Article

Improving Automotive Component Supplier Service through Physical Distribution Activities to Original Equipment Manufacturers (OEMs)

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Abstract

Purpose/objectives: The purpose of this study was to investigate whether physical distribution activities can significantly improve customer service for automotive component suppliers to Original Equipment Manufacturers (OEMs) in the Eastern Cape.

Design/methodology/approach: By means of non-probability sampling, namely convenience sampling, 50 automotive component suppliers in the Eastern Cape were visited. Each business firm received four questionnaires to be completed by logistics practitioners. Altogether, 126 usable questionnaires were returned. The data were collected by means of a survey using a self-administered, structured questionnaire.

Findings/results: The results indicated that physical distribution activities, such as transportation management and order processing, were significant predictors of customer service.

Practical implications: The results have managerial implications where the logistics department should continuously update its transportation and order processing systems to keep abreast of the best practices within the automotive industry. The results could be used by managers to highlight the benefits of improved customer service, focusing on a firm's transportation and order processing activities.

Originality/value: Based on the results of the study, it is recommended that automotive component suppliers in the Eastern Cape employ transportation

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management and order processing (activities of physical distribution) to improve customer service. It is also recommended that the automotive component suppliers regularly benchmark their logistics practices against world-class business firms, as the results may have a positive effect on the way transportation and order processing activities are managed and executed if customer service is to be improved.

Keywords: automotive component suppliers; customer service; physical distribution; transportation management; order processing

Introduction

The automotive industry in South Africa is a significant part of the economy. As the largest manufacturing sector in the country's economy, the automotive industry's contribution to the gross domestic product (GDP) comprised 4,3% (2,4% manufacturing and 1,9% retail) in 2021 (AIEC 2022, 5). The South African automotive industry manufactures a wide range of vehicles, such as passenger cars, light commercial vehicles, medium commercial vehicles, heavy commercial vehicles, extra heavy commercial vehicles, and buses (AIEC 2022, 9).

Due to the wide range of vehicles in the industry, South Africa has established major vehicle manufacturing plants (Original Equipment Manufacturers [OEMs]) or car assemblers, such as Volkswagen, BMW, Nissan, Isuzu, Ford, Mercedes Benz, and Toyota, as well as 13 manufacturers/exporters of trucks and buses and 500 automotive component suppliers (AIEC 2022, 11). In the automotive industry, component suppliers are firms such as Continental Tyres, Goodyear, Faurecia, Johnson's Control, and other suppliers that supply components to the car assemblers (AIEC 2016, 13; Tolmay and Badenhorst-Weiss 2015, 2). The automotive industry in South Africa has a large impact on the economies of Gauteng, KwaZulu-Natal, and the Eastern Cape. According to the AIEC (2019, 26), these provinces are the clusters in which the OEMs with their component suppliers are centred. Table 1 is a representation of these OEMs in South Africa.

Table 1: Automotive original equipment manufacturers represented in South Africa

Company	South African automotive cluster
BMW	Gauteng
Nissan	Gauteng
Ford	Gauteng
Isuzu	Eastern Cape
Mercedes Benz	Eastern Cape
Volkswagen	Eastern Cape
Toyota	KwaZulu-Natal
FAW	Eastern Cape
BAIC	Eastern Cape

Source: AIEC 2019, 27; Tolmay and Venter 2017, 3

It can be noted from table 1 that the majority of OEMs are in the Eastern Cape.

Service delivery for automotive component suppliers can be one of the main determinants of success in the automotive industry. The rationale is that poor service delivery by automotive component suppliers can negatively affect the customer service levels of OEMs and can lead to dissatisfied customers (Lin et al. 2023; Lynch and Whicker 2017, 45). Examples of poor customer service by automotive component suppliers may include late deliveries, inferior product quality, under and over deliveries, and the incorrect delivery location of customer orders. Some of the common performance measures of customer service include orders shipped on time, distribution system malfunction, distribution system information, as well as post-sale product support (De Villiers, Nieman, and Niemann 2017, 206; Kułyk, Michałowska, and Kotylak 2017, 208).

Distribution system malfunction measures the efficiency of procedures and time required to correct errors in the distribution system, such as errors occurring during shipping, which may lead to product damage and customer claims (De Villiers et al. 2017, 206; Kułyk et al. 2017, 208). According to Kułyk et al. (2017, 208) and De Villiers et al. (2017, 206), post-sale product support is a measure of the efficiency in providing product support after delivery, which includes providing spare parts and technical support of the product. Dibb et al. (2019, 451) assert that customers seeking a high level of customer service from a supplier will want efficient order processing, the availability of emergency shipments, as well as the prompt replacement of defective items and warranties. Automotive component suppliers need to effectively manage the customer service process if customer service is to be improved.

