

-RESEARCH ARTICLE-

IMPACT OF E-PROCUREMENT, E-FULFILLMENT, E-LOGISTICS ON SAUDI SME'S PERFORMANCE: MEDIATING ROLE OF E-SUPPLY CHAIN PERFORMANCE AND MODERATING ROLE OF REVERSE LOGISTICS AND RETURN

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—Abstract—

The emergence of Internet and technology has revamped the logistics services and improved efficiency of businesses. The current study aimed to evaluate the impact of e-procurement, e-fulfillment, and e-logistics on small and medium enterprises in Saudi Arabia. The study incorporated the mediating role of e-supply chain performance on the effect of e-procurement, e-fulfillment, and e-logistics on SME performance. The moderating role of reverse logistics and return between the relationship of the three independent variables and SME performance was determined. The study adopted a purposive and convenience sampling approach to obtain data from employees in Saudi SMEs that utilize electron systems in their logistics and operations departments. A sample of 112 employees was collected through the administration of surveys. The data was analyzed through structural equation modelling. The findings revealed that e-procurement and e-logistic have a significant impact on SME performance, whereas the moderating role of reverse logistics is significant between e-logistic and SME performance. The study confirmed that e-supply chain performance significantly

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mediates the relationship between e-procurement, e-fulfilment, e-logistics, and SME performance. The findings are useful for SMEs to focus on the implementation of e-procurement and e-logistics and develop e-supply chain strategies to improve organizational performance.

KEYWORDS: E-logistics, E-Supply Chain Performance, Saudi Arabia, SME Performance

1. INTRODUCTION

Small and medium-sized businesses (SMEs) have made significant contributions to employment and GDP globally (Rezvani & Fathollahzadeh, 2020). Many owners and managers would be troubled by the prospect of rapid expansion for their company. Although they must deal with risks and difficulties in running their businesses, it is crucial for them to be aware of the factors contributing to expansion. The growth of small and medium-sized enterprises (SMEs) in the Kingdom of Saudi Arabia are subject to the same factors that affect SMEs in any other country. For a more in-depth understanding of the challenges faced by SMEs and their owners and managers in Saudi Arabia, it is essential to draw from the studies of SMEs in other countries and regions around the globe (Mohamed & Jamil, 2020). That's why they came up with "Saudi Arabia's Vision 2030" — a national transformation programme for the kingdom. This plan lays out a strategy for reducing reliance on oil exports by encouraging the growth of a diverse domestic manufacturing and service sector that can compete on a global scale and create good employment for a growing population. Small and medium-sized enterprises (SMEs) have the potential to increase economic growth by creating new jobs, but this strategy will only succeed with improved support for SMEs (Rafiki, 2020).

One of the factors that contributes to the success of small and medium-sized businesses (SMEs) is an effective supply chain and E-commerce. According to Farouk and Darwish (2020), companies that can sustain themselves in the markets do so thanks to an effective management of their supply chains. Supply chain management must be performed in an efficient manner, which necessitates the implementation of novel approaches in commercial enterprises (Arda et al., 2021). The small and medium-sized businesses (SMEs) that are a part of economies that are still developing are coming to terms with the idea that sustainable business performance can be achieved through the larger supply chains that they are surrounded by Yildiz et al. (2016). Information can be effectively maintained using a unified supply chain network that is accompanied by an integrated information management system. This network links the customers and the suppliers. The integration of different aspects of a company's operations is facilitated by such a system. Effective supply chain management (SCM) and the utilisation of an integrated information system are essential to the continued existence of small and medium-sized businesses (SMEs) that are a part of emerging economies (Jermsittiparsert & Rungsrisawat, 2019).

Similarly, E-commerce streamlines specific industry procedures while boosting production and effectiveness via Internet technologies. It enables businesses to conduct data analysis to enhance their productivity, combine back-end tools with those used for payments, and engage with suppliers, vendors, and consumers with convenience. In an integrative framework, many businesses operating within the same product category coordinates the delivery of goods, resources, and data to enhance consumers' perceptions of the significance of that product category and to maximize operational effectiveness. In this regard e-procurement, e-fulfillment and e-logistics are the key factors that contribute to the effectiveness of E-SCM and E-commerce of SMEs (Brandon-Jones et al., 2018).

E-procurement, also referred to as electronic procurement, has been utilized for many decades in various nations. It has been utilized in various ways, each of which has unique merits (Anthony, 2018). E-procurement is the practice of purchasing and offering goods and services online. In contrast to e-commerce, it uses a company's complex loop, which is normally only accessible to active members. E-procurement, when successfully enforced, facilitates interactions like proposals, authorizations, and emails by establishing a clear connection and opening the channels of exchange among a business and a provider (Pérez-López et al., 2022). It has been reported that e-procurement implementation may help ensure a cheaper price for the items purchased and an effective public purchasing procedure, ultimately leading to decreased expenses and shorter turnaround times. The demand that competitors directly participate in a "real-time" acquisition process can further encourage accountability. Order purchasing and order fulfilment are the two basic areas into which e-fulfilment can be categorized. Figure 1 illustrates the theoretical paradigm for the adoption of electronic procurement in small and medium enterprises.

