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Boosting operational performance through logistics drivers: Evidence from manufacturing industry

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A B S T R A C T

The aim of the study was to examine the impact of logistics drivers on the operational performance of large manufacturing industries in Ethiopia. To this end, the researchers employed an explanatory research design with a mixed approach. To select the case industries the researchers used the census sampling technique and stratified sampling technique for respondents' selection. Both primary and secondary data were accessed about the issue to analyze. After the data collection process, the study used a partial least square structural equation model (PLS-SEM) to find the relationships between the hypothesized constructs. In this study, inferential analysis was made with the support of smart PLS software. The result of the finding depicts that the product of R^2 Value specifies that 69.1% of enhancement in an endogenous variable (i.e., Operational performance) is caused by the joint results from the exogenous variable (i.e. Transportation, Inventory, and facility Management). The finding also shows that there are raw materials and currency problems that made the industries produce below their capacity.

1. Introduction

Doing business in the current market situation is different from what we did in the past. Nowadays businesses are in an unsettled environment, which is characterized by more intense competition, the latest technology-oriented, consistently changing customer demand, reliable customer service, quick product life cycle, multifaceted market situation, complexity in logistic operation, and the like. These business problems could be handled by integrated logistics drivers to enhance the operational performance of the firms. In order to get long-term sustainable superior operational performance, firms should be determined by the ability to integrate partners within the logistics chain. According to Natasha et al. (2017) if companies successfully practice logistics management, they could reduce costs, increase their competitiveness and enhance operational efficiency. A firm implementing logistics drivers on the right path in replying to the changing business environment through an integrative manner, can achieve a reduction in total logistics cost and improve the firm's operational performance in terms of efficiency and responsiveness. Martin, (2011) suggested that effective logistics management offers a key foundation of competitive advantage if it can control cost and enhance service differentiation. This distinctive role will support firms to become both cost and value leaders.

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Accordingly, virtuous logistics management is progressively known as the vital enabler, which lets a business advance and sustains its competitive benefit and safeguards maximum customer gratification. Fugate et al., (2010) show that increase in logistics efficiency, effectiveness, and differentiation decreased expenses, inventory, and cash requirements and increased inventory availability, timely delivery, on-time and damage-free deliveries over enhanced operational performance.

Ethiopia was named the fastest-growing country in the world. As a developing country, Ethiopia needs to get the advantage of globalization to advance its economy by giving emphasis on drivers of logistics management. Nevertheless, in practice in Ethiopia, the operation of logistics is characterized by the poor logistics management system and practice and deficiency of coordination of goods transport system, low level of development of logistics infrastructure, and inadequate fleets of freight vehicles in number and age, damage and quality deterioration of goods while handling due to lack of proper inventory management (Debela, 2013). This is due to a lack of efficient and responsive logistic management. It is essential to advance logistics practice for the purpose of enjoying a greater competitive advantage over the competitors. However; in Ethiopia exploiting the existing competitive advantage is constrained by a number of key logistics factors. As Mamo et al., (2017) stated, one of the key factors that have been identified as undermining competitiveness is the poor logistics system. The report had drawn attention to the logistics sector in Ethiopia as being a critical constraint to current trade flows and a bottleneck to further economic growth and development. In the Ethiopian manufacturing sector, among the major problems contributing to the poor performance of the industry, the lack of adequate knowledge and skills in managing logistics drivers is the critical one (LIDI, 2015).

Logistics is the major prominent sector facilitating import-export trade activities for the country. Logistics efficiency and responsiveness are the keys to attracting international business companies to diversify their business in the country. Transport operation system, telecom and ICT services, terminal facilities and operation system, technological and administrative capabilities of institutions, and regulatory frameworks of logistics, deliver excellent operations, all are determinant factors of Ethiopian global logistics performance, (Kebede & Hussen, 2015). The infrastructural limitation is common to almost all Ethiopian export trade logistics factors. Eshetie, (2018) in the study of Ethiopia's manufacturing industry opportunities, challenges, and way forward, indicated that the main challenges of the Ethiopian manufacturing sector are the high logistics cost. These factors are contributing to the inefficient operation of manufacturing firms in Ethiopia.

As far as the researcher's data, past studies have greatly contributed to the logistics and supply chain field of study. However, still, there has been a gap that requires profound investigation of drivers of logistics on enhancing operational performance in terms of efficiency and responsiveness. This empirical study is aiming to address, "How do logistics drivers lead to boost operational performance of Hawassa large manufacturing industries?

2. Objective of the study

2.1 General objective of the study

General objective of this study was to examine logistics drivers enhancing operational performance of Ethiopian large manufacturing industries.

2.2. Specific objective of the study

1. To examine the relationship between transportation management and operational performance of Ethiopian large manufacturing industries.
2. To examine the relationship between inventory management and operational performance of Ethiopian large manufacturing industries.
3. To examine the relationship between facility management and operational performance of Ethiopian large manufacturing industries.