Poor customer service may result from the improper management of physical distribution activities such as transportation, storage, materials handling, and order processing and communication (Slack et al. 2017, 341), as these activities may have an impact on customer service. Automotive component suppliers may be able to improve customer service through physical distribution, which involves planning, implementing, and controlling the physical flow of goods and information from where the customers' orders originate to where customers can consume the product (Kotler, Armstrong, and Tait 2016, 389; Lin et al. 2023).

However, not much research has been done on the improvement of customer service through physical distribution activities from the perspective of automotive component suppliers, particularly in the Eastern Cape. For instance, the study by Tolmay and Venter (2017) focused on relationship value antecedents in the South African automotive component supply chain. In addition, Tolmay (2019) conducted research on antecedents of trust among buyers and sellers within the South African automotive supply chains. The research conducted by Qhogwana (2016) focused on the use of innovative strategies by automotive component manufacturers in Gauteng, which did not include physical distribution. Tolmay and Badenhorst-Weiss (2015) also conducted research on the relationship value, trust, and supplier retention in South African automotive supply chains.

This article focuses on how to improve automotive component supplier service through physical distribution activities to original equipment manufacturers (OEMs).

Literature Review

According to Kotler et al. (2016, 389), physical distribution involves planning, implementing and controlling the physical flow of goods and information from where the customers' orders originate to where customers can consume the product. Slack et al. (2017, 341) identify the physical distribution activities as order processing, inventory management, materials handling, and transportation management. To understand these activities and their effect on customer service, explanations for these activities are as follows:

- **Order processing and communication:** This involves managing the customer order information, for example, customer preferences regarding packaging or delivery location.
- **Inventory management:** Keeping an appropriate amount of inventory of products to fulfil customer orders.
- **Materials handling:** Ensuring that the movement and storage of products are handled efficiently to avoid damages.
- **Transportation management:** Physically moving products or materials from the supplier to the customer by using road, rail, ocean, and air transportation.

Order processing, inventory management, materials handling, and transportation management are discussed in the next section.

Order Processing

Business firms may use order processing to ensure that the correct goods ordered will be available when required by the customer, which provides information on the requirements of the customer. Order processing comprises activities associated with fulfilling customer orders and taking into consideration the order cycle time, which greatly affects customer service (Pienaar and Vogt 2016, 15). Order cycle time is the entire time involved and process undertaken, beginning with the order receipt or the placement of an order by a customer and ending with delivery scheduling to ensure receipt of the shipment by the customer (Price and Harrison 2015, 159). The order cycle process may provide an opportunity for the business firm to improve customer service, such as ensuring that the customer receives the order as required. However, if the order information is not accurate at the time the order is processed, the business firm may not be able to provide good customer service, as the order may not be available when required by the customer. According to Mengistu (2018, 18), unavailable goods cause time delays, which negatively affect customer service.

According to Van Weele (2018, 44), when a customer places an order, it is very important to be specific about the information and instructions to the supplier, such as the order number, concise description of the product, unit price, number of units required, expected delivery date and time, as well as the delivery address. According to Pienaar and Vogt (2016, 16), the accuracy and time in which a firm processes an order are important determinants of the level of its customer service.

While business firms are processing customer orders, challenges may arise relating to customers receiving their orders on time, in the correct condition, where and when required by the customers. Business firms have the challenge of consistently meeting the targeted order cycle time, which influences the amount of inventory held by the business firm (Mbanje and Lunga 2015, 8). If the product is unavailable when required by the customer, the business firm's level of customer service is negatively affected and may result in a loss of the customer. Communication about the delivery instructions may also represent a challenge, such as inaccurate delivery time information, which could delay the delivery of customer orders (Chapman et al. 2017, 327). An incorrect delivery address may also pose a challenge when orders are delivered to the wrong place. Business firms may also face the challenge of incorrect order quantities delivered to the customer due to human error during order processing. Overcoming the above-mentioned challenges is in accordance with the study conducted by Nguyen (2019, 113), which indicates that customers will be pleased when the order process is quick and correct; thus, business firms should ensure product availability, the timeliness of orders, as well as delivery of products because these physical distribution factors make a significant contribution to perceptions of customer service.

Inventory management may play an important role in ensuring that business firms have sufficient inventory of the required products in stock to satisfy customer demand.

Inventory Management

According to Musau et al. (2017, 1036), inventory management is a supply chain element that may improve customer service for automotive component suppliers through the effective management of inventory between the supplier and the customer.

