

MAPPING IDEA & LITERATURE FORMAT | RESEARCH ARTICLE

# E-Supply Chain Management and Customer Satisfaction in Indonesian E-Commerce

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## ABSTRACT

This study examines the impact of Electronic Supply Chain Management (e-SCM) implementation on operational performance and customer satisfaction in Indonesian e-commerce companies. As digital commerce continues to grow rapidly, primarily through platforms such as Shopee and Tokopedia, understanding the effectiveness of supply chain digitization becomes increasingly crucial. The study aims to identify which e-SCM factors contribute most significantly to enhancing company performance and meeting evolving consumer expectations. Using a quantitative approach with 252 respondents, factor analysis identified six critical success factors: market adaptation, inventory control, revenue improvement, remote product monitoring, product quality, and technology utilization. The results demonstrate that effective e-SCM implementation significantly improves process efficiency, cost accuracy, service responsiveness, and product availability, all of which are strongly correlated with customer satisfaction. Furthermore, this research highlights the practical implications for e-commerce companies to overcome challenges such as integration complexity and cybersecurity risks. The findings provide a strategic foundation for firms seeking to enhance their digital supply chains and maintain competitiveness in a rapidly evolving market landscape.

**Keywords:** e-SCM, Operational Performance, Customer Satisfaction, E-Commerce Indonesia, Digital Transformation.

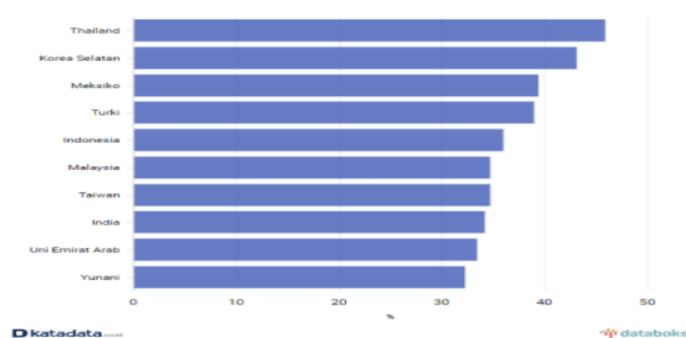
## I. Introduction

In the era of digital transformation and global competition, businesses must respond to increasingly complex consumer behavior by leveraging technology to maintain customer satisfaction and loyalty. The rapid rise of e-commerce illustrates this shift, particularly in Indonesia, which ranks among the top five countries for weekly online shopping frequency (Annur, 2022). Rakuten Insight (2023) further reports that over 70% of Indonesian consumers shop online at least once a week. Social dynamics shape this surge; Wang (2024) finds that peer effects and herd behavior significantly influence consumer decisions during major online sales events, such as "Double 11." Similarly, Kalifa et al. (2022) show that global disruptions can create demand anomalies in e-commerce, reflecting the combined impact of social and external factors on digital consumer patterns. To manage these evolving dynamics, many firms are adopting Electronic Supply Chain Management (e-SCM), which integrates digital technologies to coordinate key supply chain functions, such as demand planning, procurement, production, distribution, and inventory management. As highlighted by Kusuma Putra et al. (2024), digital transformation across industries demands greater flexibility and responsiveness, necessitating



that businesses abandon rigid operational models in favor of more dynamic supply chain strategies. In line with this, Nurhilalia et al. (2024) emphasize that companies must not only pursue operational efficiency but also leverage digital tools to understand consumer behavior better, maintain loyalty, and align their strategies with shifting market expectations.

E-SCM enhances operational efficiency, responsiveness, and customer satisfaction, while reducing delays and costs. However, its implementation presents challenges, including technological infrastructure requirements, complex system integration, cybersecurity risks, and organizational resistance to digital change. This study addresses the central problem of how companies implement e-SCM to improve supply chain performance and customer satisfaction in a rapidly changing environment. By analyzing empirical data, case studies, and literature, the research explores the benefits, barriers, and strategic approaches to e-SCM adoption. The study also evaluates performance using key supply chain indicators, such as Strategic Supplier Partnerships, Customer Relationships, Information Sharing, and Postponement (Lagat et al., 2016), which are essential to enhancing agility, collaboration, and customer value in a digitally connected marketplace.



