regresi	T-test	Sig.	Partial
Customer Service (X_1)	0,012	0,083	0,934	0,014
Operational Metrics (X_2)	0,293	2,073	0,046	0,339
Logistic Cost (X_3)	0,252	2,282	0,029	0,369
Constant	: 1,921	F-test	: 4,965	
Multiple R	: 0,311	F-table	: 2,892	
Adjusted R Square	: 0,248	t-table	: 2,034	

V. DISCUSSION

This research has offered an empirical validation for a framework that identifies three constructs of logistics performance. This research has also analysed the relationship between logistics performance and the sales level. The data of this study were collected from a sample of 37 retail grocery stores in Palu, Central Sulawesi Province. The result supports three out of fourth hyphotheses that represented the conceptual framework of this research.

Furthermore, the flow of goods should be managed carefully in order to reduce risk. Therefore, logistics manager should have proper plan to order goods with the

aim to reduce the cost. Based on interview and observation, most of storage manager in retail grocery stores in Palu have proper schedule to order goods and manage their inventory. Storage managers apply several methods to put their order to suppliers, such as, phone, EDI, and salesman visitation.
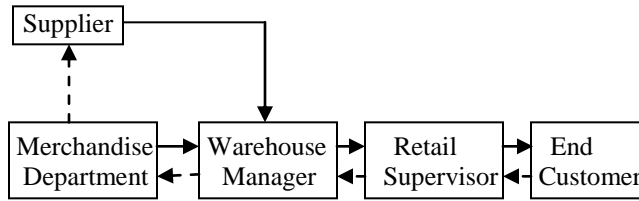

Figure 2. Retail logistics

The Fig. 2 shows that all entities have strong contribution to improve the order in each stage. For instance, if supervisor has low performance, storage manager would also have difficulties. This situation can also impact the next entities because all activities are integrated. Most of the big retailers apply the flow of goods similar to Fig.2. So, the big retailers have managed their inventory in appropriate way. Menawhile, other retailers apply push system in their inventory. Furthermore, small retailers put their order to their supplier by phone as well as the regular visit of the salesman. As a result, these retailers are difficult to maintain efficiency in logistics operation.

Furthermore, hyphotesis (H_1) relates to the simoultaneous impact of logistics performance on the sales level. The empirical result has exposed a significant impact of logistics performance on sales level. The focus of the study is retail sector in developing city in Indonesia. This study helps to clarify and support Schramm-Klein and Morschett study that logistics performance impact marketing performance. This study might also contribute to deliver an understanding between the contructs.

Hyphotesis (H_2) corresponds to the association between customer service and sales level. The empirical result confirms customer service can not support the sales level. In line to this, Vickery, Jayaram, Droge, and Calatone [13] claim that there are few studies found the strong relationship between customer service and financial performance. In addition, this result also implies that retailers may not fully recognize the linkage between customer service and the sales level. This study found that there are few retailers maintain share information by EDI (electronic data interchange). Most of retailers set up order via phone or salesman visitation. Therefore, retailers have long timeline in order processing and difficult to track their order. In addition, the implementation of service support and handling convenience are not improved. Accordingly, the association between customer service and the sales level is rejected in this study.

Hyphotesis (H_3) represent the association between operational metric and sales level. The empirical result validates that there is strong correlation between operational

metric and sales level. This result shows that most of retailers in Palu focus on their inventory, transportation and storage. In line to this, Tracey, Lim, and Vonderembse [12] point out that both inventory control and supplier communication are the critical factors to improve business performance, such as, marketing as well as financial. This study reveals that geografical issue is also one of the critical factors for retailers. Most of retailers in Palu depend on their supply base in Surabaya. Meanwhile, the distance between Palu and Surabaya (West Java) is very far. The lead time of goods delivery is around three weeks. Consequently, retailers should have adequate inventory to fulfill demand.

Hyphotesis (H_4) characterise the association between logistics cost and sales level. The empirical result confirms that there is positive correlation between logistics cost and sales level. This result shows that cost related inventory, packaging, and transportation have a positive impact on the sales level. This result support Toyli, Hakkinen, Ojala, and Naula study [8]. They posit that the capability to reduce cost related to transportation would have significant impact on reducing the warehousing and inventory cost. What is more, third party logistics can support retailers to reduce activity base costing and sustain their long run profit [14]. The lower logistics cost occur in operation, the price of goods can be more competitive. This result also acknowledge that retailers in Palu are struggling to reduce the logistics cost in order to obtain more profit.

VI. CONCLUSION AND RECOMMENDATION

The empirical study shows that logistics operation has a significant impact on the sales level. In other words, if logistics performance is properly managed, the level of sales would also increase. This study also highlighted several propositions for theory and managerial practice. In theoretical terms, retailer should maintain proper relationship with suppliers. Thus, customer service can be improved and both supplier and retailers can obtain more advantages. The improvement might also impact on operational and logistics cost. Furthermore, this study contributes to provide managerial practices. First, retail managers should focus on operational and logistics cost in order to improve the sales level. Second, customer service in this study cannot support sales level. But, both distribution and trading aspects can also be nominated as the main of priorities to provide proper customer service. Eventually, enabling ICT in logistics operation is critical to support logistics performance as well as the sales level.

Collaboration and integration are important factors in order to improve logistics performance. Maintain collaboration and integration would impact logistics operation and cost. In addition, the challenge for retailers in Palu is geographical issue which supply base is located far from the point of sale. For that reason, applying proper information technology, such as, EDI and ERP systems would improve the sales of retail grocery stores. In this case, they may improve the timeline of order, tracking, fund

transfer processing, and service support. This study has limitation in terms of scope and the number of respondents. This study focuses on retail grocery stores with limited respondents whereas it should be enlarged into other type of retailers. In addition, the future research should involve information technology as another variable into this model. Thus, the future research should contribute to this issue in large respondents and different region or nationality.

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