A business firm can achieve effective inventory management by ensuring that the right amount of inventory is purchased to support the day-to-day activities of a business (Wisner, Tan, and Leong 2016, 209). An automotive component supplier firm can either have good or poor inventory management that may affect customer service either positively or negatively. Horn et al. (2014, 84) differentiate between indications or situations of good and poor inventory management. Good inventory management can be identified when a business firm is able to keep stock levels to a minimum, which results in minimum inventory carrying costs. Minimum stock levels are an indication of the use of a method that can efficiently manage inventory, such as the first-in-first-out (FIFO) method. Such a situation will ensure that there are no shortages of customer orders, thus no backorders. This is in line with findings in the study by Mengistu (2018, 56), which shows that there is a significant and positive relationship between product availability and customer service. Another indication of good inventory management is a business firm experiencing high inventory turnover rates. Indications of poor inventory management may include situations such as a regular lack of space in the warehouse for storing products in a structured and orderly manner.

However, increasing safety stock could cover the business firm during production shutdowns due to vacations, machine maintenance and stocktaking. Another reason for holding inventory could be the ability to increase a production run, as changing or adjusting production lines in a short period to accommodate changes in models, colour and design features can be expensive. This is because the longer the production run, the lower the cost per unit to produce. Lastly, high seasonality due to a specific time in which the demand for a product increases beyond the normal demand may be the reason for firms to hold inventory.

A business firm may decide to hold inventory for various reasons, which influences the types of inventories carried by the firm. According to Coyle et al. (2013, 636), inventory includes all goods in transit, stored within a supply chain, consisting of raw materials, component parts, semi-finished products, finished products, and packaging. Raw materials are low-value, unfinished products, which business firms use to produce finished products (Monczka et al. 2016, 622–624). Components are goods that are already manufactured, which will not undergo additional physical changes, but will be joined with other components to form the final product (Van Weele 2018, 30).

Semi-finished inventory refers to inventory that has not yet been transformed into a final product awaiting to be transported to the next process of the production process (Monczka et al. 2016, 622–624). Inventory items sold to customers for different uses are finished products (Monczka et al. 2016, 623). Packaging is material that may be used by business firms to protect the customers' goods and to communicate information to the customer about the product. Pienaar and Vogt (2016, 15) elaborate that packaging can make it easier to store, handle and transport items, thereby lowering logistics costs. Raw materials, component parts, semi-finished products, finished products, and packaging can be classified into different categories based on their purpose for the business firm.

Materials Handling

Materials handling involves the movement, storage, control and protection of goods and materials throughout the process of manufacture and distribution in the supply chain (Price and Harrison 2015, 76). The materials being handled may include raw materials, work-in-progress, component parts, finished goods or packaging ready to be delivered to the customer. The aim of materials handling is to provide efficient movement of materials, using the appropriate equipment with little damage, and using special packaging and handling where needed (Bahale and Deshmukh 2014, 10181). When materials or products are moved efficiently from the supplier to the customer by using appropriate packaging and equipment to avoid damage, customer service may be improved, as the customer will receive the order in the right condition. In the study by Sankar Jeganathan and Naveenkumar (2018, 432), it is indicated that a good material handling system will improve the speed and throughput of material movement through the supply chain, thus improving customer service. Indications of inefficient material handling may include unnecessary delays in the handling of products, excessive manual labour, the poor use of skilled labour, and high losses due to the damage of stock (Bahale and Deshmukh 2014, 10181). Inefficient materials handling, such as damage of stock, may affect customer service negatively.

Transportation Management

According to Monczka et al. (2016, 659), transportation plays a significant role in logistics customer service because it involves moving inventory from one location to another (Goldsby, Iyengar, and Rao 2014, 4–5). Transportation can be divided into inbound and outbound transportation (Chopra and Meindl 2016, 431). According to De Villiers et al. (2017, 160), inbound transportation includes raw materials or components carried in bulk from suppliers to the plants by water, rail, air, or road transport in large loads.

According to Dibb et al. (2019, 457), business firms select a transport mode (land, sea, or air) based on cost, transit time, reliability, capability, accessibility, security, and traceability. Cost refers to business firms comparing alternative modes of transport to determine whether the benefits from a more expensive mode are worth the higher cost. For example, air freight carriers provide many benefits, such as high speed, reliability, security and traceability, but at higher costs relative to other transport modes. However, when speed is less important, business firms prefer the lower costs offered by other modes. Transit time involves the total time a carrier has possession of goods, including the time required for picking up an order, handling and delivery between the points of origin and destination. Closely related to transit time is the frequency or number of shipments per day offered by each mode.