3. Empirical review and research Hypothesis

3.1 Logistics drivers and operational performance

Effective logistics management provides the right product in the right place at the right time which is why it has received much attention over the past decade from practitioners and the government (Tilokavichai et al., 2012). Numerous studies found that logistics drivers have a significant advantage on a company's greater operational performance (Natasha et al., 2017; Kebede & Hussen, 2015; AYENEW, 2016; Fugate et al., 2010; WONDUANTE, 2019). As Chopra and Meindl, (2007) stated that the core drivers of logistics are transportation, inventory, and facility management. According to Fugate et al. (2010), the fundamental principles of logistics management are reducing costs and improving business performance. In support of this (Arvis et al., 2014) argued that Well-functioning logistics, both locally and globally, is a compulsory requirement of operational performance and national competitiveness. Li and Warfield (2011) in their study shows that logistical drivers that are high quality in nature offer additional benefits that lead to the availability of the product which keeps manufacturers in the leading position over their competitors. Something is here according to (Buyukozkan et al., 2008) Logistics drivers play an important role in adding competitive advantage to a firm in customer support and business excellence. Realizing the importance of sustainability in logistics management is critical for competitive advantage. A significant determinant of business performance these days is the role of logistics management functions in ensuring the smooth flow of materials, products, and information throughout the company's supply chain (Kilasi et al., 2013). Therefore, based on this it is hypothesized that:

H. *Logistics drivers have a positive and significant relationship with operational performance.*

3.2 Transportation and operational performance

Kenyon and Meixell (2011) defined transportation as the activities involved in delivering any raw material goods or finished products from suppliers to warehouses and sales locations. Transportation is essential in the whole production process, from manufacturing to delivery to the final consumers and returns. Only good coordination between each transportation component would bring the benefits to a maximum (Laird, 2012). The study indicated that the main component in a logistics chain is transportation management, which joined the separated activities, and it influenced the performance of the logistics system hugely (Tseng et al., 2005). Current evaluation by (Ferrantino et al., 2013) the combined impact of improving border administration, and upgrading transport and communications infrastructure would increase global Gross Domestic Product (GDP) by 4.7%, six times more than what would result from a complete and worldwide elimination of tariffs.

Empirical studies show that foreign direct investment is attracted to areas where transportation systems are more efficient (Saidi & Hammami, 2011). According to Randall et al. (2010). Transportation plays a key role in the supply chain because without the efficient movement of finished goods and raw materials the entire system would not be able to work at its full potential. Mukolwe and Wanyoike (2015) refer to transport management as allowing a faster and cost-effective flow of goods and raw materials thus improving operational efficiency and responsiveness. The study result of (Obasan et al., 2016) found that transportation has a strong relationship with logistic operational performance and firm performance. In support of these the study conducted by Musau et al. (2017) on textile firms concludes that transport management has the potential to positively influence supply chain performance and organizational performance. Transportation is the greatest significant part of logistics for the reason that of the effect on customer service level and cost structure (Owusu Kwateng et al., 2014). Shahzadi et al. (2013) stated that in manufacturing firms the performance of transportation activity can be increased by a model of the smart transportation management system. Their study argued that transportation has an impact on the performance of the firm. Transportation is playing the role of critical to logistics and can be seen as the glue that holds channel members together (Coyle, 2011). Well, transport management in logistics drivers could provide superior logistics efficiency, reduce operation costs, and promote service quality for firms (Bowersox, 2010). Therefore, based on this the researchers hypothesised that;

H_{1a}. *Firms with a high level of transportation management will have a high level of* operational performance.

3.3 Inventory management and operational performance

Inventory management is very critical for any firm specifically for manufacturing since profitability is highly associated with the efficient and responsive management of inventory. In manufacturing firms above 60 % of the investments were spent on inventory. ONIKOYI et al. (2017) argued that efficient inventory management leads to increased operational performance and profitability. Their study indicated that JIT, MRP, and EOQ are the best inventory management practices. The results of Lwiki et al. (2013) study point out that there is a positive relationship between inventory management and operational performance. Bowersox (2010) indicated that logistical strategies are intended to attain customer service objectives while keeping the lowest possible investment in inventory. Their study states that the key to effective logistical segmentation rested in the inventory priorities dedicated to supporting core customer's goals in order to achieve maximum inventory turns. In support of the above statements, the study of Atnafu and Balda (2018) concludes that higher levels of inventory management practice can lead to an enhanced competitive advantage and improved organizational performance. Dettoratius (2013) states that inappropriate inventory management results in a lot of revenue being lost for the firms. Salawati et al., (2012) examined the impact of inventory management on performance and found a strong and positive relationship. Inventory management is very essential to any business that is enhancing its performance and achieving high levels of customer satisfaction (Atnafu & Balda, 2018). Naliaka and Namusonge (2015) found that inventory management affects the competitive advantage and operational performance of manufacturing firms. Therefore, based on this the researchers hypothesised that;

H_{1b}. *Firms with a high level of inventory management will have a high level of operational performance.*

