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Article

The Determinants of Small and Medium-Sized Enterprises' Orientation Towards Electronic Commerce: The Case of Ankara Province

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Abstract: Small and Medium-Sized Enterprises have an important position in the world economy. In order to respond to changing needs in a competitive environment, they need to follow technological innovations and integrate them into their businesses. In the study conducted to determine the strategic value perception that is effective in SMEs' orientation towards E-commerce, the applicability of E-commerce and the effects of E-commerce on the marketing and financial performance of businesses, data was collected from 260 businesses with a survey in 2016 and 2025. Descriptive statistics, confirmatory factor analysis, t-tests, correlation, regression and Anova analyses were applied to the data. One of the important findings in the study is that the "share of electronic commerce in total sales volume" increased in 2025 compared to 2016. Similarly, the increase in the number of women in managerial positions is also remarkable. It is also seen that managers have understood the importance of E-commerce over the years and have developed applications for this purpose. As a result, it has been determined that there has been an increase in the marketing and financial performance of businesses. The results also support previous studies on the subject. The results provide significant contributions to decision makers in making regulations, increasing the efficiency of managers, and investors in understanding the regional economy.

Keywords: Electronic Commerce; Small and Medium-Sized Enterprises; Financial Performance; Marketing Performance

1. Introduction

Trade has been one of the fundamental elements of economic relations throughout history and has constantly changed with the development of societies. While traditional economic and trade models evolved with the industrial revolution and globalization, advances in information and communication technologies have paved the way for the digitalization of trade today. In the traditional economy, labor-based and capital factors are necessary for production [1]. However, in today's new economy, human factors have become less important [2], and the Internet based on information and communication technologies (ICT) has become more important factors [3]. Factors such as economic stagnation, inflation, and unemployment in developed countries in the 1990s shaped the development process of new economic dynamics and, as a result, encouraged investments in information communication technologies and applications [4].

In commercial terms, the Internet can be considered a tool or product to reach different consumer groups. As a result of the proliferation of commercial activities through the Internet, the concept of electronic commerce (E-commerce) has emerged [5]. The Turkish Language Association defines trade as "buying and selling products, goods or services." However, since E-commerce can be used not only for commercial activities but also in many different fields, it is obvious that the definition will not be sufficient to explain E-commerce [6]. However, the Internet's widespread use and information infrastructure developments have enabled E-commerce to grow rapidly, allowing businesses to reach

broader markets by crossing geographical borders. E-commerce has dramatically transformed the traditional understanding of trade by offering advantages such as low-cost market entry, fast access, effective data management, and direct access to the customer base. Small and Medium-sized Enterprises (SMEs) have benefited the most from this transformation. Thanks to E-commerce, SMEs not only have the power to compete with larger-scale companies but also have the opportunity to expand their customer base by opening up to international markets.

The transition to E-commerce is not equally easy for every business, and factors such as financial inadequacies, lack of digital literacy, and technical infrastructure deficiencies make it difficult for SMEs to integrate into this process. In addition, businesses that cannot keep up with digital transformation face the risk of losing their competitiveness and being unable to sustain their existence in the market [7]. Considering that most of today's trade takes place on digital channels such as websites, marketplace platforms, or other social media channels, it has become inevitable for SMEs to take advantage of the advantages offered by E-commerce in terms of growth, development, and sustainability. In this context, incentive mechanisms such as financial support, training programs, and technical infrastructure investments should be created to accelerate the adaptation of SMEs to E-commerce, just like large enterprises or conglomerates, and existing practices and programs should be improved so that enterprises can become more competitive in the digital market.

In this context, the study seeks answers to the following questions;

- Is the strategic value of E-commerce for SMEs perceived correctly?
- What is the level of applicability of E-commerce for SMEs?
- Do SMEs benefit from E-commerce?
- Are the results obtained in different years similar?

The following sections of the study include the theoretical framework of the concepts, the methodology applied, analyses and findings, and finally, conclusions and contributions.

2. Theoretical Framework

The importance of gaining an advantage in increasing competition conditions with globalization has been understood increasingly, and researchers have conducted different studies in the literature on E-commerce and SMEs. Most of the studies have focused on the conceptual and theoretical framework to make the subject understandable, and many different definitions have been made, especially for E-commerce.

2.1. E-Commerce

Continuous developments in technology continue to affect commercial life both directly and indirectly. Electronic commerce methods, whose usage area and applicability are gradually expanding, have started to replace traditional trade models. E-commerce, which has a comprehensive structure in terms of scope, is of great importance, especially for the sustainability and competitiveness of SMEs, thanks to the various elements and tools it offers. In its most basic form, E-commerce uses electronic platforms such as the Internet to conduct commercial transactions. E-commerce growth has changed how businesses transact and created new opportunities for them to streamline their business operations. With E-commerce tools, companies can connect more easily and quickly with customers, suppliers, and partners, facilitating the exchange of information, goods, and services [8]. With E-commerce, companies gain additional advantages such as lower transaction costs, shorter production cycles, and a more comprehensive product range [9]. Thus, companies can optimize their business processes, improve customer service, and offer more products or services [10].

E-commerce differs from classical trade in terms of some basic features. The main differences between these two types of trade can be listed as follows [11]:

- Access to information: In traditional commerce, consumers access the information they need by contacting the business directly, whereas in E-commerce, they can easily access this information through web pages.

- Costs: While businesses face rent, personnel, and other physical store expenses in classical trade, E-commerce significantly reduces these costs. This cost reduction is reflected in prices, making electronic goods and services more affordable.
- Product diversity: E-commerce sites that sell online offer a wide range of products, giving buyers more choices. In contrast, physical stores can offer a more limited range of products due to space constraints.
- Fast comparison and purchase: On E-commerce platforms, consumers can log in to the site within a few minutes, compare all the features and prices of products, and make their decisions quickly. After completing the purchase within seconds, they can easily deliver their products to the specified address, thanks to the delivery option.

E-commerce, a comprehensive concept not limited to a single definition, first emerged in the United States and has been conducted through English-language web pages for many years [12]. E-commerce, which has continuously evolved since its emergence, today allows online retail platforms such as Amazon and Alibaba to become widespread and new actors to join the sector.

The literature offers various definitions of E-commerce based on different perspectives. In the traditional sense, trade can be defined as exchanging, buying, and selling goods and services for monetary consideration to make a profit. For trade to occur, there must be a profit-making motive, and producers and consumers must be involved. In most cases, intermediaries, who are themselves profit-seeking, come between these two parties. This situation is slightly different for E-commerce [13].

The State Planning Organization emphasizes the importance of the principle of trust by addressing E-commerce from a public perspective. Electronic commerce is defined as an integrated system that involves the realization of trade and the approval of documents related to trade by connecting public institution networks and companies based on the principle of mutual trust [14]. Digitizing the documents frequently used in public institutions and organizations will provide significant savings in terms of time and cost.

Definitions vary according to researchers' approaches to the subject. Transactions carried out in the digital environment for purposes such as education, public information, and advertising that have economic consequences or support commercial processes are also considered within the scope of E-commerce [15]. In another study, E-commerce is defined as the buying, selling, and exchanging products and services using electronic data via the Internet [16]. According to the World Trade Organization (WTO), E-commerce is producing, marketing, selling, and distributing products and services through communication and transportation networks [17]. Developments in information and communication technologies and the rapid increase in internet usage have paved the way for forming an information-based economic order. In the globalizing world, the realization of commercial transactions electronically in this new economic order is called "E-commerce" [18].

The rapid development of information technologies has led to significant changes in the business environment and provided businesses with new ways to trade. Today, competition is not limited to local market businesses but also national companies with different E-commerce models. Moreover, start-ups emerge as strong competitors in this dynamic ecosystem [19]. In particular, some E-commerce models have radically changed trade rules in specific sectors. For example, platforms such as Airbnb in the accommodation and rental sector, Netflix in the movie and TV series streaming sector, and Uber in the taxi and transportation sector have set new standards in the industry by transforming traditional business models. As a result of this transformation, local businesses are forced to regularly review and renew their business models to maintain their competitive advantage [19].