According to Kadłubek et al. (2022, 2), the results of the survey research conducted by Accenture Digital (2014) among thirteen thousand customers in different industries show that over 66% of the customers stop doing business with the supplier because of poor customer service. Daugherty, Bolumole, and Grawe (2019, 22) posit that in physical distribution, customer service is changing the landscape of transportation management.

Customer Service

Customer service involves the entire process of order fulfilment, which includes the receipt of the order; collecting and packaging of the goods; shipping and delivering the consignment; providing after-sale service for the customer; managing the payment, and handling the possible return of the goods (Melović et al. 2015, 8). Zimonjić (2018, 475) asserts that business firms may need to emphasise the need to improve customer service through physical distribution. Dibb et al. (2019, 451) assert that customers seeking a high level of customer service from a supplier will want efficient order processing, the availability of emergency shipments, as well as the prompt replacement of defective items and warranties.

According to Price and Harrison (2015, 231–233), Pienaar and Vogt (2016, 154), as well as De Villiers et al. (2017, 193), the customer service process involves three primary phases, namely pre-transaction, transaction and post-transaction between the supplier and the customer in which customer service activities are executed. The pre-transaction phase involves customer service factors, which take place prior to the actual sale of the product. In the pre-transaction phase, a specific customer service strategy is translated into a written customer service policy, defining transaction and post-transaction service standards and related performance measurements. The overall objective of the customer service policy in the pre-transaction phase should be to improve customer service, which may be achieved through physical distribution (Dibb et al. 2019, 451).

According to Jahanshahi et al. (2011, 255), examples of activities that may be performed by automotive component suppliers in addressing the three phases of pre-transaction, transaction and post-transaction of customer service in the automotive industry may include discovery services, repair and maintenance services, communication services, as well as information services. For example, discovery services may include outlining the new needs of customers and providing products that will respond to those needs before the customer places an order.

Hypothetical Model and Hypotheses

Figure 1 shows the proposed factors influencing customer service.

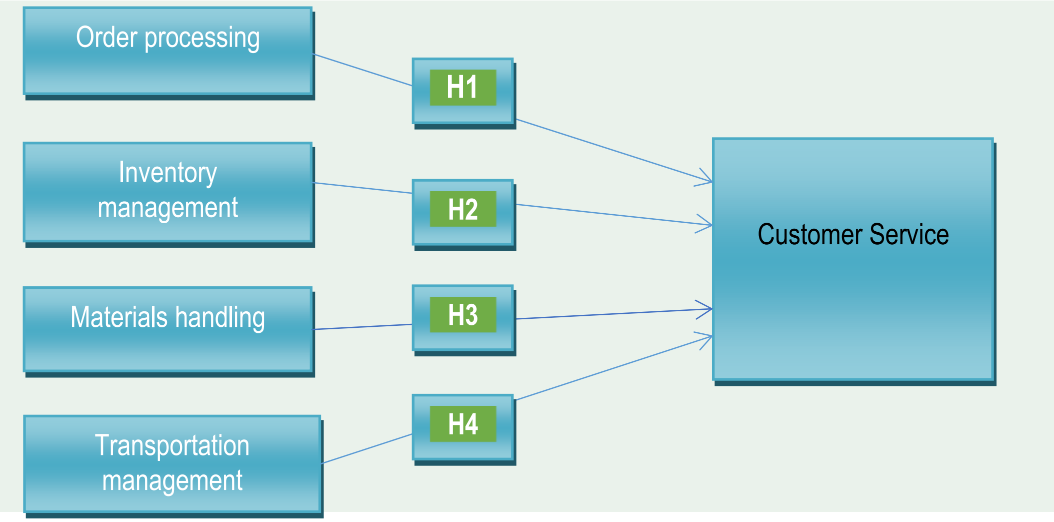

Figure 1: Proposed hypothetical model used to investigate the improvement of customer service through physical distribution

Source: Researchers' own construct based on Awan, Salam, and Inam (2015, 8)

Hypotheses

Based on the above discussions, it is suggested that customer service is positively impacted by order processing, inventory management, materials handling and transportation management. The following four hypotheses were formulated:

H_1: There is a positive relationship between "order processing" and "customer service."
H_2: There is a positive relationship between "inventory management" and "customer service."
H_3: There is a positive relationship between "materials handling" and "customer service."
H_4: There is a positive relationship between "transportation management" and "customer service."