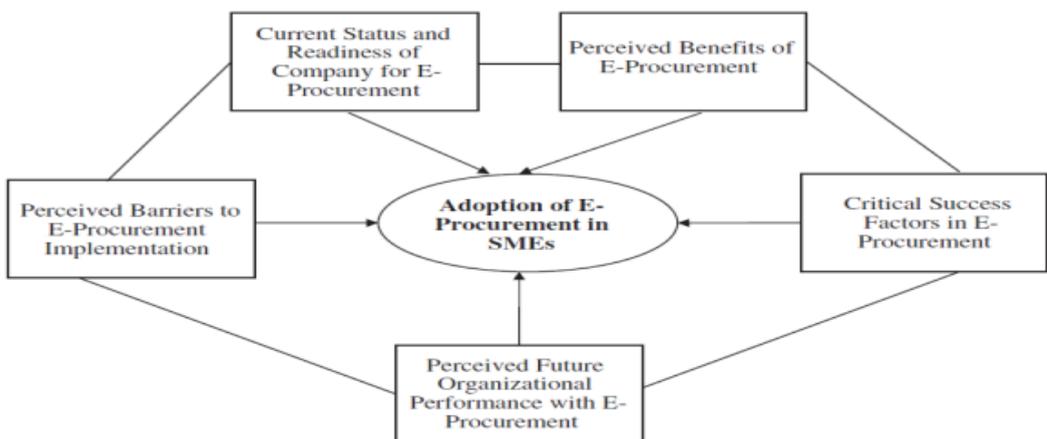


Figure 1. A Conceptual Model for SMEs' Adoption of E-Procurement Source: (Angappa et al., 2009)

Similarly, planning, implementing, and controlling the optimal, productive shipment and storage of goods, resources, and associated data from the place of origination to the site of consumption to satisfy consumer needs is referred to as logistics. These ideas are used online through e-commerce logistics or e-logistics in order to execute that business online. When personnel, procedures, and technologies are combined to guarantee service quality before, throughout, and afterwards, the online purchasing procedure is referred to as e-fulfilment. The e-logistics notion has grown in popularity due to technological advancements since it offers ideas for data collaboration and data integrity among participants in distribution networks. Therefore, providing data with collaborators is among the key responsibilities of e-logistics, and doing so can affect the companies' performance (Erceg et al., 2019). As a result, logistics service suppliers are regarded as business associates worldwide, and their interactions with clients are viewed as partnerships. The flourishing of e-commerce has had a significant impact on supply chain management and logistics, which is now being overtaken by its triumphs in both established and developing nations (Yu et al., 2017). Advancements in a company's overall efficiency and financial efficiency are included in organizational effectiveness. The decrease in production costs due to improved synchronization of production activities among buyer and provider, as well as a rise in customer contentment due to fewer purchasing failures, are additional advantages of e-procurement outside advances in strategic sourcing efficacy.

Small and medium-sized enterprises (SMEs) are companies that meet specific requirements and constraints. They contribute more to a nation's economic development. The term "reverse logistics" refers to all processes involving recycling goods and resources. The act of transporting items away from their usual end location to maximize worth or dispose of them properly (Omoruyi & Chinomona, 2019). Nevertheless, to generate revenue for the businesses, it is crucial to have systems in place to ensure the controlled operation of commodities and data from the site of consumption to that of production. To accomplish the tasks of supply chain management, which significantly influence an organization's productivity, strong client connections are essential. Managing back orders and excess product sales is a component of reverse logistics (Peña-Montoya et al., 2020). Generally, logistics entails managing the processes that carry an item towards clients, whereas RL involves managing the processes that take a commodity reverse in the distribution network to the producer.

The aims of this study are:

1. To determine the Influence of E-Procurement, E-Fulfillment, and E-Logistics on the performance of Small and Medium Enterprises in Saudi Arabia.
2. To evaluate the Mediating Role of E-Supply Chain Performance on Saudi SMEs' Performance

3. To assess the Moderating Role of Reverse Logistics and Return on Saudi SME's Performance

With the creation of innovative strategies, e-commerce is thriving and will continue to expand in the coming years. Logistics, procurement, and fulfilment have all been significantly impacted by the large number of businesses that engage in E-commerce. The current research outcomes will offer companies recommendations when they are thinking about going into business.

This research will be organized with a front matter, and sections for the body of the paper. Each of these sections is elaborated upon in detail. These sections include an introduction, literature review then methodology, results, and discussion.

2. LITERATURE REVIEW

2.1 E-Procurement and SME's Performance

Several studies highlight the significance of e-procurement and its link with the overall performance of the company. Since it is a function that integrates the utilization of IT, buying resources, and information exchange with vendors, it is proposed and proved through analysis that small and medium enterprises which focus on performing procurement functions effectively along with strong support from senior management, reduction of hindrance in IT implementation, and strategic buying, have improved their procurement and overall corporate performance (Masudin et al., 2021; Sánchez-Rodríguez et al., 2019). When the management prioritizes procurement through investment and focuses on creating a culture that fosters innovation and IT integrations required for better e-procurement, the outcomes improve (Hua et al., 2022). Further, since they are mainly involved in the decision, they participate in sharing information with vendors, investment, and implementation of IT, and reduce any resistance in this regard, they can improve e-procurement. Effective e-procurement can enhance firm outcomes in the form of productivity and financial performance (Daoud et al., 2019; Marei et al., 2021).

H1: E-procurement has a significant and positive impact on SMEs' performance.

2.2 E-Fulfilment and SME' Performance

Studies suggest that the utilization of effective e-fulfilment services can attract and retain customers when they perceive that it is a more useful, easy-to-use, and secure source to receive services. When the e-fulfilment is functionally effective and suitable, the customers become oriented towards them since they are time and cost-efficient. The customers build trust in the services as a result and more frequently recommend and utilize the services. It is a better order fulfilment strategy since it will be convenient for customers and help in generating higher revenues and better corporate performance. The companies, however, must focus on effective IT infrastructure, management assistance,

and stock management for e-order fulfilment and hence improved performance (Gawor et al., 2018; Kurniasari et al., 2022; Titiyal, Bhattacharya, et al., 2022).

H2: E-fulfillment has a significant and positive impact on SME's performance.