Categorizing E-commerce by the type of parties involved in transactions or business processes is widely accepted as a common and effective method of defining online businesses [12]. E-commerce occurs through various commercial relationships between consumers, businesses, and governments [20].

In general, E-commerce types are classified as follows [20]:

- B2B (Business to Business): Business-to-business E-commerce is a type of E-commerce where more than one consumer and company can meet at a common point and carry out their buying and selling transactions on an electronic platform.
- B2C (Business to Consumer): Business-to-consumer E-commerce refers to the daily shopping made by many users by visiting businesses' websites, virtual stores, mobile applications, or virtual marketplaces.
- B2G (Business to Government): In business-to-government E-commerce, transactions between businesses and the government/public are carried out digitally. The government is the largest buyer of almost all services and products.
- C2B (Consumer to Business): Consumer-to-business E-commerce allows buyers to propose prices to businesses and make comparisons between sellers. It is also frequently encountered as an auction method.
- C2C (Consumer to Consumer): Consumer-to-consumer E-commerce is an E-commerce method that establishes communication between consumers. In C2C E-commerce, the consumer is both a buyer and a seller.

In addition, with E-commerce development, new types of commerce, such as mobile and social media marketing, are becoming widespread.

2.2. Small and Medium Enterprises

SMEs are recognized worldwide as the main force of the economy and account for between 70% and 98% of the national economy of almost every country, regardless of its level of development [21]. This concrete fact has become a constant focus of the authorities in developing the world economy. Therefore, incentives are offered for SMEs to make the necessary breakthroughs to ensure countries' economic growth, and various policies are developed to support them legally, financially, and technologically.

In particular, the United States of America (USA), the European Union (EU), and in recent years, Turkey have taken important steps in developing SMEs. These countries have promoted entrepreneurship, creativity, and innovation as their primary objective. In addition, public institutions, organizations, and professional associations provide financial resources to SMEs and work sensitively to guide company founders, managers, and employees by organizing training and development programs [22]. SMEs are indispensable in promoting economic growth, technological innovation, and employment growth. However, SMEs struggle to adapt to innovative technologies or activities due to their characteristics, such as short operating years, small scale, and low credit qualification [23].

Economically important SMEs are classified in different ways. Although they are an important economic element, they are not yet fully understood. A careful examination of the classifications of SMEs can lead to a more accurate understanding of their importance and, accordingly, an increase in investments in SMEs [22].

There are different definitions of SMEs in the literature. This situation is mainly due to regional differences and many different institutions define SMEs. For example, definitions by international trade authorities are usually considered from the global perspective. Similarly, there are different definitions of SMEs for regional economies. Despite the different definitions, some key elements define SMEs in a common framework [24]:

- Number of employees working in the company,
- Annual turnover,
- Foreign trade activities of the company,
- Shareholders' equity and other similar financial indicators.

Today, SMEs have been identified as making significant economic and social contributions to the country. Despite changes in global dynamics, SMEs can also play an active role in the international market. However, despite these advantages, SMEs face some challenges [25]. SMEs are often recognized for their entrepreneurial side. Although they need to grow their business volumes

with their entrepreneurial spirit, some firms may prefer to move away from entrepreneurial activities due to the problems and costs they may face during the growth process [26].

Since many international and regional institutions and organizations have definitions of SMEs, which may confuse them, the EU has established a standard definition of SMEs and recommended it to member or candidate countries. Within this framework, in Turkey, the definition of SMEs has been brought in line with EU standards with the "Regulation on the Definition, Qualifications and Classification of Small and Medium-Sized Enterprises" published in the Official Gazette dated November 18, 2005, and numbered 25997 and entered into force on May 18, 2006 [27].

According to this regulation, an SME is defined as an enterprise that employs less than two hundred and fifty employees and whose annual net sales revenue or financial balance sheet does not exceed forty million Turkish Liras. Furthermore, SMEs are classified as follows:

- Micro Enterprise: Enterprises with fewer than 10 employees and an annual net sales revenue or financial balance sheet not exceeding 1 million Turkish liras.
- Small Business: Businesses with less than 50 employees and annual net sales revenue or financial balance sheet not exceeding 8 million Turkish liras.
- Medium-sized Enterprise: Enterprises with fewer than 250 employees and an annual net sales revenue or financial balance sheet not exceeding 40 million Turkish liras.

The dynamic structure of global economies is directly related to SMEs' existence and functions. Both globally and in Turkey, SMEs have been largely unaffected by economic crises and have even played an important role in overcoming them. SMEs play a critical role "not only in underdeveloped countries but also in developing countries such as Turkey and developed economies in creating employment and value added [28].

According to the Turkish Statistical Institute (TurkStat), SMEs in Turkey account for 99.7% of the total number of enterprises. The contributions of SMEs to the economy are as follows [29]:

- 70.5% of total employment
- 47.9% of personnel costs
- 47.4% of turnover
- 41.6% of production value
- SMEs accounted for 40.1% of value added at factor cost.

These data reveal SMEs' importance in the national and international economies.

Fundamentally, E-commerce adoption can bring numerous benefits to small businesses, including increased efficiency, competitiveness, and market access [30]. E-commerce technologies can improve the operational efficiency of SMEs by optimizing process management and increasing market orientation through improved market knowledge [31]. They can also improve the effectiveness of various business operations and enhance an organization's ability to adapt to changing market conditions; change their value proposition, value creation, and value capture mechanisms; and define the scope and level of digitalization they want to achieve [32]. Digitalization has also affected how consumers and businesses interact [33]. Thanks to emerging technology, consumers have access to numerous channels through which they can easily communicate with companies and other consumers [34]. For this reason, it is economically important for SMEs to turn to E-commerce and successfully adapt to E-commerce. Figure 1 shows the important elements of E-commerce adaptation for SMEs.

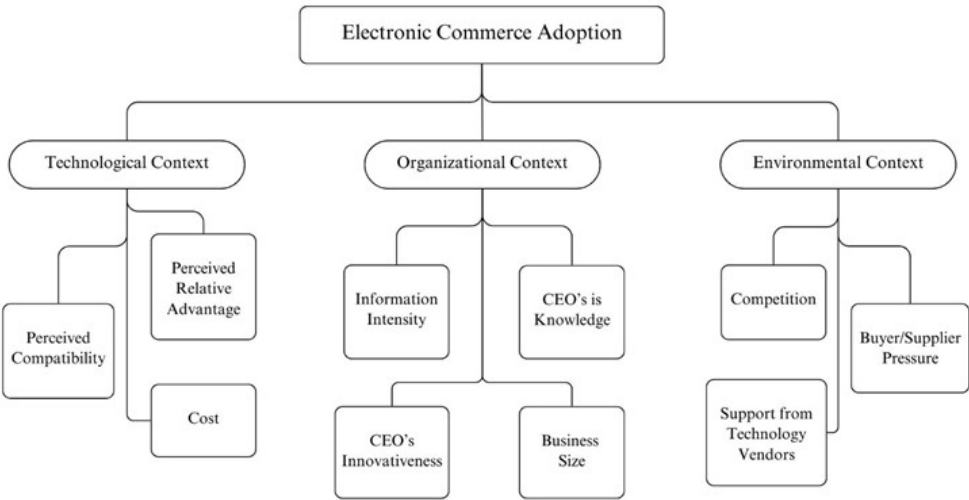


Figure 1. Adoption of SMEs to Electronic Commerce. Source: Adapted from [35].

3. Methods

This study aims to determine the strategic value SMEs perceive when starting E-commerce, whether they have the necessary infrastructure and resources to start E-commerce, and whether E-commerce affects enterprises’ marketing and financial performance. For this purpose, data were collected by survey method in SMEs operating in Ankara -Ivedik Organized Industrial Zone (OIZ). In the following sections, the population and sample, the measurement tools of the variables measured in the study, and how the data were collected are given in detail.