Research Methodology

A quantitative research methodology was adopted in this study to empirically test the hypothetical model. To test for reliability, the Cronbach's alpha coefficient was adopted (Bryman 2012, 170). Exploratory factor analysis (EFA) was employed to test for validity. According to Collis and Hussey (2014, 276), factor analysis is employed to examine the relationships between variables on a Likert scale, and it identifies sets of interrelated variables on the basis that each variable in the set could be measuring a different aspect of some underlying factor. When assessing the validity of the measuring instrument, the factor loadings were considered. To determine the relationships between the factors identified, a correlation analysis was performed. A multiple regression analysis was performed to determine if any of the factors would be able to significantly predict customer service scores. The non-probability sampling technique, particularly convenience sampling, was applied in this study. Convenience sampling was deemed appropriate in this study because there was no comprehensive sampling frame for the target population.

Given the reasons, guidelines, and constraints outlined above, the researchers targeted a sample of 50 automotive component suppliers in the Eastern Cape. Each business firm received four questionnaires to be completed by logistics practitioners. As a result, 200 questionnaires were distributed. Altogether, 126 usable questionnaires were returned, proving to be a large enough sample to satisfy the objectives of the study, conduct the statistical analyses required, as well as to fulfil the norms of the research.

IBM SPSS Statistics 26 package was used for the analysis and summary of the descriptive and inferential statistics used. The next section discusses the development of the measurement scale.

Scale Development and Operationalisation of Independent Variables

Operationalisation is the conversion of theoretical concepts into measurable constructs (Jonker and Pennink 2010, 51). The terminology used to describe the process of operationalisation is determined by whether the process is of a quantitative or qualitative nature (Veal and Darcy 2014, 71). The items contained in the measuring instrument were gained by operationalising the hypothetical constructs discussed in earlier sections and using previous empirical investigations as well as items formulated specifically for this study. Additionally, an intensity rating scale (a Likert-type scale) was assigned to each item in the questionnaire to quantify the hypothetical constructs. All statements dealing with the hypothetical constructs in this study were measured using a 5-point Likert scale.

Order Processing

Table 2 contains the items used to measure order processing. Items ORD1, ORD2, ORD3, and ORD4 were adopted from Nguyen (2019, 106). These items were modified for specific use in this study as they were deemed appropriate with respect to the automotive component suppliers' order processing. Items ORD5–8 were generated specifically for this study. Order processing was understood in terms of its potential impact on customer service for automotive component suppliers and whether the order placement time was short, the backorder time was short, the order status information was given to the customer upon request, customer complaints were handled, and customer needs were met (Hoang and Nguyen 2019, 4; Nguyen 2019, 106).

Table 2: Operationalisation of the independent variable "Order Processing"

CODE	ITEMS
ORD1	The time it takes for our customers to place orders is short
ORD2	The time it takes for our firm to process backorders is short
ORD3	Our firm always records the customer requirements correctly
ORD4	Our customers can track and trace orders
ORD5	Order status information is provided to the customer
ORD6	Our firm replaces faulty or damaged items sent to customers
ORD7	Our customers are allowed to increase or decrease their orders as the need arises
ORD8	Handling customer complaints is quick

Inventory Management

Inventory management is viewed from an automotive component supplier perspective regarding inventory management decisions that may improve customer service. To measure inventory management in relation to customer service, the items in table 3 were used. Mengistu (2018, 40) was consulted for INV1–8 of the items that were contextualised for this study, and the other five items were generated specifically for this study. For this study, inventory management decisions were understood as those that might have had a significant impact on customer service, which included the ability of the automotive component supplier to keep minimum stock levels, fully supply the units ordered, ensure maximum space utilisation, and maintain high inventory turnover rates, accurate order picking and packing. In addition, the automotive suppliers' inventory decisions were measured in terms of carrying safety stock, cycle stock, promotional stock, speculative stock and whether the firm could minimise its obsolete stock. To measure inventory management concerning customer service, the items in table 3 were used. Mengistu (2018, 40) was consulted for five of the items that were contextualised for this study, and the other five items were generated specifically for this study.

Table 3: Operationalisation of the independent variable "Inventory Management"

Code	Items
INV1	Our firm keeps stock to a minimum level
INV2	Our firm uses the storage space to its maximum
INV3	Our firm ensures high inventory turnover
INV4	Our firm ensures that products are accurately picked according to the customer order
INV5	Our firm ensures that the products are packaged as requested by the customer
INV6	Our firm fully supplies the units ordered
INV7	Our firm carries safety stock in case of an increase in demand
INV8	Our firm carries enough stock to satisfy price discounts
INV9	Our firm carries stock that can no longer be used by customers
INV10	Stock-outs occur regularly

Materials Handling

To measure the variable materials handling, some of the 10 principles of materials handling discussed in the literature review were consulted. These 10 principles were discussed in the context of automotive component suppliers attempting to improve customer service. The items in table 4 were generated from the planning principle, standardisation principle, work principle, ergonomic principle, unit load principle, automation principle and the system principle specifically for this study.