3.4 Facility management and operational performance

The strategic architecture of supply chain networks relies heavily on facility placement decisions. The storage, assembly and fabrication of a product take place at facilities. Better management of the role, location, capacity, and flexibility of these facilities has a positive effect on supply chain performance. In facilities management, a company proved to be more responsive or more efficient but not at the same (Chopra & Meindl, 2007). The facility is responsible for coordinating all efforts related to planning, designing, and managing buildings and their systems, equipment, and furniture to enhance the organization's ability to compete successfully in a rapidly changing world. Facility management has the potential to contribute significantly, and it is vital to identify and measure the extent to which it supports, or can be adapted to, the changing needs of organizations, and contribute to productivity, profitability, service, and quality (Amaratunga & Baldry, 2000). Shahzadi et al. (2013) and Chopra and Meindl (2007) argued that the facility is one of the logistics drivers and closely related to performance. Organizations need to find a situation where both efficiency and responsiveness in supply chain practices are at an average level to enhance their performance. Therefore, based on this the researchers hypothesised that;

H_{1c}. *Firms with a high level of facility management will have a high level of operational efficiency.*

3.5 Conceptual framework

LOGISTIC DRIVERS

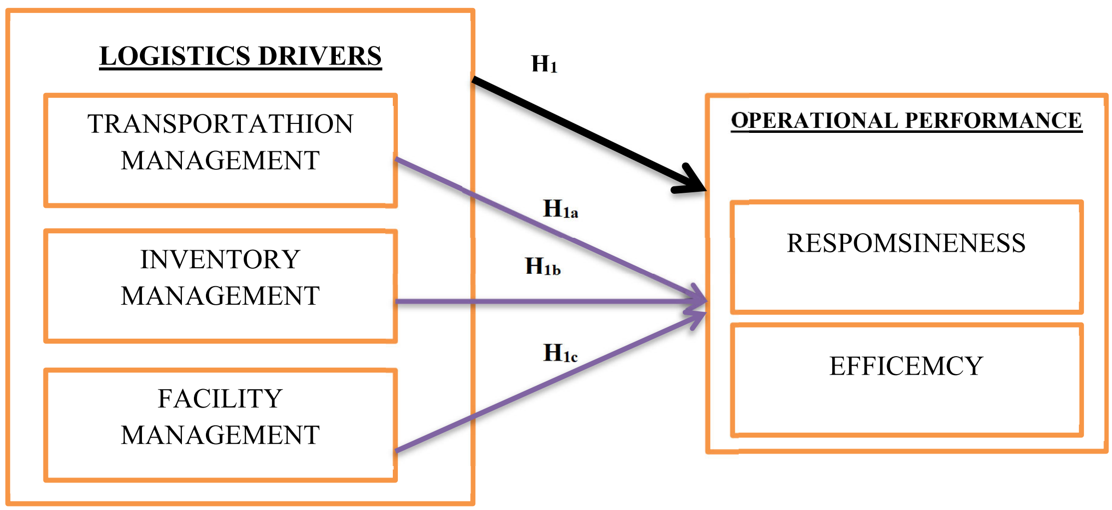

Fig. 1. Conceptual Framework

SOURCE: - Researchers Conceptualized

4. Research design and methodology

It is known that all research needs a strategy to determine where it is going. For the purpose of addressing this study's research questions, the researchers employed an explanatory sequential mixed research design. Because the quantitative phase is preceded by the qualitative research process, it is considered sequential (Creswell, 2014). Explanatory sequential mixed methods are one in which the researcher first conducts quantitative research, analyses the results, and then builds on the results to explain them in more detail with qualitative research. This method will help the researchers to assimilate qualitative and quantitative data. Regarding the population of the study, large manufacturing industries in Ethiopia were considered. For the purpose of determining sample size, the researchers employed a Stratified sampling technique. In order to define the particular sample size of the study, a sample determination formula developed by Yamane, (1973) will be chosen and used by current researchers as a way to determine sample size. The study utilized both primary and secondary sources, to collect data related to its major concern. In order to collect primary data, the study has conducted a series of observations, interviews, and a 5 points Likert scale questionnaire that will measure the variables included in the dependent independent. For the purpose of secondary data, the study will be undertaking in-depth reviews of different documents from available published as well as unpublished sources. After the relevant data were collected then, procedures of content analysis and statistical analysis were carried out; as major instruments of analyzing and interpreting data gathered from both primary and secondary sources. Inferential statistics were made by the partial least square structural equation model (PLS-SEM) through the help of Smart PLS software (Awang, 2012).

5. Result, discussion and interpretation

In this portion, the researchers discussed the result of the finding according to the aim of the proposed study. The aim of this study is the impact of logistics divers on the operational performance of large manufacturing industries in the southern part of Ethiopia. To execute the stated explanatory test both qualitative data and quantitative data with survey questionnaires were collocated. The collected data were purified prior to entry into the designed analysis software. To end this study used a structural equation model with smart PLS-SEM (partial least square structural equation model) software. A total of two hundred ninety-four (294) sample questionnaires were distributed to respondents. During the data purification process, the researcher found nine questionnaires were not filled according to the instruction and eleven questionnaires were not returned. Therefore; 274 valid questionnaires were used for the analysis which is covering 93% of the response rate. To check the data distribution normality tests were checked by using the Skewness and kurtosis value. The result confirmed that the data distribution is normal since the value of Skewness and kurtosis is somewhere between + or – 2

5.1. Exploratory factor analysis (EFA)

According to Martin and Maes (1979) exploratory factor analysis is used to reveal the underlying structure of a relatively large set of variables claim that exploratory factor analysis is a multivariate technique used for data minimization aiming to indicate a set of variables of a smaller number of variables more specifically. In support of this Suhr, (2000) Factor analysis could be described as an orderly simplification of interrelated measures. Factor analysis has traditionally been used to investigate the underlying structure of a group of interrelated variables without imposing any predetermined structure on the outcome (Child, 1990) by performing exploratory factor analysis (EFA), the number of constructs and the underlying factor structure is identified. EFA is a technique for determining the number of latent constructs and the underlying factor structure of a set of variables.