3.1. Population and Sample

In this study, a questionnaire was used as a data collection method. The first survey was conducted between March 2016 and June 2016, and the second between February 2025 and March 2025 for 260 SMEs operating in Ankara-Ivedik OIZ. As a result of the interviews with the IT department of Ankara-Ivedik OIZ and the information obtained from the official website, it was learned that the number of companies actively operating in the industrial zone is approximately 5100 for 2016 and approximately 9200 for 2025 [36].

Excluding the subsidiaries of large enterprises, there are approximately 4,300 enterprises operating in the region with SME status in 2016 and approximately 8900 enterprises in 2025. The list of companies that participated in similar studies was reviewed, and this number was reduced to approximately 512 companies. In March and April 2016 and February 2025, preliminary interviews were conducted with companies by phone and one-on-one visits, and they were asked whether they would participate in the study. Two hundred sixty enterprises that voluntarily agreed to participate were surveyed in 2016, and 260 enterprises in the same region were surveyed in 2025 to compare the results better.

Ankara-Ivedik OIZ was chosen because of its high concentration of SMEs and diversity of commercial activities. During the data collection, one-on-one appointments were made with the companies, and direct interviews were conducted with the managers. In terms of the reliability of the data obtained, a voluntary sample was selected, and thus, data about the study’s population was obtained with high accuracy.

The data collection process was not rushed, so the respondents understood the survey questions correctly and responded truthfully. The study was applied to SMEs operating in different sectors and managers in different departments working in these enterprises.

3.2. Measurement Tools

The “Strategic Value Perception of E-commerce” and “Applicability of E-commerce” scales used in the study were translated into Turkish using Grandon and Pearson’s (2004) study [37]. The “Financial Performance of Businesses” scale was taken from Bulut et al. (2009) [38] and Kuivalainen and Sundqvist (2004) [39]. Weerawardena’s (2011) [40] scale was utilized to measure the “Marketing Performance of Businesses.”

In the first part of the questionnaire, in addition to demographic variables, there are statements measured under three main headings:

- 1. Strategic Value of E-commerce
- 2. Applicability of E-commerce (Initiation)
- 3. Financial and Marketing Benefits of E-commerce for Businesses

The sub-statements operationalizing these headings are rated using a 5-point Likert scale (1 - Strongly Disagree, 2 - Disagree, 3 - Moderate, 4 - Agree, 5 - Strongly Agree).

- To measure the Strategic Value of E-commerce, 15 statements were used in 3 dimensions: organizational support, managerial efficiency, and tools that facilitate decision-making [37].
- To measure the feasibility of E-commerce, 23 statements were included in 5 dimensions: organizational readiness, compatibility, external environmental pressure, ease of use, and perceived benefit [37].
- To measure the benefits businesses, obtain from e-commerce, 8 statements including financial and marketing performance dimensions were used [39,40].

4. Analysis and Findings

First, demographic information about businesses and managers is included. Then, confirmatory factor analysis was conducted with SPSS-Amos software to determine the perception of the strategic value of E-commerce and confirmatory factor analysis to determine the applicability of E-commerce. Reliability analysis was conducted for the dependent variables, marketing performance, and financial performance items, and the four-item values were summed and divided by the number of items. Thus, variables were created to represent these items. Afterward, a one-sample t-test was conducted to determine the median value difference of the variables, correlation analysis of the variables, regression analysis, and t-test and ANOVA test to determine whether the variables differ according to age and gender.

4.1. Findings of the Managers and Enterprises Participating in the Study

General information about the enterprises and managers who participated in the survey is presented in Table 1.

		2016		2025	
		n	%	n	%
Gender	Male	224	86.2	201	77.3
	Female	36	13.8	49	22.7
Age	36 years old and less	88	33.8	92	35.4
	37-42 years old	91	35.0	85	32.7
	43 years old and older	81	31.2	83	31.9
Education Level	Primary education	28	10.8	15	5.8
	High School	104	40.0	97	37.3
	Associate degree	32	12.3	39	15.0
	Bachelor’s-Postgraduate	96	36.5	109	41.9
Years of Employment in Current Position	5 years and less	57	21.9	68	26.1
	6 to 10 years	112	43.1	106	40.8
	11 to 15 years	40	15.4	45	17.3

Total Number of Employees	16 years and more	51	19.6	41	15.8
	3 people and less	56	21.5	60	23.1
	4 to 6 people	102	39.2	98	37.7
	7 to 9 people	42	16.2	47	18.1
	10 people and more	60	23.1	55	21.1
Business Sector	Service	63	24.2	27	10.4
	Production	70	26.9	64	24.6
	Trade	55	21.2	75	28.9
	Other	72	27.7	94	36.1
Does the company have a website?	Yes	58	22.3	63	24.2
	No	54	20.8	67	25.8
Does the Business Do E-commerce?	Yes	113	43.5	101	38.8
	No	35	13.5	29	11.2
How many years has the business been using E-commerce?	5 years and less	228	87.7	251	96.5
	6 to 10 years	32	12.3	9	3.5
	11 years and more	234	90.0	257	98.8
What is the Share of E-commerce Sales in Total Sales?	25% and less	26	10.0	3	1.2
	26% to 50%	83	31.9	50	19.2
	51% to 75%	98	37.7	118	45.4
	76% and more	79	30.4	92	35.4

Source: Prepared by the author

Table 1 shows that;

For 2016, 86.2% of the respondents were male, 13.8% were female, 33.8% were 36 years old or younger, 35.0% were 37-42, and 31.2% were 43 or older. The rate of those with primary education is 10.8%; high school is 40.0%; associate’s degree is 12.3%; bachelor’s or postgraduate is 36.5%.

For 2025, 77.3% of the respondents are male, 22.7% are female, 41.8% are 36 or younger, 38.0% are 37-42, and 20.2% are 43 or older. The rate of those with primary education is 8.6%, high school is 39.0%, associate’s degree is 13.1%, and bachelor’s and graduate degree is 39.3%.

For 2016, 21.9% of the respondents had 5 years or less in their current position, 43.1% had 6-10 years, 15.4% had 11-15 years, and 19.6% had 15 years or more. The rate of those working in the current enterprise for 5 years or less is 21.5%; 6-10 years is 39.2%; 11-15 years 16.2%; 15 years or more is 23.1%. Those with three or fewer employees account for 24.2%; those with 4-6 employees account for 26.9%; those with 7-9 employees account for 21.2%; and those with 10 or more employees account for 27.7%. The proportion of service sector enterprises is 22.3%; the production sector is 20.8%; the trade sector is 43.5%; and the other industry is 13.5%

Among the participants, the rate of those who have a website in their businesses is 87.7%; the rate of those who do not have one is 12.3%; the rate of those who have E-commerce in their companies is 90.0%; the rate of those who do not have one is 10.0%. The rate of those who have been engaged in E-commerce for 5 years or less is 31.9%, and those with 6-10 years is 37.7%; the rate of those with 11 years is 30.4%. It is seen 26.2% of the participants stated that E-commerce sales contributed 25% or less to the total sales volume; 40.0% of the participants noted that it contributed between 26%-50%; 23.8% of the participants stated that it contributed between 51%-75%; and 10.0% of the participants said that it contributed 76% or more.

For 2025, 26.1% of the participants have five or fewer years of experience in their current position, 40.8% have 6-10 years of experience, 17.3% have 11-15 years of experience, and 15.8% have 15 years or more. The rate of those working in the current enterprise for 5 years or less is 23.1%; 6-10 years is 37.7%; 11-15 years 18.1%; 15 years or more is 21.1%. The proportion of those with three or fewer employees is 10.4%; those with 4-6 employees is 24.6%; those with 7-9 employees is 28.9%;

those with 10 or more employees is 36.1%. The proportion of those whose business sector is service is 24.2%, production is 25.8%, trade is 38.8% and other is 11.2%.