**Figure 1. Ranking of Countries by Frequency of Online Purchases**

Based on Figure 1, Thailand ranks first in terms of weekly online shopping activity, with 45.8% of its population engaging in regular online purchases. South Korea follows with 43.1% of its internet users participating in e-commerce, while Mexico holds the third position at 39.4%, and Turkey comes in fourth at 38.9%. Indonesia ranks fifth, with 36% of its population shopping online on a weekly basis. Malaysia and Taiwan follow with 34.7%, India at 34.1%, the United Arab Emirates at 33.4%, and Greece at 32.2% (Annur, 2022). Moreover, the e-commerce sector is projected to continue its strong growth trajectory. According to Herman (2022), the e-Conomy SEA report estimates that Indonesia's digital economy reached USD 77 billion in 2022, with e-commerce contributing USD 59 billion—equivalent to 77% of the total digital economy. By 2025, this value is expected to grow to USD 130 billion, with e-commerce accounting for USD 95 billion. This upward trend is further supported by recent findings from Saputra and Santoso (2024), who argue that post-pandemic digital acceleration has permanently shifted consumer behavior towards online platforms, making e-commerce a dominant channel in Southeast Asia's retail landscape. Indonesia's e-commerce ecosystem is dominated by major platforms, including Shopee, Tokopedia, Bukalapak, Lazada, and Blibli.com, each offering distinct market focuses and strategies. Given the sector's rapid development and immense potential, this has sparked the researcher's interest in examining the dynamics and performance of the e-commerce industry in Indonesia.

Based on the background, this study aims to address the following research questions:

- What is the impact of implementing E-Supply Chain Management on the company's operational performance, including process efficiency, cost reduction, and inventory management?
- How does the implementation of E-Supply Chain Management affect visibility and collaboration within the company's supply chain?
- What is the influence of E-Supply Chain Management implementation on customer satisfaction in terms of product availability, delivery time, and service quality?

## II. Literature Review and Hypothesis Development

The literature review in this study is systematically structured to identify theories, empirical findings, and research gaps related to the implementation of e-SCM and its impact on customer satisfaction in the e-commerce sector. This review adopts a structured literature synthesis framework, similar to those used in studies on brand management and consumer perception of celebrity controversies, to establish a strong theoretical foundation (Sarjono et al., 2025) To contextualize the application of Electronic Supply Chain Management (e-SCM) within the Indonesian e-commerce landscape, it is essential to understand the profile and positioning of the dominant industry players. An overview of leading e-commerce platforms provides insight into the structure, market orientation, and operational scale of the sector. This company profile section highlights the key characteristics of the top five e-commerce platforms in Indonesia, which form the foundation for analyzing supply chain practices and customer satisfaction in the digital marketplace.

### 2.1. Company Profile

An analysis of visitor traffic to e-commerce platforms is crucial for understanding market reach and consumer preferences in Indonesia's rapidly expanding digital economy. According to data published by Databoks (2023), Shopee emerged as the most visited platform in the first quarter of 2023, with approximately 160 million visitors. Tokopedia followed with around 120 million visitors, while Lazada ranked third with 80 million. Blibli and Bukalapak reported significantly lower figures, with approximately 30 million and 20 million visitors, respectively (see the picture below).

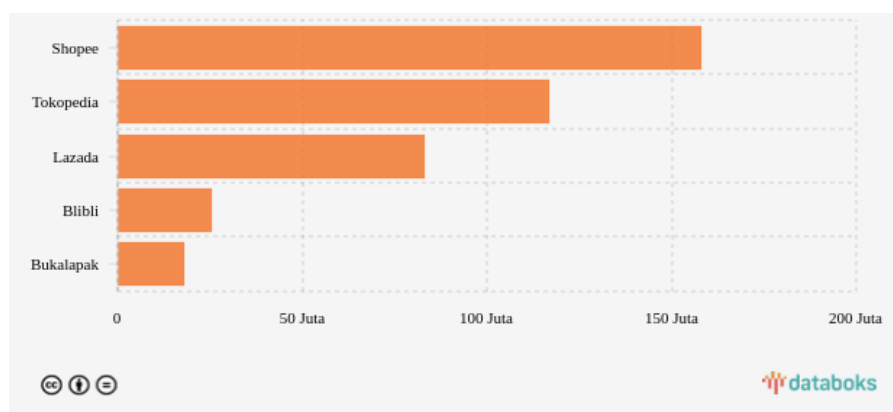


Figure 2. Top 5 E-Commerce Platforms by Number of Visitors in Indonesia (Q1 2023)

Numerous well-established e-commerce platforms operate in Indonesia, including Shopee, Tokopedia, Bukalapak, Lazada, and Blibli.com, each with its own market focus and strategy. Based on this substantial market growth and potential, this study focuses on the e-commerce industry. The following are the five most-visited e-commerce platforms in Indonesia, as determined by recent web traffic data.