2.3 E-Logistics and SME's Performance

Companies sometimes overlook the worth of their clients in an effort to seize possibilities for enhancing business results. The use of e-logistics enables companies to meet client requirements at the lowest cost. According to studies, businesses that use e-coordination and e-logistics solutions can enhance total earnings by promptly learning from their prior business operations (Ullah et al., 2021). Studies also imply that the performance of storage operations is affected by information exchange and transparency as part of e-logistics. In e-logistics, organizations should prioritize actual time communication. Evidence suggests that the corporation can enhance its stock management outcomes by improving communication and information. They also need to stress the value of actual prediction decisions in e-logistics, which can improve the efficiency of inventory management. E-logistics can also aid firms in cost reduction and improved coordination, which will improve the performance of the company's supply chain and increase the firm's competitiveness. Additionally, it is a more time-efficient choice, enhancing business efficiency (Erceg et al., 2019; Shah et al., 2019; Vedaste et al., 2021).

H3: E-logistics has a significant and positive impact on SME's performance.

2.4 Mediating Role of E-Supply Chain Performance

E-procurement is becoming more widely considered a useful instrument for optimizing procedures and lowering buying expenses. The e-procurement approach has become essential to consistently thriving in the business, notably for SMEs, as the rivalry is now not just between enterprises but also between supplier chains. Other advantages of e-procurement to a business encompass a shorter purchase turnaround period, a wider range of suppliers, less documentation, no more order mistakes, increased productivity, increased efficiency of the buying procedure, and a smaller buying unit with fewer operational aspects involved. Additionally, it was discovered that e-procurement increased degrees of collaboration and enhanced supply chain effectiveness. Better supplier cooperation is the result of excellent e-procurement solutions being used by established corporations or businesses (Mafini et al., 2020). Hence when the supply chain performance improves, the flexibility and responsiveness of the company improve towards its customer base, leading to better response to the market and adaptability to change. Hence it improves the performance of the company (Benzidia et al., 2020).

Further, research suggests that e-fulfilment is found to be more beneficial for customers leading to an increase in their preference for e-fulfilment services. They found it more efficient and effective regarding performance and have better utilization. The various

aspects of e-fulfilment, including personalization, quality of the medium, delivery, and return system, significantly influence the loyalty of consumers in a positive way (Dewi et al., 2020; Titiyal, Thakkar, et al., 2022). Hence they prefer buying frequently and recommending the services leading to better revenue for the service providers resulting in better performance (Rashid et al., 2020).

Further, e-logistics has an important role in information exchange. It can enhance the information available about new companies in the industry, innovation coordination, consumer experience, and competition in the sector, making it easier for companies to respond effectively and increase their competitiveness through improved supply chain performance. It is found that by enhancing operating economies, improving efficiency, allowing information exchange and collaboration, and boosting flexibility and creativeness, e-logistics, as a component of e-corporate capabilities, aids SMEs in creating value. Increased SME revenues and operational effectiveness are the results of this e-business significance. However, firms must focus on information technology infrastructure, better information exchange, and better communication for this purpose. Hence it can be said that e-logistics contributing to the supply chain performance of the company results in the better overall performance of small and medium enterprises. (Bi, 2017; Erceg et al., 2019; Islam et al., 2018).

H4a: E-supply chain performance positively and significantly mediates the association between e-procurement and SME's performance.

H4b: E-supply chain performance positively and significantly mediates the association between e-fulfilment and SME's performance.

H4c: E-supply chain performance positively and significantly mediates the association between e-logistics and SME's performance.

2.5 Moderating Role of Reverse Logistics and Returns

Reverse logistics and returns have an impact on SMEs' complete supplier chains, which affects their commercial viability. The survival of SMEs' economies depends on their capacity to react quickly to emerging market prospects. The concept that reverses supply chain operations (logistics processes, conveyance, manufacturing planning, and monetary supervision) involve numerous parameters and different aspects that make it possible to achieve corporate and systemic objectives. Reverse logistics have a significant impact on functional management, including client satisfaction with firm offerings and cost savings.

One of the key supply chain concerns, reverse logistics, has been a strategic focus for many businesses because of its exceptional value. An effective reverse logistics system can boost an organization's revenue while lowering operational costs and the costs associated with obsolete and faulty parts. Effective logistical management not only contributes substantially to the creation of competitive advantages but also results in

client satisfaction and fulfils their unique requirements (Karabegović et al., 2019; Mahindroo et al., 2018). Since the final consumer initiates the RL procedure with a store, the firm's RL procedure has a significant impact on a company's profitability and degree of customer experience. To increase the utility of inputs and commodities and hence lessen the strain on industrial facilities, RL is the primary operational procedure that is necessary.

The research emphasized the connections between RL characteristics and corporate resource allocations. It shows the importance of the connections between corporate resource allocations to RL, cutting-edge RL techniques, and returns processing management. It was later discovered that creative RL techniques had a favourable correlation with an organization's operational delivery excellence. In the domain of logistics, it is anticipated that if companies give returns management the proper amount of effort, focus, and resources, it could result in budget benefits and improved customer service (Bentamar et al., 2020; Morgan et al., 2018). In contrast to logistics in conventional outward movements of goods, RL has a variety of operations; thus, it requires additional investments to set up properly planned returns and corporate responsibilities. It has an enormous ability to increase a company's entire logistical effectiveness and help create long-lasting client relationships (Mishra et al., 2020; Pawar et al., 2021). Hence it can be said that the overall performance of the firm can be improved by enhancing customer experience, fulfilment, procurement and management of goods with the presence of reverse logistics in the equation (Ivanova et al., 2022; Saruchera et al., 2021).

H5a: Reverse logistics and returns significantly and positively moderate the relationship between E-procurement and SMEs' performance.