In this study, 28 observed indicators were evaluated with classes of five (5) components as Transportation, Facility, Inventory, Efficiency, and Responsiveness. By using the PLS-SEM algorithm EFA was conducted to define the content or meaning of factors of each item with their respective components. Accordingly, 24 out of 28 items were loaded well on their own factor with the exceptions of one facility item, one Inventory item, and one efficiency item and responsiveness item. After the purification process, the items loaded below 0.60 were removed. After removing low factor loading values below the cut point value, the remaining purified items were used for further analysis using PLS-SEM.

Table 1
Explanatory factor Analysis

Constructs	Items	Component				
		FM	IM	TM	E	R
Facility	FM1	**0.758**				
	FM2	**0.826**				
	FM3	**0.823**				
	FM5	**0.744**				
	FM6	**0.713**				
Inventory	**I1**		**0.637**			
	I2		**0.635**			
	I4		**0.764**			
	I5		**0.790**			
	I6		**0.772**			
Transportation	**T1**			**0.787**		
	T2			**0.852**		
	T3			**0.677**		
	T4			**0.743**		
	T5			**0.847**		
	T6			**0.749**		
Efficiency	**E2**				**0.722**	
	E3				**0.738**	
	E4				**0.794**	
	E5				**0.843**	
Responsiveness	**R1**					**0.722**
	R2					**0.741**
	R3					**0.761**
	R4					**0.790**

Source; survey (2021)

5.1. Evaluation of the Measurement Models

Hair et al. (2014) recommended checking the reliability and validity of the hypothesized model first in the measurement model section. Accordingly, after the purification process of the items, the researchers calculate the reliability and validity of the measurement model.

5.1.1. Construct Reliability and Validity of measurement model

The reliability of the variables was calculated using Cronbach alpha and composite reliability (CR). The result of reliability is presented in the table below. As stated in the table the value of Cronbach alpha and composite reliability was above the recommended 0.7 value Hair et al., (2014). The average variance extracted (AVE) value is also greater than the recommended value of 0.5. According to the result, it can be said that the model has excellent internal conductance/ reliability.

Table 2

Reliability of Research Constructs

Constructs	Cronbach's Alpha	rhoA	CR	AVE
Efficiency	**0.780**	**0.790**	**0.858**	**0.602**
Facility	**0.831**	**0.831**	**0.882**	**0.599**
Inventory	**0.768**	**0.763**	**0.844**	**0.522**
Operational Performance	**0.875**	**0.894**	**0.899**	**0.557**
Responsiveness	**0.829**	**0.830**	**0.886**	**0.661**
Transportation	**0.868**	**0.874**	**0.902**	**0.606**

Source; survey (2021)

To check the validity of the measurement model investigators used discriminate and convergent validity. According to Hair et al., (2014), discriminant validity is the degree to which a construct is really different from other constructs by empirical standards. From this, we can say that discriminant validity measure the differentiation between constructs. In this study, discriminant validity is measured through the Fornell-Larker criterion as mentioned by Hair et al., (2014). The off-diagonal values are the correlations between latent constructs and the slanting is the square root of the average variance extracted.

Table 3

Results of Discriminant Validity Using Fornell-Larker Criterion (1981)

Constructs	E	FM	IM	OP	R	TM
Efficiency	**0.776**					
Facility	0.636	**0.831**				
Inventory	0.737	0.774	**0.778**			
Operational Performance	0.738	0.655	0.723	**0.787**		
Responsiveness	0.743	0.539	0.694	0.723	**0.813**	
Transportation	0.704	0.469	0.750	0.694	0.697	**0.778**

Source: survey (2021)

In this study, the researcher also checked the convergent validity of the measurement model. Convergent validity is the extent to which a measure correlates positively with alternative measures of the same constructs. Based on the reference of Hair et al. (2014) in these studies to present convergent validity, investigators consider the outer loadings of the indicators, as well as the average variance extracted (AVE). In this process, the outer loading value should be significant statistically and the standardized outer loadings should be 0.708 or higher. However, it can retain the reflective indicator outer loading Wight is> 0.40 but< 0.70, if deletion does not increase measures above the threshold. Accordingly, the researchers in this study retain three reflective indicators, since the constructs AVE value is in the recommended threshold value (i.e., >0.5).