#### a. Tokopedia

Tokopedia is the leading e-commerce platform in Indonesia, holding the largest market share in the sector. Officially founded on February 6, 2009, by William Tanuwijaya and Leontinus Alpha Edison, Tokopedia was publicly launched on August 17, 2009. The platform was established with the mission of promoting digital economic equality by empowering individuals and communities to engage in online buying and selling activities. Tokopedia aims to serve as a marketplace that facilitates accessible and inclusive e-commerce transactions, meeting the diverse needs of Indonesian society.

b. Shopee

Shopee ranks as the second-largest e-commerce platform in Indonesia, based on market share. Launched in December 2015, Shopee was founded by Forrest Li and Chris Feng, and is operated by Sea Limited Group (formerly Garena Group). Designed to cater to regional markets, Shopee offers a seamless, secure, and efficient online shopping experience, supported by integrated payment and logistics systems. Founded on the belief in technology's transformative power, Shopee aims to connect buyers and sellers within a unified digital community. The platform provides a comprehensive e-commerce ecosystem, combining diverse product offerings with social engagement features and customer-centric services.

c. Bukalapak

Bukalapak ranks as the third-largest e-commerce platform in Indonesia, based on market share. Publicly launched on January 10, 2010, it was founded by Achmad Zaky, Muhammad Fajrin Rasyid, and Nugroho Herucahyono. Currently owned by Suitmedia and Kreatif Media Karya, Bukalapak is led by CEO Willix Halim. With a mission to promote economic equity, Bukalapak aims to provide a technology-based platform that empowers individuals to grow through innovation, reflecting its belief that everyone deserves the opportunity for a better life.

d. Lazada

Lazada ranks fourth in Indonesia's e-commerce market share. Initially founded by Rocket Internet and Pierre Poignant, Lazada is a Singapore-based private e-commerce company that officially launched in Indonesia in March 2012. Now under the Alibaba Group and led by CEO James Dong, Lazada focuses on delivering a seamless and enjoyable online shopping experience. The platform offers multiple payment options, including cash on delivery (COD), along with comprehensive customer service and efficient logistics through its First and Last Mile Easy Returns system.

e. Blibli.com

Blibli.com ranks fifth in Indonesia's e-commerce market share. Founded on July 25, 2011, by PT Global Digital Niaga, a subsidiary of PT Global Digital Prima, which is in turn a subsidiary of the prominent Djarum Group, Blibli.com operates as an online shopping mall, facilitating convenient transactions between buyers and sellers. Key to its establishment is Kusumo Martanto, a Georgia Institute of Technology alumnus with a master's degree in industrial engineering, who currently serves as CEO of PT Global Digital Niaga.

## 2.2. Definition of E-Supply Chain Management

Tyagi (2014) defines a supply chain as a network of organizations coordinating to deliver products and services efficiently. Electronic Supply Chain Management (E-SCM) utilizes internet technology to integrate and streamline these processes, enhancing efficiency, visibility, and market responsiveness. Indrajit and Djokopranoto (2003) emphasize E-SCM as leveraging internet tools to connect business partners, especially suppliers. Turban (2003) views it as applying technology to improve supply chain operations. Effective E-SCM requires adequate resources to ensure fast, efficient, and innovative supply chain management.

a. Supplier

According to Hansen and Mowen (2001), suppliers are vital business partners responsible for ensuring the availability of goods necessary for a company's operations. Suppliers represent a key market segment, and their strategic selection has a significant impact on the success of supply chain management (Hou Hehuang, 2002). Additionally, supplier development is a crucial effort to enhance the overall competitiveness of the supply chain (Lee et al., 2001).

b. Manufacturing

Manufacturing strategy, according to Krajewsky and Ritzman (1999), is a company's approach to transforming resources into products to meet market demand and compete effectively. Therese (1996) highlights its role in planning and delivering superior products. Heizer and Render (2001) stress that success depends on alignment with the competitive environment, corporate strategy, and product life cycle.

c. Distributor

Lindsay and Maureen (2001) define Selling-In as sales from distributors to customers, such as sub-distributors, wholesalers, and retailers. Sukresna et al. (2015) highlight that distribution channel interactions are shaped by independent structures involving producer and distributor orientations, as well as distributor performance, satisfaction, trust, interdependence, and conflict, all of which positively influence business outcomes.

d. Retail

Berman and Evans (2004) and Levy and Weitz (2006) define retail as commercial activities involving the sale of goods and services directly to end consumers for personal or household use. Retailers purchase in bulk from suppliers and sell in smaller quantities to final consumers, focusing on meeting consumer needs rather than resale.

e. Customer

Greenberg (2010) defines customers as individuals or groups who purchase products or services based on personal decisions, taking into account factors such as price, quality, and service. Lupiyoadi and Hamdani (2006) add that satisfied customers tend to return repeatedly. These definitions highlight the importance of collaboration in e-SCM, facilitating the integration of partners and enhancing supply chain operations through internet technology.