H5b: Reverse logistics and returns significantly and positively moderate the relationship between e-fulfilment and SME's performance.

H5c: Reverse logistics and returns significantly and positively moderate the relationship between e-logistics and SME's performance.

3. METHODS

The current study aimed to investigate the effect of e-procurement, e-fulfilment, and e-logistics on SME performance in Saudi Arabia. The mediating role of supply chain performance and the moderating role of reverse logistics and return are also empirically tested. Therefore, the research methodology primarily involved a deductive approach and developed the construct's domain by reviewing the literature and identifying the items to measure the constructs in our research model. A quantitative method approach was deemed suitable as it allows objectives to be statistically analyzed (Saunders et al., 2017). The following sections describe the research design, method and analysis in more detail.

3.1 Population and Sampling

Based on the research objectives, the researcher selected the target audience, and the present cross-sectional study focuses on the impact of e-logistics, e-fulfilment, and e-procurement on SME performance; therefore, the data used to test the hypothesis was obtained from the logistics and operation department in the small and medium enterprises in Saudi Arabia. The number of registered SMEs in Saudi Arabia is close to a million (Benny, 2021); therefore, the researcher used non-probability sampling to obtain data as the researcher had to select SMEs with particular characteristics (Williamson, 2018). The researcher initially used purposive sampling to include only those SMEs that utilized electronic systems for procurement, fulfilment, and logistics services. Purposive sampling was followed by convenient sampling. Survey questionnaires were shared with the employees, and employees were assured anonymity and confidentiality of the data.

3.2 Data Collection

The survey-based approach using online administration of the surveys was adopted in our study as it is a suitable method for data collection in quantitative research (Bell et al., 2022). The questionnaire consisted of two sections, the first covering the respondents' demographics. The other section comprised questions related to the constructs of our research. The researcher contacted managers in the logistics and operations departments of the SMEs. The purpose of the research was clearly informed to the employees. The participation was voluntary and informed consent was taken. The researcher assured the confidentiality of the data. A total of 335 questionnaires were obtained; however, after a thorough evaluation, 23 questionnaires were discarded due to missing values. A final sample of 112 complete questionnaires was chosen for further analysis.

3.3 Measurement Scale

The items adopted to measure the six variables were adopted from the literature. Four measurement items for e-procurement and three items for e-fulfilment were adopted from the work of Chang et al. (2013). E-logistics was measured using four items adapted from the works of Chang et al. (2013) and Gimenez et al. (2015). SME performance was measured with 4 items adopted from Afshan et al. (2018), and 4 items were used to measure reverse logistics and return from the scale by Autry et al. (2001). The constructs were measured through a "5-point Likert scale" ranging from "1 (strongly disagree) to 5 (strongly agree)." The table below summarizes the measurement items:

3.4 Data Analysis

A quantitative analysis was conducted using SPSS and AMOS software. Inferential and descriptive statistics were calculated. Confirmatory factor analysis was conducted to measure the suitability of data. The structural equation modelling (SEM) technique was

used to evaluate the impacts of e-procurement, e-fulfilment, and e-logistics on SME performance and test the significance of the mediator and moderator. The minimum suitable sample size for SEM analysis is 200 (Kline, 2015).

Table 1. Measurement Scale

Variables	No. of items	Developed by/ adapted by
E-procurement	4 items	(Chang et al., 2013)
E-fulfilment	3 items	(Chang et al., 2013)
E-logistics	4 items	(Chang et al., 2013; Gimenez et al., 2015)
SME Performance	4 items	(Afshan et al., 2018)
Supply Chain Performance	5 items	(Chang et al., 2013)
Reverse Logistics & Return	4 items	(Autry et al., 2001)

4. RESULTS

4.1 Respondents' Demographic

The data was collected from employees in the logistics and operations departments of various SMEs in Saudi Arabia. Out of 112 respondents, 47.8% of the respondents were female, and 52.2% were male as shown in Table 2.0. The employees' experience working at the SMEs is represented in the Figure 2 below. Out of total, 11.2% of employees have less than 2 years of experience and 11.9% of employees have 2 to 5 years of experience. Similarly, 33.3% of employees have 5 to 8 years of experience and 43.6% of employees have more than 8 years of experience. This implies that many respondents belongs to experiences class.