Table 4: Operationalisation of the dependent variable "Materials Handling"

Code	Items
MHAND1	The handling process is based on a plan of outgoing shipments to customers
MHAND2	The handling equipment can move products of different sizes, weight and form
MHAND3	The handling tasks are kept to a minimum
MHAND4	The handling tasks ensure productivity
MHAND5	The handling tasks are safe for the employees
MHAND6	The handling equipment is automated
MHAND7	The handling equipment involves a lot of manual labour
MHAND8	Product damage does not occur regularly during handling
MHAND9	Handling delays do not occur regularly
MHAND10	The handling process involves inspection of products before shipped to customers

Transportation Management

Transportation management is viewed from an automotive component supplier perspective regarding transportation decisions. These transportation decisions relate to whether the automotive component supplier, to improve customer service, considers the following: on-time delivery of products to customers, the selection of a reliable mode of transportation, the safety of the products in transit, and the flexibility of the selected mode of transport to deliver goods of different sizes and weight. The transport decisions, as shown in table 5, were measured using the following items: on-time delivery, reliability of the transportation, safety, and security of the goods during transportation, and flexibility of the mode of transport. In other words, the units delivered are in the correct quantity; damage in transit is minimum; on-time delivery; the lead-time is reliable; the products are always delivered in the right condition; on-time delivery is consistent; products are always delivered when promised; the transportation system responds timeously to special requests or unexpected needs of customers (Mengistu 2018, 41– 42).

Table 5: Operationalisation of the dependent variable "Transportation Management"

Code	Items
TRANS1	The units that are delivered are in the correct quantity
TRANS2	The damage in transit is minimum
TRANS3	On-time delivery is consistent
TRANS4	The lead-time is reliable
TRANS5	The delivery time is communicated to the customers
TRANS6	The transportation system responds timeously to special requests or unexpected needs of customers
TRANS7	Products are always delivered when promised
TRANS8	The transport mode is reliable to move goods from point A to B
TRANS9	The products are always kept safe and secure during transportation
TRANS10	The transport mode is flexible to transport different product size, weight and form
TRANS11	The products are always delivered in the right condition

Once the operationalisation of the variables to be measured in this study was finalised, the researchers had to decide on the order in which the statements would be presented in the questionnaire. Two experts in the field of logistics (physical distribution) were consulted to confirm the face validity of the questionnaire items; thereafter, changes were made accordingly.

Results and Discussion

Reliability Analysis

Table 6: Cronbach's alpha coefficient

VARIABLE	SAMPLE (n = 126)	NUMBER OF ITEMS
Transportation Management	0.773	10
Order Processing	0.746	9
Customer Service	0.634	5

The reliabilities of both transportation management and order processing were obtained using Cronbach's alpha values. Transportation management revealed a reliability of 0.773 and order processing revealed a reliability of 0.746, both of which indicated an appropriate level of reliability. The reliability of customer service was assessed and found to be 0.634.

Validity Analysis

To ensure that the measuring instrument's results are accurate and may be used in future research, the results obtained from the information given in the questionnaires need to be reliable and valid (Quinlan et al. 2015, 13). Exploratory factor analysis (EFA) was employed to test for validity. When assessing the validity of the measuring instrument, the factor loadings were considered. Prior to performing the exploratory factor analysis (EFA), the suitability of the data needed to be assessed. This was achieved by means of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO-MSA) and Bartlett's Test of Sphericity. As seen from table 7, both conditions were satisfied according to the criteria previously stated, and the data were, therefore, deemed suitable to perform the EFA analysis.

The EFA analysis was performed, and two factors were extracted using Principal Axis Factoring with a minimum factor loading of 0.4. The first factor extracted contained 10 of the 37 logistics-related statements. The second factor extracted contained 9 of the 37 logistics-related statements. The statements that formed the first factor structure were reviewed and labelled as transportation management. Close examination of these statements indicates that they relate to the movement of inventory from one location to another, as products are not often produced, sold, and consumed at the same location (Goldsby et al. 2014, 4–5).

The statements that formed the second factor structure were reviewed and labelled as order processing. The reason is that these statements relate to the way the organisation ensures that the correct goods ordered will be available when required by the customer. Mengistu (2018, 18) posits that the unavailability of required goods causes delays that negatively affect the customer. Table 7 shows the EFA results.