f. Previous Research

The function of previous research in new studies, according to Creswell (2014), Booth, Colomb, & Williams (2008), and Randolph (2009), is to:

- 1) Identify research gaps
- 2) Build theoretical and conceptual foundations
- 3) Compare approaches or findings
- 4) Avoid duplication or redundancy
- 5) Support the validity of the selected approach
- 6) Identify trends and patterns
- 7) Serve as a scientific foundation and point of reference

**Table 1. Comparison Table with Other Papers (Novelty)**

Research Aspects	Researcher study	Abdirad & Krishnan (2022)	Kawa & Zdrenka (2024)	Yuli Eni & Chandra (2023)
Title	E-Supply Chain Management Factors That Influence Customer Satisfaction in E-Commerce Companies	Examining the Impact of E-Supply Chain on Service Quality and Customer Satisfaction	Logistics Value in E-Commerce and Its Impact on Customer Satisfaction and Performance	Impact of E-SCM on Customer Satisfaction Through Service Quality

Main Focus	The four E-SCM pillars and six key indicators have a direct influence on customer satisfaction.	The relationship between E-SCM and service quality leads to customer satisfaction.	Logistics value in e-commerce leads to customer satisfaction and loyalty.	The mediating role of service quality in the relationship between E-SCM and customer satisfaction.
Industry Context	General E-Commerce	Case study (specific location in Iran, company not specified as e-commerce)	E-Commerce (general online retailers, European context)	E-Commerce in the agricultural sector in Indonesia
Key E-SCM Variables	Strategic partnerships, CRM, information sharing, postponement, plus six additional key indicators.	Process Control, Supplier Interaction, Management Support, Customer Focus	Delivery Communication, Returns, Convenience, Reception Experience	Service quality as a mediating variable
Methodology	Electronic survey (Questionnaire), KMO-Bartlett test, Cohen's formula, SPSS v25.	Survey (n=150), Structural Equation Modeling (SEM)	Survey and regression (logistics value scores → satisfaction and loyalty)	Survey (n=446), SEM using AMOS.
Measurement Approach	Identification of six dominant indicators (e.g., visibility, adaptability, revenue, quality, tech optimization).	Conceptual model with direct and indirect effects.	Logistics value as a driver of customer experience.	Service quality as a bridge between E-SCM and customer satisfaction.
Visualization/ Representation of Results	No visualization, consistent with the requirement	Visual conceptual model available.	Structural model available	SEM visualization available
Geographical Coverage	Not explicitly stated (potentially broader or contextually expandable).	Iran	Poland and Eastern Europe (assumed based on the authors)	Indonesia
Research Novelty	Combines the four core pillars of E-SCM and derives six new dominant quantitative indicators.	-	-	-

This study makes a unique contribution by integrating both theoretical and practical approaches to identify six dominant quantitative indicators derived from the four foundational pillars of Electronic Supply Chain Management (E-SCM): Strategic Supplier Partnerships, Customer Relationship Management, Information Sharing, and Supply Postponement. This form of indicator development has not been conducted in the three comparative studies, making this research distinct in its operationalization of E-SCM components. Additionally, the methodology employed in this research adopts an exploratory statistical approach, utilizing the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy, Bartlett's Test of Sphericity, and Cohen's formula, which are analyzed via SPSS. This approach differs significantly from the more commonly used

Structural Equation Modeling (SEM) found in previous studies. As such, the study offers an alternative methodological path for evaluating E-SCM variables in relation to customer satisfaction.

Furthermore, the research directly investigates the relationship between E-SCM implementation and customer satisfaction, without incorporating mediating variables such as service quality, which were central in two of the three comparison studies. This direct approach allows a more focused analysis of the impact of E-SCM itself. Lastly, while prior research tended to be limited to specific industrial sectors or geographical regions (e.g., agriculture or single-country case studies), this study is designed with a more generalizable framework that can be applied across various sectors within the e-commerce landscape, thereby expanding its practical relevance and applicability.

### III. Research Method

This study employs a quantitative research method, which involves data collection techniques (e.g., questionnaires) and data analysis procedures (e.g., statistical tools) that generate or utilize numerical data. Quantitative research is commonly associated with positivism, a philosophical approach rooted in the natural sciences, which emphasizes empirical observation to produce objective and unbiased facts.

#### 3.1. Variable Operationalization

Operationalization converts abstract concepts into measurable variables, ensuring clarity and reliability. This study adopts validated indicators from prior research to assess key dimensions of e-SCM (Øby, 2024).