Table 4

Convergent validity for outer model

Constructs	Items	Loading (≥0. 708)	AVE (≥0. 5)
Facility	FM1	**0.758**	**0.599**
	FM2	**0.826**	
	FM3	**0.823**	
	FM5	**0.744**	
	FM6	**0.713**	
Inventory	**I1**	**0.637**	**0.522**
	I2	**0.635**	
	I4	**0.764**	
	I5	**0.79**	
	I6	**0.772**	
Transportation	**T1**	**0.787**	**0.606**
	T2	**0.852**	
	T3	**0.677**	
	T4	**0.743**	
	T5	**0.847**	
	T6	**0.749**	
Efficiency	**E2**	**0.722**	**0.602**
	E3	**0.738**	
	E4	**0.794**	
	E5	**0.843**	
Responsiveness	**R1**	**0.722**	**0.661**
	R2	**0.741**	
	R3	**0.761**	
	R4	**0.79**	

Source: survey (2021)

The study Measurement Model (Outer Model) Using Smart PLS-SEM Algorithm

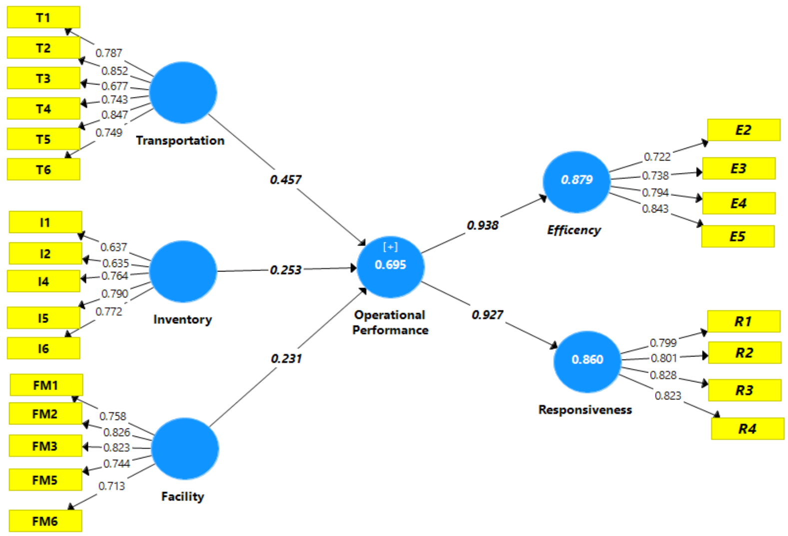

Fig. 2. Study Measurement Model

5.2. PL S-SEM Structural Model Results

After evaluating the measurement model's reliability and validity, the next step is reporting the empirical result of the structural model. The structural model includes investigating the model's predictive capabilities and the associations between the constructs. In this study before stating about structural model analysis collinearity statistics were examined. The motive is that the assessment of path coefficients in the structural models is constructed on OLS regressions of each endogenous latent variable on its corresponding predecessor constructs. Just as in a regular multiple regression, the path coefficients might be biased if the estimation involves significant levels of collinearity among the predictor constructs (Hair et al., 2014). Consequently, for this study multicollinearity tests were conducted using smart PLS- for each construct. Corresponding to the assessment of structural measurement models, the tolerance levels below 0.20 (variance inflation factor (VIF) above 5.00) in the predictor constructs as indicative of collinearity. The values of VIF and tolerance levels for each indicator are stated in the table below. Therefore, the multicollinearity issue is not a problem for this study (see Table 5).

Table 5
Testing for Multicollinearity assumption

Constructs	Items	VIF
Facility	FM1	**1.815**
	FM2	**2.597**
	FM3	**2.498**
	FM5	**1.855**
	FM6	**1.795**
Inventory	**I1**	**1.533**
	I2	**1.482**
	I4	**2.069**
	I5	3.137
	I6	**2.899**
Transportation	**T1**	**2.992**
	T2	**2.776**
	T3	**1.952**
	T4	**2.504**
	T5	**2.477**
	T6	**2.32**
Efficiency	**E2**	**1.597**
	E3	**1.617**
	E4	**1.862**
	E5	**2.817**
Responsiveness	**R1**	**1.712**
	R2	**1.698**
	R3	**1.854**
	R4	**1.783**

Source: survey (2021)

The next step is to examine the path coefficient (β) beta value of the structural equation model to determine the hypothesized relationship among the constructs. Hair et al., (2014) mentioned that the path coefficients have standardized values between -1 and + 1. Estimated path coefficients close to +1 represent strong positive relationships and vice versa for negative values that are almost constantly statistically significant (i.e., P-value is <0.05). Furthermore, to say the structural model is statistically significant the T-statistics should be > 1.96. In this study so as to estimate T-value, P-value, and β-value, PLS-SEM bootstrapping procedure was used.