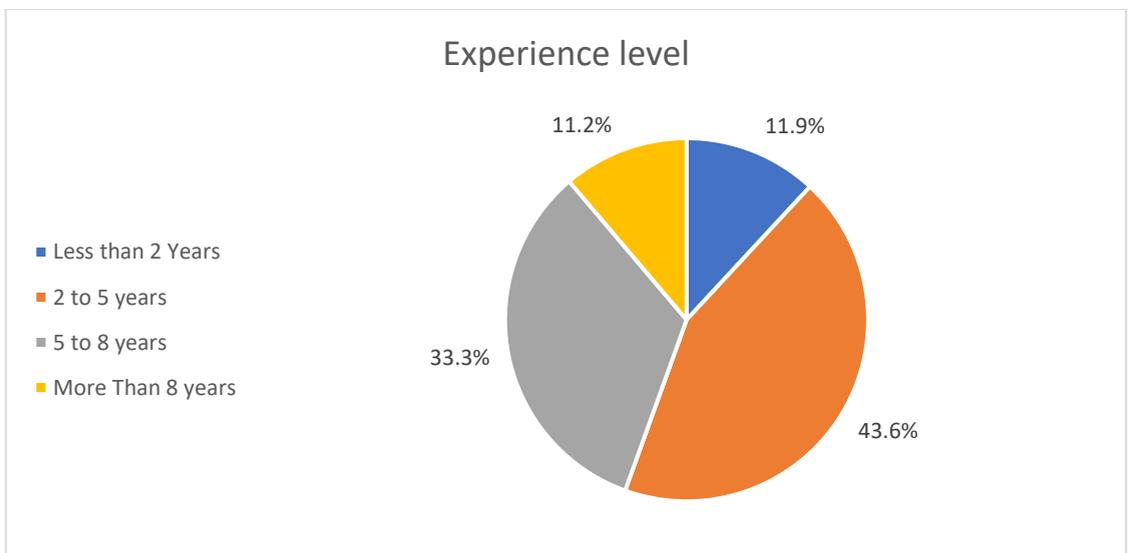


Figure 2. Experience of the Employees in the Logistics and Operations Department

4.2 Descriptive Results

Descriptive statistics are displayed in [Table 2](#) to present the data in a simpler and more meaningful manner ([Holcomb, 2016](#)). There are no outliers and data are normal. As per the findings of the descriptive analysis all the variables have mean score above average and EP has the highest mean score i.e., 3.5216.

Table 2. Descriptive Variables

	N	Min	Max	Mean	SD	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
EP	112	1.00	5.00	3.5216	1.06884	-.700	.138
EF	112	1.00	5.00	3.5107	1.15279	-.680	.138
EL	112	1.00	5.00	3.4688	.98340	-.508	.138
SMEP	112	1.00	5.00	3.5024	.95381	-.520	.138
SCP	112	1.00	5.40	3.4064	.98540	-.275	.138
RL	112	1.00	5.00	3.2829	1.13848	-.274	.138
Valid N (listwise)	112						

EP= e-procurement, EF= e-fulfilment, EL= e-logistics, SCP= e-supply chain performance, SMEP= SME performance, RL= reverse logistics

4.3 Validity, Reliability, and Measurement Model Tests

[Table 3](#) shows the results of both validity tests. The table results show that the threshold of AVE is > 0.5 ; therefore, we can conclude that there is adequate convergence as the AVE values are above 0.5 ([Hair et al., 2010](#)). Similarly, constructs were observed to be distinct in terms of divergent validity. The AVE scores are greater than the MSV values; thus, good discriminant validity was established.

Table 3. Discriminant and Convergent Validity

	CR	AVE	MSV	EP	EF	EL	SCP	SMEP	RL
EP	0.810	0.619	0.314	0.858					
EF	0.823	0.730	0.459	0.751	0.894				
EL	0.774	0.660	0.447	0.653	0.718	0.842			
SCP	0.763	0.607	0.449	0.614	0.731	0.712	0.884		
SMEP	0.812	0.847	0.412	0.557	0.675	0.702	0.671	0.764	
RL	0.880	0.723	0.408	0.305	0.670	0.606	0.623	0.758	0.750

EP= e-procurement, EF= e-fulfilment, EL= e-logistics, SCP= e-supply chain performance, SMEP= SME performance, RL= reverse logistics

The results of KMO and Barlett's Test are presented in the [table 4](#) below. The p-value for Barlett's Test of Sphericity is significant as the p-value is less than 0.05, confirming that factory analysis is suitable. The results confirmed that the sample is adequate, as the KMO value is above 0.6 ([Tabachnick et al., 2007](#)).

Table 4. KMO and Barlett’s Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.926
Bartlett’s Test of Sphericity	Approx. Chi-Square	5202.426
	Df	276
	Sig.	.000

4.4 Model Fitness

The fitness of the model was tested by conducting CFA. The results are shown in [Table 5](#) and [Figure 3](#) to validate the structure of the factors in our study. The findings show that the IFI value is 0.954, and the CFI value is 0.944. Both values are larger than 0.90, and the RMSEA value is 0.075, less than 0.08. Therefore, the values of CFA indicators confirmed that the model developed is fit and accurate.

Table 5. Confirmatory Factor Analysis

CFA Indicators	CMIN/DF	GFI	IFI	CFI	RMSEA
Threshold Value	≤ 3	≥ 0.80	≥ 0.90	≥ 0.90	≤ 0.08
Observed Value	2.785	0.863	0.954	0.944	0.075

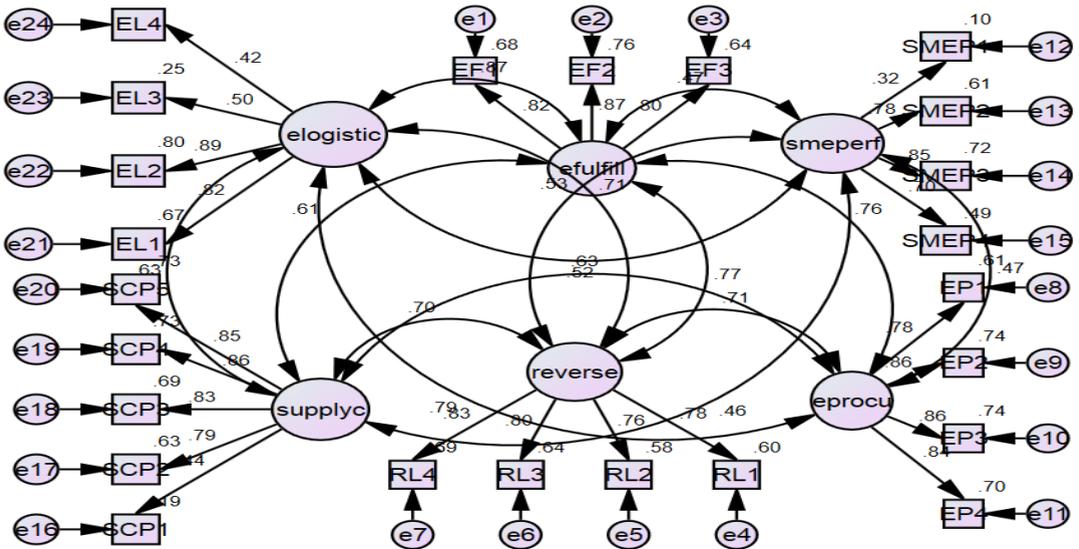


Figure 3. Measurement Model

4.5 Rotated Component Matrix

[Table 6](#) shows that the values of the matrix are between the range of 0.60 to 0.90 and no variable has more than one significant cross-loading ([Bandalos et al., 2018](#)).