**Table 2. Variable Operationalization**

Variable	Indicators	No.
<i>E-Supply Chain Management</i>  According to Oliver, R. K. and Webber, M. D. (1982)	E-Supply Chain Management plays a vital role in ensuring the timely and accurate supply of raw materials.	1
	E-Supply Chain Management exerts a positive influence on e-commerce stakeholders by enhancing communication effectiveness.	2
	The implementation of E-Supply Chain Management can lead to improved service quality.	3
	E-Supply Chain Management facilitates companies in optimizing time efficiency.	4
	E-Supply Chain Management helps reduce transportation costs in raw material procurement.	5
	The implementation of E-Supply Chain Management leads to increased customer satisfaction.	6
	Users of E-Supply Chain Management are expected to gain a deeper understanding of technology.	7
	E-Supply Chain Management technology enables companies to adapt to market dynamics.	8
	E-Supply Chain Management enhances a company's responsiveness to customer needs.	9
	E-Supply Chain Management can broaden organizational insights.	10
	E-Supply Chain Management helps firms control finished product stock.	11
	E-Supply Chain Management enables companies to monitor their products remotely.	12
	E-Supply Chain Management can enhance a product's pricing.	13
	The implementation of E-Supply Chain Management improves cost accuracy.	14
	E-Supply Chain Management helps companies optimize human resource efficiency.	15
	E-Supply Chain Management enhances productivity within the company.	16

	E-Supply Chain Management helps companies maintain product quality and consistency.	17
	The implementation of E-Supply Chain Management helps companies prevent product unavailability.	18
	E-Supply Chain Management contributes to increased company revenue.	19
	The implementation of E-Supply Chain Management enables companies to optimize existing technologies.	20

Based on the operational variable table above, 20 indicators have been synthesized from previous studies and used as measurement tools to assess the implementation of E-Supply Chain Management in e-commerce companies.

### 3.2. Type of Research

This study employs a descriptive research design. Descriptive research typically involves quantitative methods to analyze variables such as demographics, satisfaction ratings, and performance metrics, as well as qualitative approaches to explore decision-making and organizational behavior (Schlenkrich et al., 2024).

### 3.3. Data Collection Technique

Data for this study were collected using a structured questionnaire, which consists of standardized, pre-formulated questions designed to be answered by respondents. The questionnaire applied in this study is of a closed-ended type, where participants respond based on predefined answer choices. A Likert scale is utilized to measure respondents' perceptions and attitudes toward each item. (Kawa & Zdrenka, 2024).

### 3.4. Data Analysis Method

The data analysis in this study employed factor analysis, a statistical technique used to identify interrelationships among multiple independent variables. The main goal of factor analysis is to group variables into one or more underlying factors that represent shared dimensions of data variation (Covei, 2025).

### 3.5. Respondent Profile

A total of 252 respondents participated in the survey. All respondents have experience shopping via e-commerce platforms, ensuring that the collected data reflects informed perceptions regarding the implementation of E-Supply Chain Management in e-commerce transactions.

#### a. Respondent Profile Based on Gender

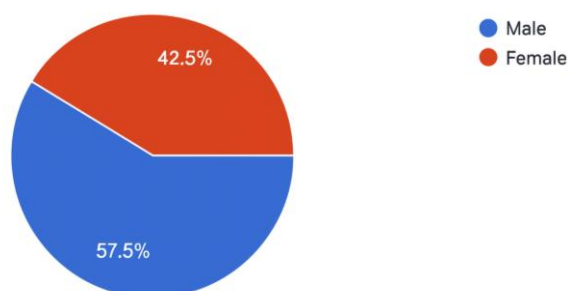


Figure 3. Respondent Profile Based on Gender

Based on the questionnaire results, the respondents comprised 145 males and 107 females, indicating a higher representation of male consumers in this study.

b. Respondent Profile Based on Highest Education Level

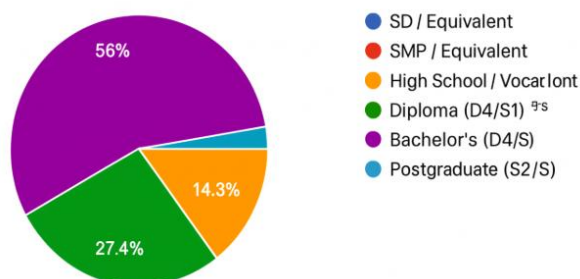


Figure 4. Respondent Profile Based on Highest Education Level

Based on the questionnaire results, there were no respondents with primary or junior high school education, 36 respondents with senior high school/vocational education, 69 with diploma levels (D1–D3), 141 with a bachelor's degree (D4/S1), and 6 with postgraduate degrees (S2/S3). Thus, the sample is predominantly composed of individuals holding bachelor's degrees.