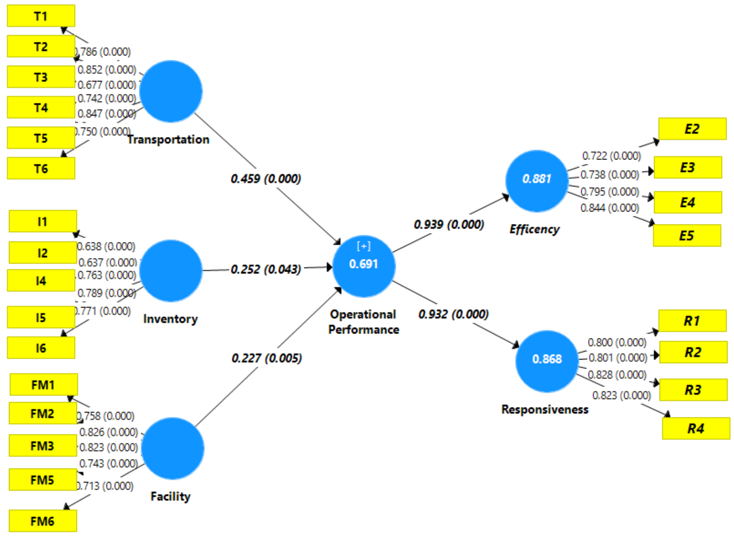

Fig. 3. PLS-SEM path Coefficient of TM, IM, FM, and OP

The above structural model figure indicates that the endogenous variable (i.e., Operational performance) has predictive accuracy of 0.691, which is the R^2 Value. Additionally, the structural model R^2 Value of 0.691 expresses rational joint effects in Transportation, Inventory, and facility Management. Besides, the product of R^2 Value specifies that 69.1% of enhancement is caused by the results from the Transportation, Inventory, and facility Management. As the result is positive and significant the structural model can be observed as strong and of good quality.

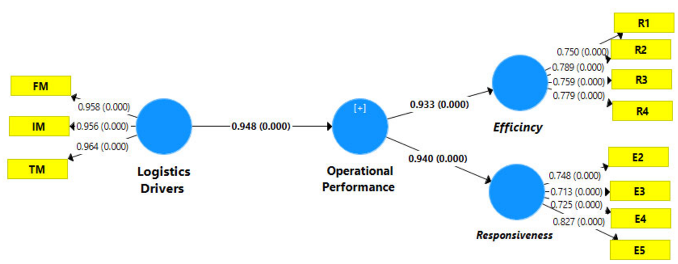

Fig. 4.PLS-SEM path Coefficient of Logistics drivers and operational performance

In the above figure, the researchers estimate the combined effect of logistics drivers on endogenous variables (operational performance) using smart-PLS software. According to the figure, the result logistics drivers are a higher predictive accuracy effect on operational performance with a predictive value of (R^2=0.89.9 or 89.9%). According to (Hair et al., 2014; Ali, 2021)) the result is considered substantial.

5.2.1. Logistics drivers and operational performance (hypothesis-1)

The study's first hypothesis depicts that logistics drivers have a positive and significant relationship with operational performance. The finding fully supports the investigation anticipation of the relationship between logistics drivers and operational performance. In the figure… path coefficient portrayed that beta value (β) of 0.948 (94.8%) and its P-value of 0.000. the value indicates that one unit change in logistics drivers will have 0.948 enhancements in operational performance. Previous studies support this result (AYENEW, 2016; Debela, 2013; Fugate et al., 2010; Stank et al., 2010) even if estimation techniques and constructs are used to measure both logistics drivers and operational performance were different.

Besides this quantitative evidence on the importance of logistics drivers on operational performance improvements, interview result shows that inefficient logistics system in the country, indecorous inventory and facility management, inefficient transportation management, and currency issue to import raw materials made the industries operate below their capacity and alter operational performance. If there is the appropriate management of logistics drivers' industries will enhance their operational performance and secure a better competitive advantage than competitors. Therefore, hypothesis one (H1) is supported.

5.3.2. Transportation management and operational performance (H1a)

PLS-SEM path coefficient shows that transportation management has a direct positive and significant relation with operational performance. This relation is stated in the figure-3 with the effect size of β-value of 0.459 (45.9%) p-value 0.000. The result of this study is compatible with the empirical studies developed prior to model validation. Previous researchers (Coyle, 2011; Musau et al., 2017; Obasan et al., 2016) states that transportation is a critical element in logistics operation that make the operational performance very effective and leads to superior competitive advantage. This study finding also supports previous findings regarding the relationship between transportation and operational performance. Hence, H1a is supported.

5.3.3. Inventory management and operational performance (H1b)

Hypothesis H1b refers to the relationship between inventory management and operational performance as positive and significant. The finding of bootstrap processes with a β-value of 0.252 (25.2%) and a p-value of 0.043 support the assumption. The result indicates that if inventory management goes by one percentage operational performance will be enhanced by 25.2%. Proper and well-organized inventory management leads to enhanced operational performance. The finding is reliable to the findings of (Daniel & Assefa, 2018; Deveshwar & Dhawal, 2013; & Lwiki et al., 2013). Thus, H1b is supported

5.3.4. Facility Management and operational performance (H1c)

To secure strategically long-term competitive advantage the company's performance should achieve a balance between responsiveness and efficiency (Chopra & Meindl, 2007). To improve a company's performance with responsiveness and efficiency, firms must examine facility as one of the logistics drivers. In this investigation H1c refers, there is a positive and significant relationship between facility management and operational performance. The study path coefficient result supports the hypothesized model with a β-value of 0.227 (22.7%) and a p-value of 0.005. This is also supported by study literature and previous research work (Meloa et al., 2007). The study argued that the decision regarding the importance of facilities in manufacturing firms has a significant effect on operational performance. Therefore, H1c is supported.