Table 7: EFA results	Factor	
Pattern Matrix	**1**	**2**
Order processing of customer orders is performed immediately		
Stock levels in the firm are kept to minimum levels		
The storage space in the warehouse is used to the maximum		0.451
Customers can track and trace their orders at any time		
Order status information is provided to the customer at any time		0.488
Products are accurately picked according to the customers' order		0.701
Customers can increase or decrease the quantity ordered as the need arises		
Customer complaints are handled immediately		
Back-orders (outstanding orders) are processed immediately		0.598
Customers' requirements on orders are always recorded correctly		0.471
The material handling process is planned according to the outgoing shipments		0.436
Faulty or damaged products sent to customers are replaced immediately		
The material handling tasks are safe for the employees		0.407
The correct quantities ordered are always supplied		
The material handling tasks ensure that the products are moved efficiently (low cost) from point A to point B without damage to the products		0.596
The firm carries stock that is no longer ordered by customers		
The material handling equipment (forklift truck, hand pallet truck, powered pallet truck/conveyor) used for the movement of products within the warehouse		0.445
High inventory turnover is achieved by the firm		
The material handling equipment can move products of different size, weight and shape		
The material handling tasks (receiving and order picking) are kept to a minimum	0.541	
Safety stock is carried in case of an unexpected increase in demand	0.443	
Products are packaged as requested by the customer		
The damage of products in transit is kept to a minimum		
The transportation system responds timeously to special requests or customers' unexpected needs	0.408	
On-time delivery to customers is consistent	0.719	
The material handling process does not cause any delays in outgoing shipments	0.468	
The orders delivered to customers are always of the correct quantity	0.419	
The material handling equipment is automated		
The delivery time is communicated to customers	0.569	
The delivery lead-time to customers ensures that customers receive orders on the due dates		
Product damage due to material handling equipment does not occur regularly	0.646	
The material handling equipment involves manual labour		
Products are delivered on the due dates	0.416	
The transport mode used is suitable to move products from point A to point B		
The products are always delivered in acceptable condition		
The transport mode is flexible to transport different product sizes, weights and shapes	0.431	
The products are kept safe and secure during transportation		

Correlation Analysis

To determine the relationships between the factors obtained, a correlation analysis was conducted. To assess correlation coefficients, firstly, the relationship needs to be statistically significant. Once the statistical significance is determined, the direction and strength of the relationship can be assessed. A small correlation is represented by $|r| < 0.3$, a medium correlation is $0.3 < |r| < 0.5$ and a large correlation is shown by $|r| > 0.5$. The relationship between transportation management and order processing was small ($r = 0.255$, $p < 0.01$) (Bryman 2012, 341). The strongest relationship obtained was between transportation management and customer service ($r = 0.478$, $p < 0.01$).

Table 8: Correlations analysis

Correlations			
	Transportation management	**Order processing**	**Customer service**
Transportation management	1	.255**	.478**
Order processing		1	.320**
Customer service			1

Multiple Regression Analysis

A multiple regression analysis was performed to determine whether any of the factors could significantly predict customer service scores.

The regression model was deemed to be statistically significant ($F = 15.649$, $df = 3$, $p = 0.000$) (Collis and Hussey 2014, 281). Transportation management ($t = 4.658$, $p = 0.00$) and order processing ($t = 2.132$, $p = 0.035$) were both found to be significant predictors of customer service (Collis and Hussey 2014, 281). To determine which predictor had the greatest impact on customer service, the standardised beta coefficients were assessed. Transportation management had the greatest standardised beta coefficient, $B = 0.393$ and, therefore, had the greatest impact on customer service of the significant predictors (Rubin and Bellamy 2012, 238).

The results for the multiple regression analysis shown in table 9 suggest that a revised model be shown, with transportation management and order processing having an impact on customer service.

Table 9: Multiple regression analysis

Model Summary								
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.333	0.424		3.145	0.002		
	Transportation management	0.395	0.085	0.393	4.658	0	0.831	1.203
	Order processing	0.185	0.087	0.18	2.132	0.035	0.829	1.206

Revised Hypothetical Model

After a multiple regression analysis was performed, it was clear that the hypotheses listed hereunder could not be accepted.

H_2: There is a positive relationship between "inventory management" and "customer service."
H_3: There is a positive relationship between "materials handling" and "customer service."

As a result of the multiple regression analysis, a revised hypothetical model was required, as shown in figure 2. For this reason, hypotheses H_1: There is a positive relationship between "order processing" and "customer service", and H_4: There is a positive relationship between "transportation management" and "customer service", were accepted.