c. Respondent Profile Based on Employment Status

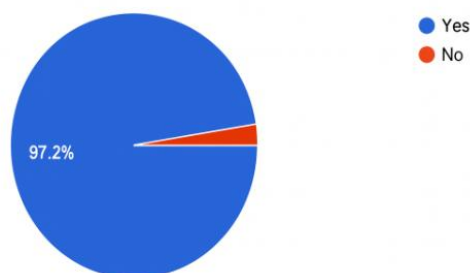


Figure 5. Respondent Profile Based on Employment Status

Based on the questionnaire results, 245 respondents were employed, while seven were unemployed at the time of survey completion. Thus, the data is predominantly from employed individuals, ensuring diverse respondent backgrounds.

d. Respondent Profile Based on the Most Recent Time They Shopped Using E-Commerce



Figure 6. Respondent Profile Based on the Most Recent Time They Shopped Using E-Commerce

Based on the questionnaire results, all respondents answered "Yes" when asked whether they had shopped on e-commerce platforms within the past month. Therefore, the questionnaire data are predominantly composed of respondents who use e-commerce.

e. Respondent Profile Based on Place of Residence.



**Figure 7. Respondent Profile Based on Place of Residence**

Based on the questionnaire results, all respondents answered "Yes" when asked if they currently reside in DKI Jakarta. Thus, the data is dominated by respondents living in DKI Jakarta.

#### IV. Results and Discussion

Based on the data processing conducted by the researcher using SPSS Version 25, all existing indicators and samples were included in the variable feasibility test.

The feasibility of these indicators was determined through the results of the Kaiser-Meyer-Olkin (KMO) and Bartlett's tests. The following are the data processing results, with the output shown below:

**Table 3. KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.604
Bartlett's Test of Sphericity	Approx. Chi-Square	957.335
	df	190
	Sig.	<.001

Based on the output of the Kaiser-Meyer-Olkin (KMO) and Bartlett's test conducted by the researcher, the KMO value is 0.604 with a significance level of 0.001. Therefore, it can be concluded that the indicators and samples are suitable for factor analysis since the KMO value is above 0.5 and the significance is well below 0.05 ( $0.001 < 0.05$ ).

The hypotheses for significance testing are as follows:

Ho = The sample (variables) is not adequate for further analysis

H1 = The sample (variables) is adequate for further analysis

Criteria based on probability (significance):

If Sig. > 0.05, then Ho is accepted

If Sig. < 0.05, then Ho is rejected

The Measure of Sampling Adequacy (MSA) ranges from 0 to 1, with the following criteria:

MSA = 1 indicates that other variables can perfectly predict the variable without error

MSA > 0.5 indicates that the variable is still predictable and can be analyzed further

MSA < 0.5 indicates that the variable cannot be predicted, cannot be analyzed further, and should be removed from the analysis

Furthermore, the analysis produced the Anti-image Correlation results, as shown in the Anti-image Matrices table. Below is a partial output of the data processing results (the full Anti-image Correlation output is available for completeness):

Anti-image Correlation	x1.1	.593 <sup>a</sup>	.257	.234	-.009	.160	-.003	-.129	-.192	-.141	-.014	-.212	-.181	-.209	-.169	-.155
x1.2	.257	.444 <sup>a</sup>	.288	.249	.056	.053	-.011	-.065	-.166	-.093	-.176	-.258	-.283	-.139	-.206	
x1.3	.234	.288	.374 <sup>a</sup>	.145	.271	-.030	.083	-.039	-.140	-.125	-.298	-.230	-.171	-.136	-.219	
x1.4	-.009	.249	.145	.583 <sup>a</sup>	.131	.202	-.063	-.002	-.124	-.065	-.247	-.279	-.111	-.156	-.147	
x1.5	.160	.056	.271	.131	.560 <sup>a</sup>	-.041	.158	.129	-.252	-.024	-.182	-.155	-.155	-.081	-.178	
x1.6	-.003	.053	-.030	.202	-.041	.691 <sup>a</sup>	.061	.137	-.192	-.013	-.010	-.088	-.101	-.237	-.002	
x1.7	-.129	-.011	.083	-.063	.158	.061	.708 <sup>a</sup>	-.041	.142	-.143	-.056	-.079	.091	-.159	-.107	
x1.8	-.192	-.065	-.039	-.002	.129	.137	-.041	.759 <sup>a</sup>	-.010	.051	-.049	-.040	-.035	-.032	-.075	
x1.9	-.141	-.166	-.140	-.124	-.252	-.192	.142	-.010	.649 <sup>a</sup>	-.199	.319	.006	.026	.059	-.031	
x1.10	-.014	-.093	-.125	-.065	-.024	-.013	-.143	.051	-.199	.692 <sup>a</sup>	.054	.222	-.021	-.119	.116	
x1.11	-.212	-.176	-.298	-.247	-.182	-.010	-.056	-.049	.319	.054	.564 <sup>a</sup>	.047	.155	.011	.056	
x1.12	-.181	-.258	-.230	-.279	-.155	-.088	-.079	-.040	.006	.222	.047	.581 <sup>a</sup>	.014	.150	.050	
x1.13	-.209	-.283	-.171	-.111	-.155	-.101	.091	-.035	.026	-.021	.155	.014	.609 <sup>a</sup>	.082	.262	
x1.14	-.169	-.139	-.136	-.156	-.081	-.237	-.159	-.032	.059	-.119	.011	.150	.082	.587 <sup>a</sup>	.088	
x1.15	-.155	-.206	-.219	-.147	-.178	-.002	-.107	-.075	-.031	.116	.056	.050	.262	.088	.583 <sup>a</sup>	
x1.16	.057	.040	-.013	-.046	-.136	-.100	-.148	-.180	-.092	-.148	-.054	-.128	-.124	.196	-.091	
x1.17	-.063	-.146	-.309	-.125	-.274	-.129	-.189	-.111	-.001	-.055	.044	.092	-.100	-.014	.195	
x1.18	-.021	-.072	-.045	.011	-.041	-.042	-.025	-.085	-.091	-.119	-.144	.025	-.057	-.161	-.159	
x1.19	-.035	-.021	.006	-.073	-.201	-.125	-.155	-.153	-.003	-.052	-.039	-.036	.000	.045	-.158	
x1.20	-.013	.029	.092	.042	.014	.067	-.029	.050	.004	-.011	-.021	-.027	-.228	-.181	-.065	