Among the participants, the rate of those who have a website in their businesses is 96.5%; the rate of those who do not have a website is 3.5%; the rate of those who are engaged in E-commerce in their businesses is 98.8%; the rate of those who are not engaged in E-commerce is 1.2%. The rate of those engaged in E-commerce for 5 years or less is 19.2%; the rate of those aged 6-10 years is 45.4%; the rate of those aged 11 years is 35.4%. It is seen that 13.8% of the participants stated that E-commerce sales contributed 25% or less to the total sales volume; 29.2% stated contributed between 26%-50%; 43.8% that it contributed between 51%-75%; and 13.2% said that it contributed 76% or more.

4.2. Findings on the Strategic Value of E-Commerce

The responses of SME managers to 15 statements to determine their perceptions of the strategic value E-commerce can provide to their businesses were analyzed by Confirmatory Factor Analysis (CFA). The findings are presented in Table 2.

In the confirmatory factor analysis, firstly, it was examined whether the components (Organizational Support, Managerial Efficiency, and Tools to Facilitate Decision-making) that make up the perception of the strategic value of E-commerce for SMEs, which were also discussed in Grandon and Pearson’s (2004) [37] study, form the same structure in this study. In the analysis process, the identical items (V3, V6, and V7) that did not adequately represent the dimensions determined for 2016 and 2025, i.e., the impact level was 0.00, were excluded from the analysis, and the measurement tool was finalized. Figure 2 presents the fit index values and mean standard deviation of E-commerce’s strategic value, the sub-dimensions reliability, and the dimensions’ correlation tables.

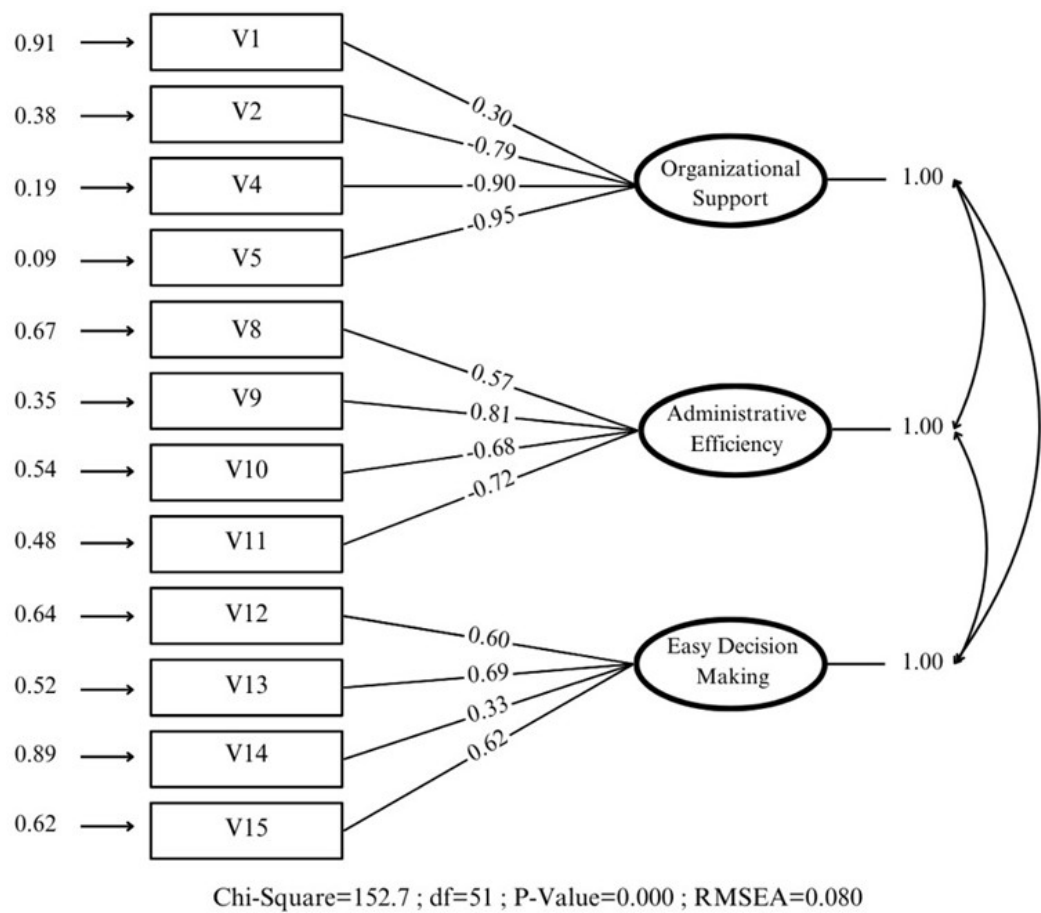


Figure 2. Confirmatory Factor Analysis of Strategic Value Perception of E-commerce (2016).

Figure 2 shows the “Confirmatory Factor Analysis of Strategic Value Perception of E-commerce” for the 2016 application. Figure 3 shows the “Confirmatory Factor Analysis of Strategic Value Perception of E-commerce” for the application in 2025. Although there is no change in the factors measuring each dimension, slight changes are observed in factor loadings.

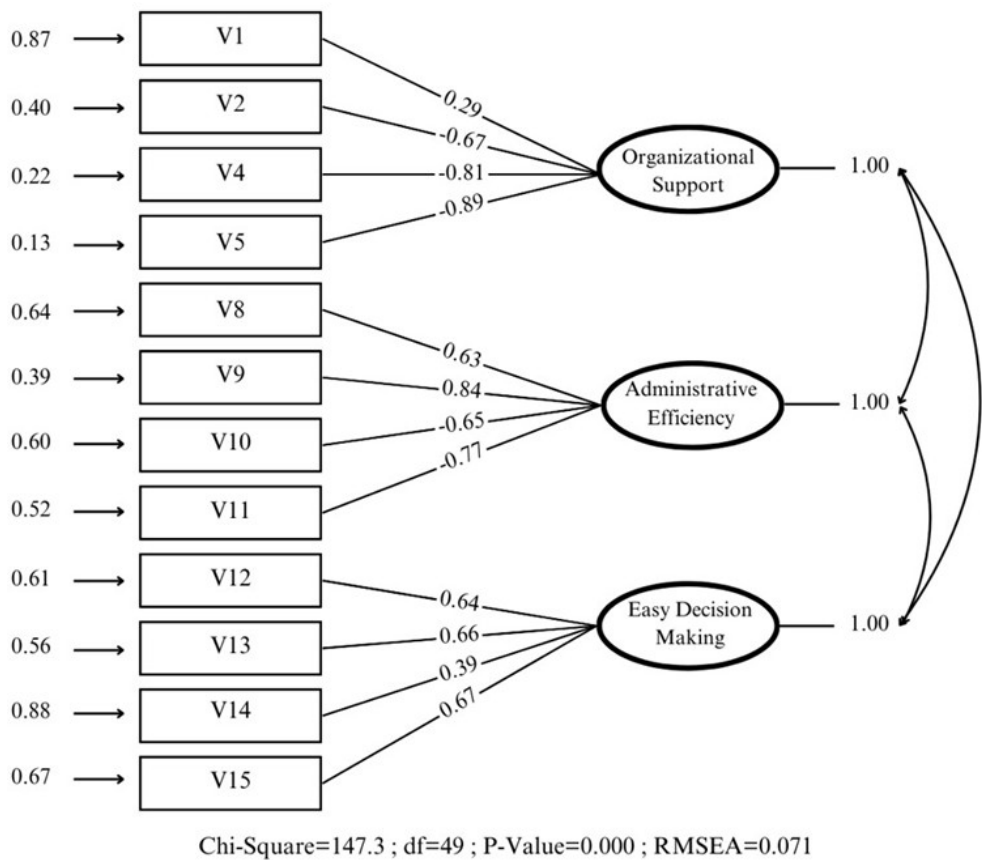


Figure 3. Confirmatory Factor Analysis of Strategic Value Perception of E-commerce (2025).