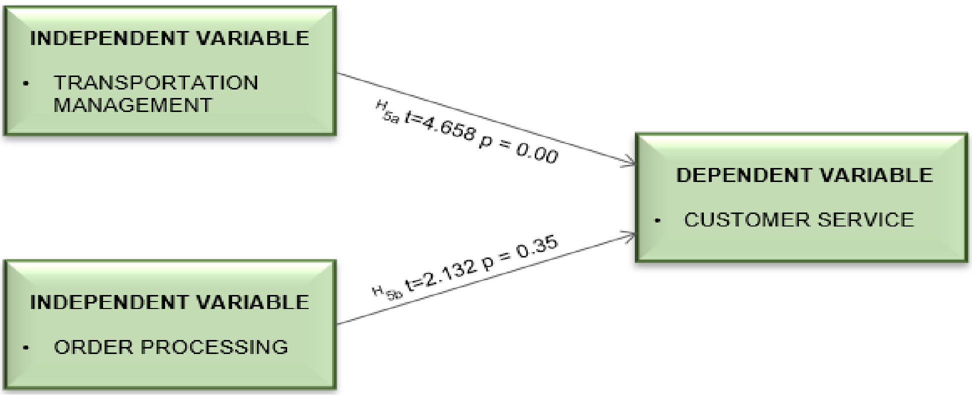

Figure 2: Revised hypothetical model

As stated earlier, the results indicated that hypotheses H_1 and H_4, relating to transportation management and order processing had a significantly positive relationship with customer service. The results indicated that the transportation system of the automotive component suppliers regarding “responding to urgent requests and notifications” was effective. This implies that the automotive component suppliers have effective approaches to the planning of the order processing, loading, scheduling, and routing, as well as transport mode selection. The results also indicated that the orders delivered to customers were always in the correct quantity, which implies that there is a clear and effective internal communication system for the quantities ordered, produced, and delivered within the organisation. According to the results, on-time delivery to customers is consistent. This is an indication that customer deliveries are in line with promised delivery dates, which implies that customer deliveries are made according to the promised lead-time and that there is an effective communication system between marketing and physical distribution (a component of logistics), which ensures that products are received on the due date as promised. The results support substantially Nguyen’s (2019, 112) finding that customers demand that all orders be delivered on time, the delivery time is clearly stated, and that the amount of time between placing and receiving an order is consistent.

Regarding order processing, the results indicated that order status information can be provided to the customer at any time. It was evident from the respondents that the automotive component suppliers have an effective order processing system in place, which enables them to provide the customers with the status of their orders as and when required. The results support Nguyen’s (2019, 112) finding that the available status of order information will help customers perceive high value in terms of customer service.

This affirms that there is transparency for customers when tracking order progress. This is an essential component of customer service because it puts the customer at ease and encourages the necessary confidence to commit to their own customers. The results indicated that the products were accurately picked according to the customers’ orders. An important aspect of customer service in order picking is to ensure that customers receive the correct goods as ordered. The results support Mengistu’s (2018, 56) finding that product availability, which is measured in terms of the percentage of orders filled, has a significant impact on customer service. The study by Terziev, Banabakova and Latyshev (2018, 51) also supports the results by highlighting that product availability is a critical element of service. In addition, Terziev et al. (2018, 51) also recommend that business firms should have standards for the number and percentage of correctly filled orders over a certain period.

The results also indicated that the automotive component suppliers ensured that customers’ (OEMs’) requirements were recorded correctly. This means that the automotive component suppliers have a good internal order recording system with clear communication of orders placed by customers (OEMS).

Conclusion, Recommendations and Managerial Implications

Based on the results of this study, logistics managers should take cognisance of the benefits of improved customer service through a firm's transportation and order processing activities. The results may have a positive effect on the way transportation and order processing activities are managed and executed if customer service is to be improved. For example, a multiple regression analysis was performed to determine whether any of the variables could significantly predict customer service scores. Transportation management ($t = 4.658$, $p = 0.00$) and order processing ($t = 2.132$, $p = 0.035$) were both found to be significant predictors of customer service.

Automotive component suppliers should prioritise their transportation activities, as this area has the potential to improve customer service significantly more than order processing, thus ensuring a competitive advantage for the firm. For instance, the results show that transportation management had the highest standardised beta coefficient, $B = 0.393$ and, therefore, had the greatest impact on customer service. The results could fill the gap in knowledge that researchers and practitioners experience regarding the variables that influence customer service.

The population of the study only included the automotive component suppliers in the Eastern Cape. It is suggested that future research also includes automotive component suppliers in other provinces. As such, the study could have been conducted over a longer period to capture the long-term effect of physical distribution on customer service for automotive component suppliers in the Eastern Cape longitudinally.

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