6. Conclusion and implications

In this investigation, the researchers emphasized on the empirical relationship between logistics drivers and the operational performance of large manufacturing firms in Hawass. The hypothesized model of the study is validated through the partial least square structural equation model (PLS-SEM). In order to validate the projected mode, the researchers develop 28 indicators. Among these 28 indicators, four observed indicators were eliminated during the purification process due to the load size. The item purification was made by exploratory factor analysis (EFA). To examine the dimension model the purified 24 items were used to check the reliability and validity of the measurement model via the Smart PLS algorithm. The reliability of the measurement model was verified using Cronbach's alpha, composite reliability, and AVE. Fornell-Larcker Criterion was used to test discriminant and convergent validity.

The result of the PLS-SEM path coefficient analysis shows that logistics drivers collectively have a large effect size on operational performance; that is β-value of 0.948 (94.8%) and p-value of 0.000. Furthermore, the square multiple correlation (R2) results indicate that when logistics drivers increase by one level, operational performance will be enhanced by 69.1 percent. Besides the joint effect of logistics drivers on operational performance, the study also tests the individual effect of transportation, inventory, and facility management on operational performance. Smart PLS-SEM algorithm depict that the three latent constructs are positive and significant effect on operational performance with β-value of 0.459 (45.9%) p-value 0.000, 0.252 (25.2%) and p-value of 0.043, and 0.227 (22.7%) and p-value of 0.005 respectively. In this regard, the research hypotheses are accepted.

The study finding will help upcoming researchers who are interested to do research on similar issues and also provide implications to logistics kinds of literature mainly on logistics divers and their measurements. In this research, investigators used responsiveness and efficiency as a dimension of operational performance. This one also provides inference as empirical evidence to future researchers. Furthermore, the study offers implications to large manufacturing industries regarding the significance of logistics drivers to boost operational performance. Finally, the research provides policy implications for the government and the national bank of Ethiopia regarding industries' inability to access currency and raw materials.

References

Ali, E. (2021). The impacts of Triple-A supply chain on supply chain performance in Ethiopian textile share company. *International Journal of Financial, Accounting, and Management, 3*(3), 245-258.

Amaratunga, D., & Baldry, D. (2000). Assessment of facilities management performance in higher education properties. *Facilities*, *18*(7/8), 293-301.

Arvis, J. F., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C., & Raj, A. (2014). Connecting to compete 2014: trade logistics in the global economy--the logistics performance index and its indicators.

Atnafu, D., & Balda, A. (2018). The impact of inventory management practice on firms' competitiveness and organizational performance: Empirical evidence from micro and small enterprises in Ethiopia. *Cogent Business & Management*, *5*(1), 1503219.

Awang, Z. (2012). *Structural equation model using AMOS graphic*. Shah Alam: UiTM Press.

AYENEW, M. (2016). Logistics Practices in Ethiopian Medium and Large Leather Footwear Manufacturing Firms. unpublished MA thesis.

Bowersox, D. C. (2010). *Supply Chain Logistics Management.* 3rd ed., Boston: McGraw-Hill.

Büyüközkan, G., Feyzioğlu, O., & Nebol, E. (2008). Selection of the strategic alliance partner in logistics value chain. *International Journal of Production Economics*, *113*(1), 148-158.

Child, D. (1990). *The essentials of factor analysis.* 2nd ed., London: Cassel Educational Limited.

Chopra, S. and Meindl, P. (2007). *Supply Chain Management: Strategy, Planning, and Operation.* 3rd ed., NJ.: Pearson Prentice-Hall, Upper Saddle Rive.

Council of Supply Chain Management Professionals. (2007). Supply chain management and logistics management definitions. Retrieved from www.cscmp.org/Website/ AboutCSCMP/Definitions/Definitions.asp.

Coyle, J. N. (2011). Transportation: A Supply Chain Perspective. 7th ed., USA: South-Western Cengage Learning.

Creswell, J. W. (2014). A concise introduction to mixed methods research. SAGE publications.

Debela, F. M. (2013). *Logistics Practices in Ethiopia*. sveriges lantbruks university(ISSN 1654-9392), Examensarbete.

Dettoratius, N. R. (2013). The impact of supplier reliability on retailer demand. Chicago: Harvard Business school.

Deveshwar, A., & Dhawal, M. ((2013). Inventory management delivering profits through stock management. Duba: World Trade Centre, i: Ram University of Science and Technology.

Eshetie, T. (2018). Ethiopia's manufacturing industry opportunities, challenges and way forward: a sectoral overview. Novel techniques in nutrition and food science, 2, 1-7.

Ferrantino, M. G. (2013). The Benefits of Trade Facilitation. Geneva, s.n: A Modelling Exercise.

Fugate, B.S., Mentzer, J.T., and Stank, T.P. (2010). Logistics Performance: Efficiency, Effectiveness, and Differentiation. *Journal of Business Logistics, 31*(1), 43–62.

Hair Jr, J. F. (2014). Partial least squares structural equation modeling (PLS-SEM). European business review.

Kebede, B. R., & Hussen, S. O. (2015). Export Trade Logistics Determinant Factors: The Case of Ethiopian Major Export Products. *Journal of Economics and Sustainable Development*.

Kebede, B. R., & Hussen, S. O. (2015). Export Trade Logistics Determinant Factors: The Case of Ethiopian Major Export Products. *Journal of Economics and Sustainable Development*, *6*(7).

Kenyon, G. N. & Meixell, M. J. (2011). Success factors and cost management strategies for logistics outsourcing. *Journal of Management and Marketing Research, 7*, 1-17.