Measurement tests on E-commerce’s strategic value perception based on 2016 and 2025 data yielded almost the same results. For the model to be significant, the RMSEA value should be below 0.080, and the chi-square/degrees of freedom (χ^2/df) should be below 3. Although the model supports the dimension with $\chi^2/df = 246.70/87 = 2.83$ and $RMSEA = 0.080$, it was determined that the dimensions were not supported for some items. In the study, the seventh item under the organizational support factor was removed from the scale since its loading value, the level of explaining the dimension was $r^2 = 0.00$, and the error coefficient was Similarly, the sixth item under the organizational support factor was removed from the scale since its loading value was $r^2 = 0.01$ and its error coefficient was 0.99. After this process, the analysis was repeated, and $\chi^2/df = 197.97/62 = 3.19$ and $RMSEA = 0.070$. However, when the model was analyzed, it was determined that some items still did not support the dimensions. The study removed the third item in the organizational support factor from the scale since its loading value was $r^2 = 0.030$ and its error coefficient was 0.097. Then, the analysis was repeated, resulting in values of $\chi^2/df = 152.7/51 = 2.99$ and $RMSEA = 0.080$. The results of the confirmatory factor analysis for the strategic value perception of E-commerce for 2016 and 2025 are presented in Table 2.

Table 2. E-commerce Strategic Value Perception Confirmatory Factor Analysis Fit Values.

Fit Indices	High Compliance	Acceptable Compliance*	Goodness of Fit Results (2016)	Goodness of Fit Results (2025)
GFI	$\geq 0,90$	0,89 – 0,85	0,910	0,920

CFI	≥ 0,97	≥ 0,95	0,900	0,920
AGFI	≥ 0,90	0,89 – 0,85	0,860	0,870
NNFI	≥ 0,95	0,94 – 0,90	0,870	0,920
SRMR	≤ 0,05	≤ 0,1	0,084	0,091
RMSEA	≤ 0,05	0,06 – 0,08	0,080	0,071
x ² /sd	≤ 3	4 - 5	2,980	2,740

* [41-51]

Upon examination of Table 2, it is evident that the model developed for the strategic value perception of E-commerce in 2016 demonstrates a high degree of fit, as evidenced by the χ^2/sd and GFI values. The model exhibits an acceptable level of fit, as indicated by the AGFI, SRMR, and RMSEA values. However, it demonstrates a low level of fit, as demonstrated by the CFI and NNFI values. Despite considering varying fit values in disparate studies, the model's significance emerges when evaluated against the aggregate fit values obtained. Projections indicate that, by the year 2025, the model will demonstrate an adequate fit based on χ^2/sd and GFI values, an acceptable fit based on AGFI, NNFI, SRMR, and RMSEA values, and a suboptimal fit based on CFI values. A comparison of the 2025 model results with those of the 2016 model reveals the emergence of a more significant model in 2025.

4.3. Applicability of E-Commerce

In order to ascertain the elements that should be present in the company prior to the implementation of E-commerce in terms of SMEs, the values that should be embedded within the business when utilizing E-commerce tools, and the anticipated benefits, a survey was administered to the participants across five dimensions. The data obtained were then subjected to confirmatory factor analysis. During the analysis process, the items (A3, A6, A7, and A12) that did not adequately represent the dimensions determined for both 2016 and 2025, i.e., with an effect level of 0.00, were excluded from the analysis. As a result, the measurement tool was finalized. The results obtained are presented in Figure 4 for the year 2016 and Figure 5 for the year 2025.

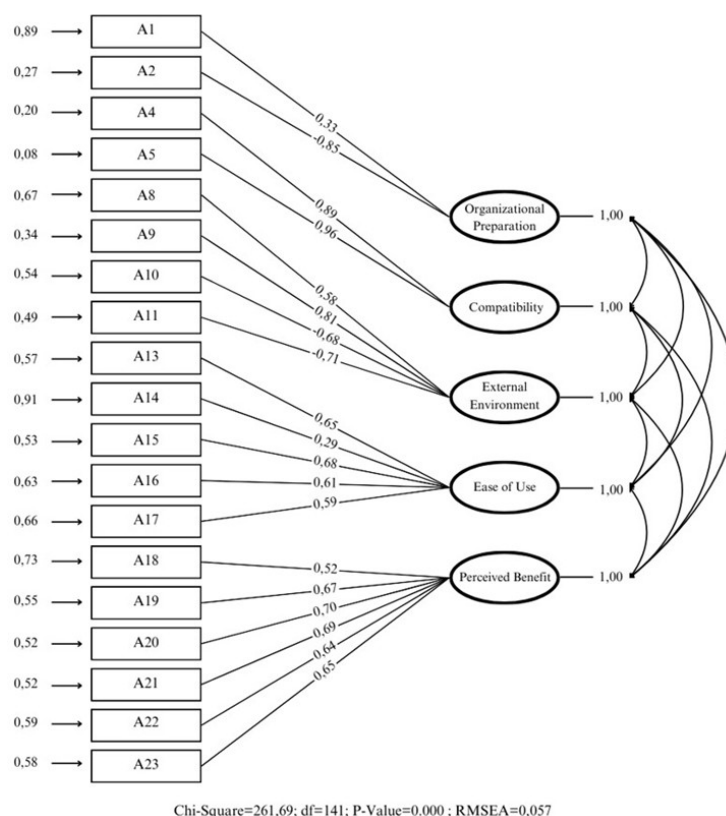


Figure 4. Confirmatory Factor Analysis of E-commerce Applicability (2016).

Figure 4 shows the “Confirmatory Factor Analysis of E-commerce Applicability” for the implementation in 2016, and Figure 5 shows the “Confirmatory Factor Analysis of E-commerce Applicability” for the implementation in 2025. Although the factors measuring each dimension do not change, slight changes are observed regarding factor loadings.