Figure 8. Anti-Image Correlation Results

Based on the partial output above, the anti-image correlation shows some indicators with MSA values below 0.5. The next step is factoring and rotation, which the researcher conducted to facilitate the grouping of indicators suitable for further analysis. Below are the resulting data outputs:

Table 4. Total Variance Explained

Component	Total	Initial (% Var.)	Initial (Cum. %)	Extraction (Total)	% of Variance	Cumulative %
1	3.346	16.729	16.729	3.346	16.729	16.729
2	2.332	11.658	28.387	2.332	11.658	28.387
3	1.586	7.928	36.315	1.586	7.928	36.315
4	1.538	7.692	44.007	1.538	7.692	44.007
5	1.200	6.001	50.009	1.200	6.001	50.009
6	1.032	5.159	55.168	1.032	5.159	55.168
7	.972	4.858	60.025			
8	.927	4.636	64.662			
9	.856	4.280	68.942			
10	.783	3.915	72.858			
11	.773	3.865	76.721			
12	.710	3.550	80.271			
13	.675	3.377	83.648			
14	.609	3.047	86.693			
15	.570	2.848	89.541			
16	.535	2.677	92.218			
17	.482	2.409	94.627			
18	.445	2.224	96.851			
19	.391	1.953	98.804			
20	.239	1.196	100.000			

#### 4.1. Results of Total Variance Explained

Based on the data analysis, 20 variables were included in the factor analysis. Among these, only six variables have eigenvalues greater than 1, namely components 1 (3.346), 2 (2.232), 3 (1.586), 4 (1.538), 5 (1.200), and 6 (1.032). Therefore, only 6 factor groups were formed. Additionally, the component matrix results are shown below:

**Table 4. Component Matrix<sup>a</sup>**

	1	2	3	4	5	6
x1.1	.459	-.377	.083	.191	.234	-.036
x1.2	.376	-.298	.032	-.252	.137	.572
x1.3	.360	-.110	-.259	.253	-.642	.100
x1.4	.412	-.431	.169	.160	.072	.159
x1.5	.384	.437	-.177	.053	-.050	-.116
x1.6	.368	.473	-.227	-.059	-.005	-.043
x1.7	.432	-.416	.021	.206	-.091	.049
x1.8	.462	-.356	.119	.026	-.051	.024
x1.9	.461	.252	-.180	.268	.029	-.314
x1.10	.407	.305	.321	.189	.181	-.397
x1.11	.385	.484	.174	.042	.130	.206
x1.12	.452	-.135	.366	.012	.307	.220
x1.13	.508	.469	.238	.300	.292	.135
x1.14	.408	-.004	.462	.348	.356	.124
x1.15	.496	.504	.187	.401	.132	.161
x1.16	.435	-.357	.471	-.048	.060	.234
x1.17	.447	.425	-.217	.040	.228	-.097
x1.18	.424	-.132	-.579	.269	-.096	-.234
x1.19	.393	-.226	.032	.450	.277	-.081
x1.20	.129	-.161	.481	.349	.419	.049