Table 6. Rotated Component Matrix

	Component					
	1	2	3	4	5	6
EP1				.661		
EP2				.729		
EP3				.789		
EP4				.754		
EF1	.712					
EF2	.740					
EF3	.695					
EL1					.737	
EL2					.712	
EL3					.809	
EL4					.855	
SMEP1			.712			
SMEP2			.759			
SMEP3			.819			
SMEP4			.808			
SCP1		.782				
SCP2		.755				
SCP3		.786				
SCP4		.832				
SCP5		.787				
RL1						.670
RL2						.736
RL3						.776
RL4						.655

EP= e-procurement, EF= e-fulfilment, EL= e-logistics, SCP= e-supply chain performance, SMEP= SME performance, RL= reverse logistics

4.6 Structural Equation Modelling (SEM)

The results of the SEM are presented in [Table 7](#), allowing the researcher to evaluate the direct and indirect effects of observed and latent variables ([Zhang, 2022](#)). E-procurement and e-logistic significantly impact SME performance (p-value < 0.05), whereas e-fulfilment has an insignificant impact on SME performance. A unitary increase in EP and EL increases SME performance by 42% and 39%, respectively. The moderating effect of reverse logistics is significant between e-logistics and SME performance. In contrast, reverse logistics is not a significant moderator between e-procurement, e-fulfilment, and SME performance, as can be observed from the graphical display in [Figures 4](#).

Table 7. Structural Equation Modelling

Hypothesized Path	Estimate	S.E.	C.R.	P	Conclusion
EP → SMEP	0.42	.043	5.456	0.02	Accepted
EF → SMEP	0.01	.047	6.245	0.62	Rejected
EL → SMEP	0.39	.052	7.813	0.01	Accepted
EP*RL → SMEP	0.02	.057	0.347	.691	Rejected
EF*RL → SMEP	-0.39	.045	5.559	.716	Rejected
EL*RL → SMEP	0.17	.046	7.759	0.04	Accepted

EP= e-procurement, EF= e-fulfilment, EL= e-logistics, SMEP= SME performance, RL= reverse logistics

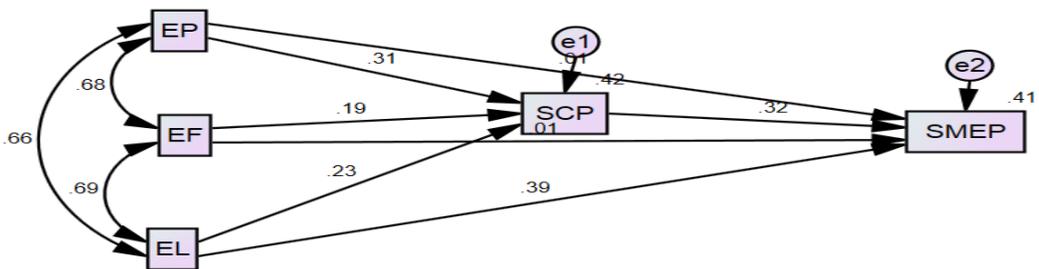


Figure 4. Structural Equation Modelling

The intersection of the lines in Figure 5 to Figure 7 confirms that the moderating effect of e-logistic is significant. The Figure 5 shows that the high RL with high EP results in high SME’s Performance. Similarly, High RL with EL enhances SME’s Performance, as shown in the Figure 6. Likewise, Figure 7 shows that increase in RL with EF increases the levels of SME’s Performance.