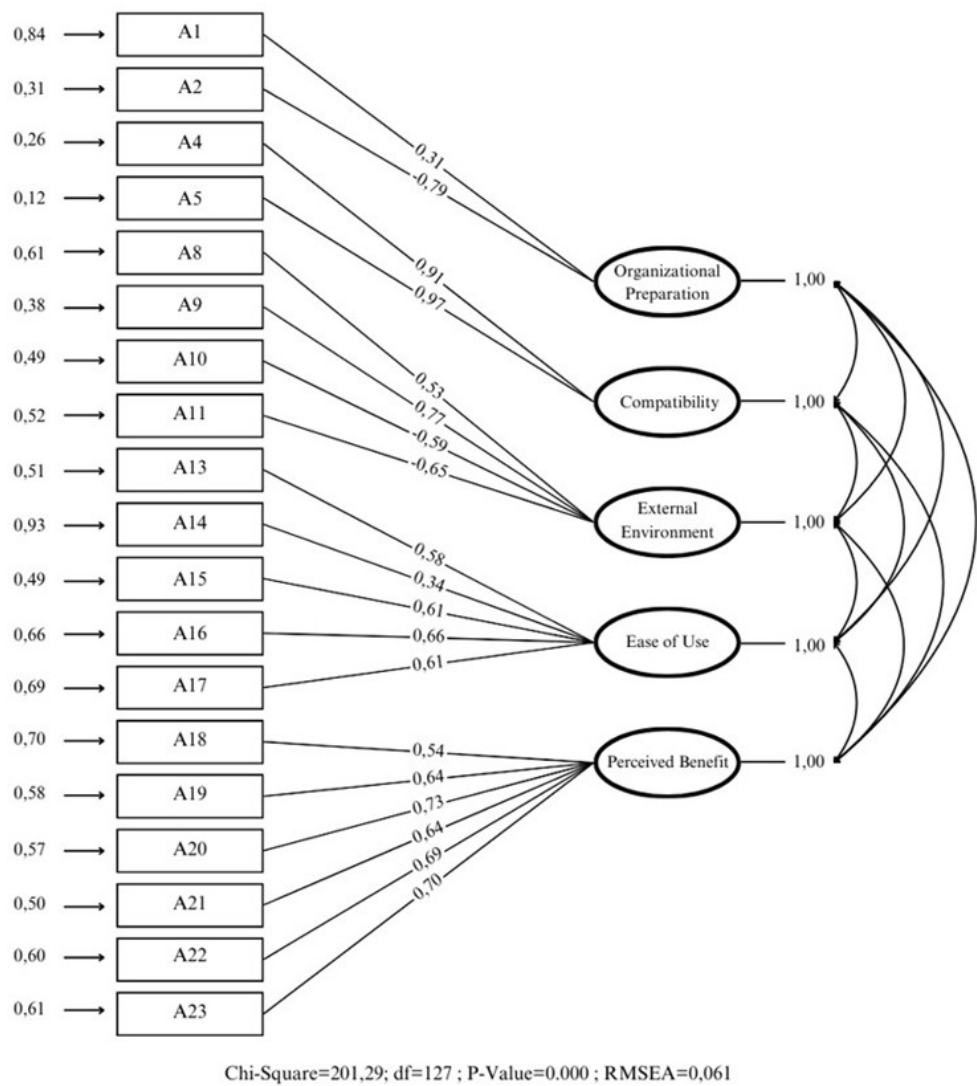


Figure 5. Confirmatory Factor Analysis of E-commerce Applicability (2025).

According to the measurement test on the applicability of E-commerce, the RMSEA value should be below 0.080, and the chi-square/freedom value (χ^2/sd) should be below 3. Despite the construct’s support for the dimension, as evidenced by the χ^2/sd . With a ratio of $525.41/220 = 2.38$ and an RMSEA of 0.070, it was determined that certain items did not align with the dimensions. In the study, the seventh item under the compatibility factor was eliminated from the scale because its loading value, defined as the degree to which it explains the dimension, was $r^2 = 0.0005$, and its error coefficient was 1. Similarly, the sixth item in the compatibility factor was deemed suitable for removal from the scale because its level of explanation of the dimension was $r^2 = 0.02$, and its error coefficient was 0.98 (high). In this form, the data were tested and $\chi^2/sd. = 451.79/179 = 2.52$ and RMSEA = 0.070.

Although the structure supports the main dimension, the detailed data analysis determined that some items were insufficient to explain the relevant dimensions and were removed. The third item under the compatibility factor in the study was removed from the scale since its loading value $r^2 =$

0.03 and its error coefficient was 0.097. The twelfth item under the external factors factor in the study was excluded from the scale since it was willing to be included in another dimension as a modification. However, it was not appropriate to be included in the proposed dimension. However, the dimension explanation level of the twelfth item under the external factors factor in the study was in the acceptable range with $r^2 = 0.17$, and the error coefficient was 0.83. As a result, $\chi^2/df = 261.69/141 = 1.85$ and RMSEA=0.057. This value shows that the factors represent and support the dimension at a high level. The results of the confirmatory factor analysis for the applicability of E-commerce for both 2016 and 2025 are presented in Table 3.

Table 3. Confirmatory Factor Analysis of E-commerce Applicability.

Fit Indices	High Compliance	Acceptable Compliance*	Goodness of Fit Results (2016)	Goodness of Fit Results (2025)
GFI	$\geq 0,90$	0,89 – 0,85	0,900	0,920
CFI	$\geq 0,97$	$\geq 0,95$	0,930	0,940
AGFI	$\geq 0,90$	0,89 – 0,85	0,870	0,890
NNFI	$\geq 0,95$	0,94 – 0,90	0,910	0,930
SRMR	$\leq 0,05$	$\leq 0,1$	0,062	0,081
RMSEA	$\leq 0,05$	0,06 – 0,08	0,057	0,048
χ^2/sd	≤ 3	4 - 5	1,850	1,680

* [41–51]

A subsequent examination of the results of the confirmatory factor analysis for the applicability of E-commerce in 2016 and 2025 reveals that the model for 2016 exhibits a high fit in terms of GFI and χ^2/sd values, an acceptable fit in terms of RMSE, AGFI, NNFI, and SRMR values, and a low fit in terms of CFI value. In the year 2025, it was ascertained that the model exhibited a high degree of fit in terms of GFI, RMSEA, and χ^2/sd values; an acceptable degree of fit in terms of AGFI, NNFI, and SRMR values; and a low degree of fit in terms of CFI value.

4.4. Calculation of Marketing and Financial Performance Dependent Variables

The result of the reliability analysis (Cronbach’s Alpha) performed on the statements measuring marketing performance, consisting of four items, was 0.740. The marketing performance factor was formed to represent these items by summing the four items and dividing them by the number of samples. The mean of this variable for 2016 was calculated as 4.1154 with a standard deviation of 0.6962, and for 2025, it was calculated as 4.3014 with a standard deviation of 0.5379. The values are presented in Table 4. The internal consistency coefficient can be found in Table 5. The result of the reliability analysis (Cronbach’s Alpha) performed on the statements measuring financial performance and consisting of four items was 0.833. Therefore, the financial performance factor was formed to represent these items by summing the four items and dividing by the number of the sample. The mean of this factor for 2016 was calculated as 4.3260 with a standard deviation of 0.6765; for 2025, it was calculated as 4.4507 with a standard deviation of 0.5678. The values are presented in Table 4. The internal consistency coefficient can be found in Table 5.

Table 4. T-Test Analysis Results of the Factors in the Study.

Factors	2016	2025	2016	2025	2016	2025	2016	2025
	Mean	Mean	Standard Deviation	Standard Deviation	T Value	T Value	P Value	P Value
Organizational Support	4,4721	4,4810	0,4539	0,4428	52,296	49,420	***	***

Administrative Efficiency	4,4769	4,4751	0,4721	0,4687	50,439	48,405	***	***
Easy Decision Making	4,4596	4,4678	0,5220	0,4935	45,087	43,175	***	***
Organizational Preparation	4,4038	4,3841	0,6466	0,5841	33,452	34,648	***	***
Compatibility	4,2731	4,3201	0,7035	0,6403	28,060	29,647	***	***
External Environment	4,3490	4,1094	0,6689	0,6173	32,519	33,921	***	***
Ease of Use	4,2977	4,4698	0,6224	0,5904	33,615	34,014	***	***
Perceived Benefit	4,4231	4,4724	0,5929	0,5472	38,696	38,384	***	***
The Impact of E-commerce on Marketing Performance	4,1154	4,3014	0,6962	0,5379	25,833	32,485	***	***
The Impact of E-commerce on Financial Performance	4,3260	4,4507	0,6765	0,5678	31,601	34,689	***	***

n=260; P<0.001; 5 Likert-Type Scale; 1 - Strongly Disagree; 5 - Strongly Agree; mean of 2016 = 4.4769; mean of 2025 = 4.4820

Table 5. Factors Measured in the Study.

Factors	Code
Organizational Support	F1
Administrative Efficiency	F2
Easy Decision Making	F3
Organizational Preparation	F4
Compatibility	F5
External Environment	F6
Ease of Use	F7
Perceived Benefit	F8
The Impact of E-commerce on Marketing Performance	F9
The Impact of E-commerce on Financial Performance	F10

4.5. T-Test Analysis Results of the Factors Measured in the Study

A sample t-test was conducted to statistically determine the difference of the 10 factors measured in the study from the middle value (neutral value) three on a 5-point Likert-type evaluation scale. The results obtained are presented in Table 4. Since the averages of the factors in the scale are higher than the middle value of 3, it can be stated that there is a high rate of agreement in the sample responses. For all factors, participants expressed their opinions in the direction of agreement. For 2016, the factor with the highest “Agree” rate is the factor of managerial efficiency, which includes increased communication within the organization and easier access to all the information requested by the manager. For 2025, the factor with the highest “Agree” rate is the operational support factor,

which includes the effects of E-commerce on cost reduction, increasing customer relations, and increasing operational profit.