#### 4.2. Results of the Component Matrix

Based on the component matrix above, it can be concluded that there are six critical factors grouped according to the highest scores from each component, as shown below:

**Table 5: of Indicator Grouping**

No	Factor	Indicator
1	Factor 1	E-Supply Chain Management technology can help companies adapt to the market.
2	Factor 2	E-Supply Chain Management contributes to providing appropriate raw materials.
3	Factor 3	The implementation of E-Supply Chain Management helps to increase the company's revenue.
4	Factor 4	The implementation of Electronic Supply Chain Management enables companies to monitor product movement and availability in real time from different locations.
5	Factor 5	The implementation of E-Supply Chain Management helps the company maintain product quality.
6	Factor 6	By using E-Supply Chain Management, users can enhance their knowledge of technology.

#### 4.3. Calculation of Independent Sample Size Using Cohen's Formula

Cohen's formula is a statistical method used to calculate the effect size, which quantifies the magnitude of difference between two groups in a study or experiment. This formula was first developed by Jacob Cohen (2013), a prominent statistician, and is widely applied to measure the strength of the effect or difference between groups in comparative analyses. Effect size represents a practical measure of the significance of research results, expressed as the magnitude of correlation, difference, or the impact of one variable on another. This measure complements significance testing by providing additional insight into the substantive importance of findings. Furthermore, effect size facilitates the comparison of variable effects across studies that employ different measurement scales.

Effect size also serves as a criterion for selecting variables for further investigation. The chosen variables need not always have large or moderate effect sizes; researchers may opt to study variables with small effect sizes, particularly when focusing on variables that moderate or mediate relationships between other variables (Keppel & Winkel, 2004). This study aims to determine the effect size of factors related to E-Supply Chain Management influencing both company performance and customer satisfaction.

#### 4.4. T-Test

**Table 6. Group Statistics**

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Zscore(Total)	1	145	-.0504995	1.07949380	.08964708
	2	107	.0684339	.88127765	.08519633

The researcher calculated the effect size for the independent sample using SPSS Version 25.

**Table 7. Effect Size**

<b>Group 1</b>		<b>Group 2</b>	
Mean (M):	145	Mean (M):	107
Standard deviation (s):	88.05	Standard deviation (s):	88.62
Sample size (n):	5.160	Sample size (n):	4.213

Cohen's  $d = (107 - 145)/88.33546 = 0.430178$ .

Glass's  $\delta = (107 - 145)/88.05 = 0.431573$ .

Hedges'  $g = (107 - 145)/88.298846 = 0.430357$ .

Next, the researcher calculated the effect size for the t-test, yielding a Cohen's  $d$  of  $-0.43$ . According to Cohen's (1988) convention, this value falls between  $0.2$  and  $0.5$ , indicating that Cohen's  $d = -0.43$  represents a small effect size.

**Table 8. Independent Sample Test**

Variabel	t	df	Sig. (2-tailed)	Mean Difference	95% CI (Lower-Upper)
Zscore (Total)	-0.933	250	0.352	-0.119	-0.370 - 0.132

The results of the standardization test indicate that the new variable Z-score (Total) has a Mean Difference of  $-0.118$ , calculated with the effect size for the t-test.

## V. Conclusion

This study concludes that Electronic Supply Chain Management (e-SCM) has a direct and substantial influence on operational performance and customer satisfaction in e-commerce companies. Through a quantitative analysis involving 252 respondents, six dominant indicators were identified: market adaptation, inventory control, revenue improvement, remote product monitoring, product quality, and technology utilization. These indicators reflect the core pillars of e-SCM and demonstrate their practical impact on supply chain responsiveness, efficiency, and service quality. Unlike previous studies that often introduced mediating variables such as service quality, this research focuses on the direct relationship between e-SCM implementation and customer satisfaction. This approach provides clearer insights into the core impact of e-SCM itself and reinforces the strategic importance of digital integration in supply chain operations. Methodologically, this study also departs from the more commonly used structural equation modeling by applying exploratory factor analysis, offering a more straightforward yet robust statistical path for operationalizing e-SCM variables.

The findings do not contradict existing theories but instead extend them by offering a more measurable and adaptable framework for real-world application in diverse e-commerce contexts. Additionally, the generalizability of this framework across sectors makes it a valuable reference for both academic and managerial use. Future research can expand upon this model by introducing moderating or mediating factors such as digital literacy, trust, or organizational agility. Comparative studies across countries or industries, as well as longitudinal research, are recommended to explore how e-SCM maturity affects long-term customer engagement and business performance. This study serves as both a foundation and a stimulus for deeper exploration of digital supply chain strategies in today's evolving commerce landscape.

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