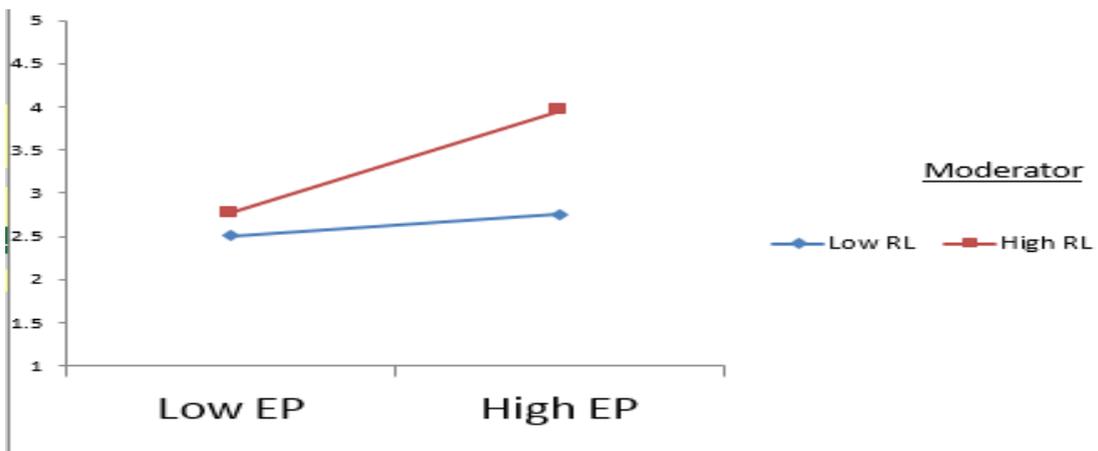


Figure 5. Interaction Effect of Reserves Logistics with E-Procurement

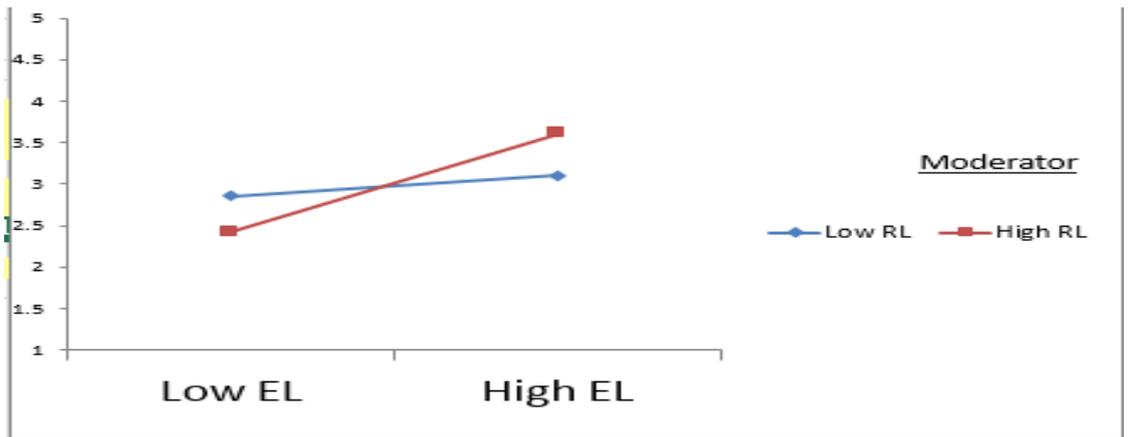


Figure 6: Interaction Effect of Reserves Logistics with E-Logistics

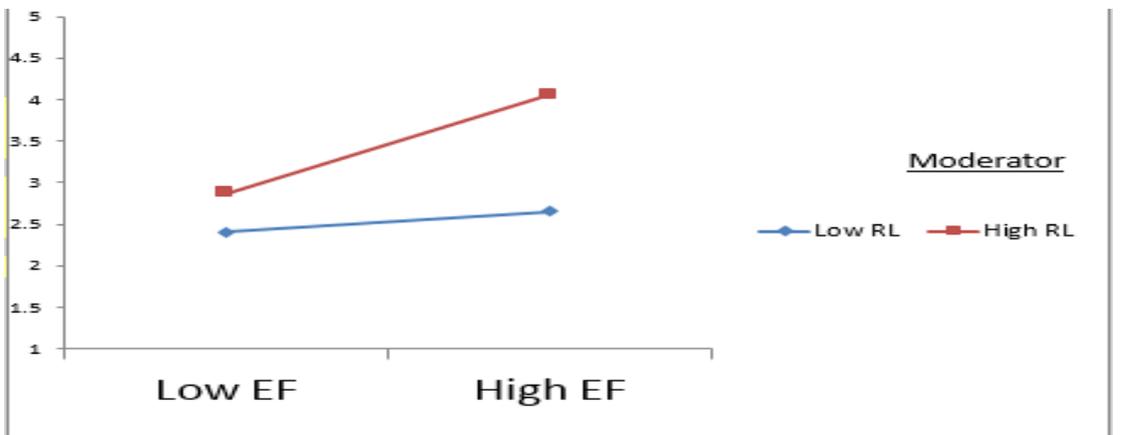


Figure 7. Interaction Effect of Reserves Logistics with E-Fulfilment

Table 8 below presents the results of mediating supply chain management. With a p-value less than 0.05, the mediating effect of supply chain performance is significant for the impact of e-procurement, e-fulfilment, and e-logistics on SME performance in Saudi Arabia.

Table 8. Mediating Effect of E-Supply Chain Performance

	EP	EF	EL
SCP	.000	.000	.000
SMEP	.003	.011	.004

SCP= Supply chain performance, SMEP= SME performance

5. DISCUSSION

The current research evaluated how Saudi Arabia's small and medium-sized businesses were affected by e-procurement, e-fulfilment, and e-logistics. The study considered the

e-supply chain's mediation effect in the relationship between e-procurement, e-fulfilment, and e-logistics effectiveness and SME performance. Reverse logistics and return were found to play a moderating role in the link between the three independent factors and SME performance. The study used a purposeful and convenient sampling strategy to gather information from staff members of Saudi SMEs that use electronic systems in their management and logistics divisions. Using surveys, a sample of 312 workers was gathered. By employing the technique of structural equation modelling, the data was examined. The results showed that while reverse logistics plays a substantial moderating function between e-logistic and SME performance, e-procurement and e-logistic influence SME performance considerably. The analysis revealed that the association between e-procurement, e-fulfilment, e-logistics, and SME performance is strongly moderated by e-supply chain performance.

[Sánchez-Rodríguez et al. \(2019\)](#) examined the association between e-procurement in small and medium-sized businesses (SMEs) and managerial support; IT challenges smart buying and the impact of e-procurement on productivity. The findings showed a substantial correlation between top management support, Technological challenges, and smart procuring and e-procurement in SMEs. Parallel to this, the researchers noted a favorable correlation between organizational effectiveness and e-procurement and procurement strategy effectiveness. Close interpersonal connections with suppliers are one of several extra variables pertinent to e-procurement in SMEs and could have been highlighted. Future studies should improve the concepts produced in this research and take into consideration the addition of additional parameters even though they demonstrate appropriate dependability for the objectives at hand. The outcomes of this study are similar to the findings of the current study. This indicates that e-procurement and e-logistic have a considerable influence on SME performance.