As a result of the T-Test, the average value was calculated as 4.3596 for 2016 and 4.3931 for 2025. According to the 2016 results, the factor with a lower “Agree” rate is the “contribution of E-commerce to marketing performance” factor, which includes statements such as the business reaching different geographies with E-commerce and brand recognition increases. According to the 2025 results, it was determined that the external environmental pressure factor, which includes statements such as competition, sectoral factors, and government sanctions, is the factor furthest from the average.

4.6. Correlation Analysis Results of the Factors Measured in the Study

Correlation analysis is used to determine whether there is a relationship between the factors and the direction and severity of the relationship. In correlation analysis, the result takes a value between -1 and +1. Whether the value is positive or negative indicates the direction of the relationship. When the value approaches 0, the relationship level decreases, and the relationship strengthens when it approaches one as an absolute value [52].

The names of the factors found in the study are abbreviated and shown in Table 5 for clarity in the tables in the following section.

The correlation analysis results for the study’s factors are shown in Table 6 for 2016 and Table 7 for 2025. The underlined values in the tables represent the internal consistency coefficient of each factor.

Table 6. Correlation Analysis Results of the Factors Measured in the Study (2016).

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	<u>0,740</u>									
F2	0,731	<u>0,770</u>								
F3	0,613	0,750	<u>0,870</u>							
F4	0,475	0,439	0,433	<u>0,880</u>						
F5	0,495	0,471	0,452	0,761	<u>0,757</u>					
F6	0,411	0,372	0,356	0,586	0,756	<u>0,832</u>				
F7	0,493	0,452	0,417	0,670	0,742	0,712	<u>0,872</u>			
F8	0,541	0,481	0,516	0,682	0,773	0,801	0,770	<u>0,910</u>		
F9	0,457	0,454	0,419	0,572	0,668	0,664	0,641	0,735	<u>0,740</u>	
F10	0,422	0,367	0,347	0,600	0,744	0,758	0,687	0,789	0,742	<u>0,833</u>

The values underlined in the symmetry of the factors are internal consistency coefficients. N: 260; Sig.: ,00; significant at p<0.01.

Table 6 shows that the lowest internal consistency for 2016 (r = 0.740) is the “Organizational Support” factor, and the highest (r = 0.910) is the “Perceived Benefits of E-commerce” factor. Since Cronbach’s Alpha coefficient of all factors is greater than 0.60, it can be stated that the test is reliable.

When Table 6 is analyzed, it is seen that there is a high level (r = 0.789) positive relationship between the effect of “E-commerce on financial performance” and “perceived benefit.” In particular, the positive effect of the “cost-cutting aspect of E-commerce” on perceived benefit causes a high relationship. There is a high level (r = 0.773) positive relationship between E-commerce compatibility factors and E-commerce’s perceived benefits. It was determined that the performance of SMEs increased in direct proportion to the conveniences brought by E-commerce in the business process. There is a weak (r = 0.367) positive relationship between the financial effects of E-commerce and managerial effects. Similarly, a weak (r = 0.347) positive relationship exists between tools facilitating decision-making and E-commerce financial contribution factors. Managers can structurally use the business’s finances by utilizing E-commerce opportunities while making strategic decisions. It is believed that the lack of effective use of E-commerce tools causes the correlation to be low.

Table 7. Correlation Analysis Results of the Factors Measured in the Study (2025).

Factors	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
F1	<u>0,771</u>									
F2	0,699	<u>0,744</u>								
F3	0,701	0,717	<u>0,812</u>							
F4	0,521	0,497	0,503	<u>0,829</u>						
F5	0,537	0,504	0,519	0,740	<u>0,783</u>					
F6	0,497	0,408	0,411	0,602	0,731	<u>0,813</u>				
F7	0,513	0,542	0,493	0,617	0,735	0,707	<u>0,851</u>			
F8	0,624	0,512	0,563	0,610	0,739	0,816	0,786	<u>0,901</u>		
F9	0,497	0,534	0,476	0,593	0,719	0,705	0,692	0,761	<u>0,811</u>	
F10	0,472	0,431	0,447	0,597	0,726	0,719	0,708	0,734	0,703	<u>0,917</u>

The values underlined in the symmetry of the factors are internal consistency coefficients. N: 260; Sig.: ,00; significant at $p<0.01$.

Table 7 shows that the lowest internal consistency ($r = 0.744$) for 2025 is the “Managerial Efficiency” factor, and the highest internal consistency ($r = 0.917$) is the “The Impact of E-commerce on Financial Performance” factor.

When Table 7 is analyzed, it is seen that there is a high level ($r = 0.816$) positive relationship between the perceived benefit of E-commerce and external environmental pressure factors. The positive impact of E-commerce, especially in terms of efficiency and performance, as well as competition and sectoral factors, is a determinant of this relationship. Similarly, there is a high level ($r = 0.786$) positive relationship between the perceived usefulness of E-commerce and E-commerce ease of use factors. E-commerce facilitates business relations with suppliers and customers. It enables them to reach their goals faster, which is directly related to productivity and performance, and is effective in this relationship. A weak ($r = 0.411$) positive relationship exists between external environmental pressure factors and ease of decision-making. The ease of decision-making factor includes factors such as fast information flow and correct strategic decisions and is more of an internal factor. In this respect, its weak relationship with external environmental pressure can be interpreted as a natural result. Similarly, a weak ($r = 0.408$) positive relationship exists between external environmental pressure factors and managerial efficiency. Although managerial efficiency is important in business performance, external factors have little effect on this issue.

4.7. Regression Analysis

A regression analysis was conducted to determine whether E-commerce’s strategic value and applicability affect SMEs’ marketing and financial performance and, if so, to what extent. Beta values show the relative importance of independent variables in their relationship with dependent variables. The Variance Inflation Factor (VIF) value indicates whether the level of relationship between independent variables poses any problem in terms of analysis. Values less than 10 for the VIF value do not cause problems [53].

Firstly, Table 8 gives the results of the regression analysis conducted for 2016 and 2025 to understand the relationship between E-commerce’s strategic value and its impact on marketing performance factors.

Table 8. Regression Analysis Between the Strategic Value of E-commerce and the Impact of E-commerce on Marketing Performance Factor (2016-2025).

Dependent Variable	Independent Variable	Beta	2016		Beta	2025		**VIF
			T Value	*P Value		T Value	*P Value	

F9	F1	0,135	1,576	0,376	0,269	1,258	0,607	4,026
	F2	0,201	1,682	0,267	0,194	2,241	0,250	4,518
	F3	0,096	1,248	0,401	0,301	2,159	0,307	5,502

*p<0,05; **VIF<10

Table 8 shows that there is no cause-and-effect relationship between the strategic value of E-commerce and its impact on marketing performance factors for 2016 and 2025.

Table 9 shows there is no cause-and-effect between the “strategic value of E-commerce” and the “impact of E-commerce on financial performance” for 2016 and 2025.

Table 9. Regression Analysis Between Strategic Value of E-commerce and the Impact of E-commerce on Financial Performance Factor (2016-2025).

Dependent Variable	Independent Variable	2016			2025			**VIF
		Beta	T Value	*P Value	Beta	T Value	*P Value	
F10	F1	0,302	2,067	0,449	0,406	1,097	0,570	4,026
	F2	0,277	2,202	0,193	0,297	2,019	0,305	4,518
	F3	0,167	2,124	0,307	0,233	1,895	0,471	5,502

*p<0,05; **VIF<10

Table 10 gives the results of the regression analysis conducted for 2016 and 2025 to understand the relationship between “E-commerce’s applicability” and “impact of E-commerce on marketing performance factors.”