Kilasi, L. B. (2013). The impact of Outsourcing of Logistics on the Competitive Advantage strategy of East African Breweries Limited. I*nternational Journal of Social Sciences and entrepreneurship, 1*(3), 521-529.

Laird, M. (2012). Logistics Management: A Firm's Efficiency Performance Model. Ohio: Unpublished BBA Thesis presented to Ohio University, USA.

Landes, D. (1998). The Wealth and Poverty of Nations. New York: W.W. Norton & Company.

Li, L., & Warfield, J.N. (2011). Perspectives on quality coordination and assurance in global supply chains. *International Journal of Production Research, 49*(1), 1-4.

LIDI. (2015). medium and large footwear manufacturing firms of Ethiopia.

Lwiki, T., Ojera, P. B., Mugenda, N. G., & Wachira, V. K. (2013). The impact of inventory management practices on financial performance of sugar manufacturing firms in Kenya. *International Journal of Business, Humanities and Technology*, *3*(5), 75-85.

Lwiki, T., Ojera, P. B., Mugenda, N. G., & Wachira, V. K. (2013). The impact of inventory management practices on financial performance of sugar manufacturing firms in Kenya. *International Journal of Business, Humanities and Technology*, *3*(5), 75-85.

Management, British Institute of Facilities. (2005, January). Facilities Introduction. Retrieved 2001, from World Wide Web. URL: http://www.bifm.org.uk

Martin, C. (2011). *Logistics and Supply Chain Management.* 4th ed. Dorset: Pearson Education Limited.

Martin, N., & Maes, H. (1979). *Multivariate analysis*. Academic Press London.

Melo, T., Nickel, S., & Gama, F. (2007). Facility location and supply chain management–a comprehensive review.

Melo, T., Nickel, S., & Gama, F. (2007). Facility location and supply chain management–a comprehensive review.

Mihretu, M. E. (2017). Disclosable Version of the ISR-Ethiopia Trade Logistics Project-P156590-Sequence No: 02.

Mukolwe, G. A., & Wanyoike, D. M. (2015). An assessment of the effect of logistics management practices on operational efficiency at Mumias Sugar Company Limited, Kenya. *International Journal of Economics, Commerce and Management*, *3*(6), 1134-56.

Musau, E. G., Namusonge, G., Makokha, E. N., & Ngeno, J. (2017). The effect of transport management on organizational performance among textile manufacturing firms in Kenya. *International Journal of Academic Research in Business and Social Sciences*, *7*(11), 1015-1031.

Naliaka, V. W., & Namusonge, G. S. (2015). Role of inventory management on competitive advantage among manufacturing firms in Kenya: A case study of Unga Group Limited. *International Journal of Academic Research in Business and Social Sciences*, *5*(5), 87-104.

Obasan, K. A., Ogunkoya, O. A., & Hassan, B. A. (2016). The effect of transportation in logistics operation on an entrepreneurial performance. *Ethiopian Journal of Environmental Studies and Management*, *9*(2), 228-234.

ONIKOYI, I. A. (2017). Effect of Inventory Management Practices on Financial Performance of Larfage Wapco Plc. Nigeria. *European Journal of Business and Management, 9*(2222-1905).

Owusu Kwateng, K., Manso, J. F., & Osei-Mensah, R. (2014). Outbound logistics management in manufacturing companies in Ghana. *Review of Business & Finance Studies*, *5*(1), 83-92.

PLS Logistics service. (2017). logistics management best practice. PLS Logistics service.

Randall, W. S., Defee, C. C., & Brady, S. P. (2010). Value propositions of the US trucking industry. *Transportation Journal*, *49*(3), 5-23.

Saidi, S., & Hammami, S. (2011). The role of transport and logistics to attract foreign direct investment in the developing countries. Hammamet, *4th International Conference on Logistics (LOGISTIQUA.*

Salawati, S. T. (2012). Inventory Management in Malasyian Construcion Firms: Impact n Performance. *SIU Journal Management, 2*, 59-60. 74.

Shahzadi, I., Amin, S., & Chaudhary, K. M. (2013). Drivers of supply chain performance enhancing organizational output: An exploratory study for manufacturing sector. *facilities management*, *5*(14), 53-64.

Stank, T. P., Davis, B. R., & Fugate, B. S. (2005). A strategic framework for supply chain oriented logistics. *Journal of Business Logistics*, *26*(2), 27-46.

Suhr, D. D. (2000). Exploratory or Confirmatory Factor Analysis. University of Northern Colorado, 200-31.

Tilokavichai, V. S. (2012). Analysis of Linkages between Logistics Information Systems and Logistics Performance Management under Uncertainty. *European Journal of Business and Management , 4*(9), 2222-2839.

Tseng, Y. Y., Yue, W. L., & Taylor, M. A. (2005, June). The role of transportation in logistics chain. Eastern Asia Society for Transportation Studies.

WONDUANTE, M. (2019). THE EFFECT OF LOGISTICS MANAGEMENT ON THE PERFORMANCE OF GARMENT FACTORIES: THE CASE OF BOLE LEMI INDUSTRIAL PARK. unpulished thesis .

Yamane, T. (1973). *Statistics: An introduction analysis*. Harper & Row.