E-procurement is an electronic business functionality that includes not only informational acquiring skills, including the ability to handle purchase requisition, send customer orders to providers digitally, and forward money transfers to providers but also the capacity to interact and work collaboratively with providers by exchanging pertinent supply chain data, like stock and manufacturing work schedules data. Potential business growth for SMEs has become more and more challenging because of swift economic trends and technological innovations. To fulfil their strategic business objectives, many firms are turning to e-procurement nowadays. Advances in the logistics industry have been affected by recent technological advancements and the growth of e-commerce operations, which have "driven" businesses to alter how they handle logistics. Currently, customer support and order fulfilment are equally important factors in competition in addition to the cost. The application of contemporary logistics techniques can have an impact on this. As a result, in the international economy, logistics service suppliers are viewed as business associates, and their connection with logistics companies is viewed as an alliance.

Majzoub et al. (2020) have highlighted and studied the key variables that affect reverse e-logistics effectiveness. A selection of 459 digital market enterprises operating in Lebanon and Syria that participate in business-to-consumer e-commerce and are confronted with the difficulties of reverse e-logistics were used for the analysis. The overall findings demonstrate the substantial influence of the recognized variables on the success of reverse e-logistics, which in flip has a substantial influence on the effectiveness of Business to consumer companies involved in reverse e-logistics operations. These variables include client satisfaction, safeguarding, and organizational culture.

Bi (2017) looked at how some critical precursors from the technologies, organizations, and surroundings affected the growth of e-supply chain synchronization capabilities in the small-to-medium firm setting. SMEs with excellent e-supply network coordination skills might function exceptionally well in the marketplace. This research provided actual data to comprehend the connections among these precursors, the capacity of the e-supply network to coordinate, and SME success. A researcher claimed that among the important elements influencing SME performance is e-business practice. SME executives must comprehend how to use available resources to build their e-business skills to fulfil their organizational objectives. The findings of this study follow the results of the present analysis, which show that the association between e-procurement, e-fulfilment, e-logistics, and SME performance is strongly moderated by e-supply chain performance. Businesses of all sizes have tremendous development potential in the worldwide economy. Nevertheless, it is becoming difficult for small and medium-sized firms in developing nations to compete in this international market due to various constrained resources. In the competitive global market, efficient supply chain management can be a key determinant in SMEs' survival.

6. CONCLUSION

Integration of various value chain participants is necessary for effective supply chain management to foster cooperative and productive ecosystems that promote the interchange of data, resources, and future revenues. To increase consumer impressions of the prominence of that product class and to maximize operational effectiveness, numerous enterprises engaged in the same line of Business synchronize the supply of goods, resources, and data. A sample of 312 workers was obtained through surveys. The data was evaluated using the structural equation modelling method. The findings revealed that E-Procurement, E-Fulfillment, and E-Logistics significantly impact small and medium enterprises.

7. RESEARCH IMPLICATIONS

The dynamic transitions that might impact SMEs throughout their supply chain interactions are thoroughly explained in the present study. Considering fluctuating

market constraints, SME managers may proactively prepare planned improvements by increasing their core competencies and network connection roles. Equally significantly, they may work to implement concrete efforts to progress from Efficient SMEs to Innovative SMEs. The pathway provided in this article may be useful for anticipating upcoming adjustments and evaluating ongoing processes. With the help of proper managerial techniques that use suitable intra-organizational and inter-organizational competencies, SME leadership may put desired growth trajectories into effect. There are several restrictions on this study, which open up new research directions. The current study is founded on statistical information from a single source, a worker. It is necessary to conduct a longitudinal study. Small and medium-sized firms make up the solely international sample under study. The findings could be generalized to other nations with comparable traits. They could be applied to businesses of all sizes.

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Appendix 1

Variable	Items	Reference
E-procurement	<p><i>Our company uses an electronic system to gather information at the procurement request stage</i></p> <p><i>Our company gathers the demand proposals about procurement information or related information through the information system</i></p> <p><i>Our company confirms the procedures concerning daily purchases with the supplier through the internet</i></p> <p><i>Our company sets up a database about procurement and utilizes it in the purchasing process</i></p>	(Chang et al., 2013)
E-fulfillment	<p><i>Our company uses an electronic software for inventory management</i></p> <p><i>Our company uses an electronic system for order fulfilment</i></p> <p><i>Our company documents in an electronic form to maintain accuracy</i></p>	(Chang et al., 2013)
E-logistics	<p><i>Our company uses shared databases for coordination, planning, management</i></p> <p><i>Our company engages in online tracking, shipping, and tracing programs</i></p> <p><i>Our company evaluates the performance of suppliers from details in the information system</i></p> <p><i>Our company forecasts demand through electronic system</i></p>	(Chang et al., 2013; Gimenez et al., 2015)

SME performance	<p><i>Our company has better current profitability than other companies in this industry</i></p> <p><i>Our company currently develops and innovates faster than our closest competitors</i></p> <p><i>The overall productivity of our company is better than competitors</i></p> <p><i>The overall production and operation cost has significantly improved than competitors</i></p>	(Afshan et al., 2018)
Supply Chain performance	<p><i>Our company manages costs well</i></p> <p><i>Our company predicts customers' potential needs accurately</i></p> <p><i>Our company manages the deadlines for products/services well</i></p> <p><i>Our company has sufficient material availability</i></p> <p><i>Our company reacts to customer problems effectively</i></p>	(Chang et al., 2013)
Reverse logistics	<p><i>Our business is capable to handle reconciliation of charge-backs</i></p> <p><i>Our firm's information system handles remanufacturing routing well</i></p> <p><i>The length of time for credit processing is reasonable</i></p> <p><i>Our firm integrates return information into database for disposition</i></p>	(Autry et al., 2001)