Table 10. Regression Analysis Between E-commerce Applicability and the Impact of E-commerce on Marketing Performance Factor (2016-2025).

Dependent Variable	Independent Variable	2016			2025			**VIF
		Beta	T Value	*P Value	Beta	T Value	*P Value	
F9	F4	0,030	0,454	0,651	0,124	0,868	0,597	2,618
	F5	0,159	1,942	0,053	0,391	3,173	0,031	3,981
	F6	0,123	1,649	0,101	0,098	1,276	0,267	3,331
	F7	0,088	1,241	0,216	0,101	1,689	0,193	2,981
	F8	0,425	5,176	0,000	0,517	5,176	0,000	4,023

*p<0,05; **VIF<10

When analyzing Table 10, a cause-and-effect relationship was found between the “perceived benefit of E-commerce” and “the impact of E-commerce on marketing performance” for 2016 only. For every 1-unit change in the perceived benefit of E-commerce, there is a 0.425-unit change in the impact of E-commerce on marketing performance factor. This relationship is explained by the idea that by incorporating E-commerce processes into the activities of SMEs and using them effectively and efficiently, the business process will become easier, the brand value of the company will increase, the customer portfolio will improve, and it will be much easier to reach different markets easily. No significant relationship was found for p<0.05 in the effect of the suitability of the infrastructure of the

enterprises for E-commerce, the competitive environment in the sector in which the enterprise operates, or specialization in E-commerce on the marketing performance of the enterprise. For the year 2025, a causal relationship was found between the perceived usefulness of E-commerce and the effect of E-commerce on marketing performance and between the perceived usefulness of E-commerce and the compatibility of E-commerce with the firm. A 1-unit change in the E-commerce compatibility factor causes a 0.391 change in the E-commerce impact on the marketing performance factor. This result supports the idea that the organization’s culture, applications used in business processes, and technology infrastructure increase marketing performance and efficiency. As of 2016, a cause-and-effect relationship was found between the perceived benefits of E-commerce and the impact of E-commerce on marketing performance in 2025. Every 1-unit change in the perceived benefit of E-commerce causes a 0.517-unit change in the impact of E-commerce on marketing performance factor.

Table 11 gives the results of the regression analysis for 2016 and 2225 on the relationship between E-commerce’s applicability and impact on financial performance.

Table 11. Regression Analysis Between the Effect of E-commerce Viability on Financial Performance Factor (2016-2025).

Dependent Variable	Independent Variable	2016			2025			**VIF
		Beta	T Value	*P Value	Beta	T Value	*P Value	
F10	F4	-0,024	0,425	0,671	0,013	1,895	0,630	2,618
	F5	0,242	3,471	0,001	0,498	3,587	0,024	3,981
	F6	0,246	3,830	0,000	0,401	3,179	0,087	3,331
	F7	0,059	0,974	0,331	0,179	1,759	0,279	2,981
	F8	0,377	5,368	0,000	0,446	4,975	0,017	4,023

*p<0,05; **VIF<10

Table 11 shows that there is a cause-and-effect relationship between the E-commerce Compatibility with Business, External Environmental Pressures, and Perceived Benefits of E-commerce factors and the E-commerce Impact on Financial Performance factor for 2016. A 1-unit change in the E-commerce Compatibility factor causes a 0.242 change in the E-commerce Impact on Financial Performance factor. This situation supports the idea that the company’s culture, business process practices, and technological infrastructure increase marketing performance and efficiency. A 1-unit change in the external environmental pressure factor causes a 0.246 change in the E-commerce impact on the financial performance factor. Daily innovations, business development, competitive environment, and social factors force companies to be more efficient in financial management and reveal this effect. Finally, every 1-unit change in the perceived benefits of E-commerce causes a 0.377-unit change in the factor of the impact of E-commerce on financial performance. Ease of doing business and increased efficiency in business processes naturally positively impact financial performance. For the year 2025, a 1-unit change in the E-commerce compatibility factor causes a 0.498 change in the E-commerce impact on the financial performance factor. Similarly, each 1-unit change in the perceived benefits of E-commerce causes a 0.446-unit change in the impact of E-commerce on the financial performance factor. In particular, the acceleration of technological development is expected to cause the effects of both factors to become more significant and to increase performance.

5. Discussion and Conclusions

In this study, data were collected from 260 companies in Ankara İvedik OSB in 2016 and 2025 by survey method from 260 companies in Ankara İvedik OSB in 2016 and 2025 in order to determine

the strategic value perception of E-commerce, the applicability of E-commerce, and the effects of E-commerce on the marketing and financial performance of SMEs. The scales of the strategic value perception of E-commerce and the applicability of E-commerce were used in the studies of Grandon and Pearson (2005) [37], to measure the marketing performance of businesses, Weerawardena (2011) [40], to measure the financial performance, Bulut et al. (2009) [38] and Kuivalainen and Sundqvist (2004) [39] and were translated into Turkish and applied.

The rate of male managers or company owners in managerial positions who participated in the survey was 86.2% in 2016, while the rate of women was 13.8%. For 2025, the rate of men is 77.3%, while the rate of women is 22.7%. The increase in the proportion of women as company owners or managers is important here. The rate of firms having a website was 87.7% in 2016 and 96.5% in 2025. The proportion of companies stating that they conduct E-commerce is 90% for 2016 and 98.8% for 2025. One of the study's most important findings is the increase in the share of E-commerce in total sales volume. In 2016, those who stated that "the share of E-commerce in total sales volume is between 26%-50%" ranked first in this category with 40%, while those who stated that "the share of E-commerce in total sales volume is between 51%-75%" ranked first with 43.8% in 2025. The study's variable, called strategic value perception, consists of 3 factors: organizational support, managerial efficiency, and tools that facilitate decision-making. This result supports the 3-factor structure determined in Grandon and Pearson's (2004) [37] study. It is accepted that organizational support, managerial efficiency, and tools that facilitate decision-making constitute the variable of strategic perception of E-commerce.

The study's applicability variable consists of five factors: organizational readiness, E-commerce compatibility, external environmental pressure, ease of use of E-commerce, and perceived usefulness of E-commerce. This result supports the 5-factor determination in Grandon and Pearson's (2004) [37] study.

As a result of the T-Test, the fact that the mean values of all the variables of strategic value perception of E-commerce, the applicability of E-commerce (initiation), and marketing and financial performance are above 4 for both 2016 and 2025 (on a 5-point Likert scale) shows that the managers believe that the benefits they will obtain from E-commerce will be high, they are ready and willing to start E-commerce and they believe that E-commerce increases the marketing and financial performance of the business. Managers want to benefit from the speed and convenience that E-commerce will bring. For this reason, they are willing to plan or have already planned to provide the necessary infrastructure, technology, and qualified labor force to implement E-commerce in their businesses. Similar to the results obtained, Stockdale & Standing (2006) [54] stated in their study that managers who started E-commerce in their businesses met their expectations and experienced an increase in the marketing performance of their businesses. In his study, Kasik (2015) [55] revealed that the innovations brought by E-commerce contribute positively to the performance of businesses.

The impact of E-commerce on the marketing and financial performance of enterprises is considered a dependent variable in this study. In the regression analysis, the perceived benefit of E-commerce, which is one of the dimensions of the E-commerce applicability variable, has a significant effect on the variable of the effect of E-commerce on marketing performance. In other words, SMEs' brand value will increase, customer portfolios will expand, and it will be much easier for them to reach different markets by including E-commerce applications in their activities, using them effectively and efficiently. Kalayci (2008) [56] obtained similar results in his study and stated that thanks to E-commerce, SMEs have an effective marketing opportunity and can reach millions of consumers. In his study, Abebe (2014) [57] found that businesses that adapt E-commerce tools to their structure and use them effectively carry out their business processes more efficiently. In this way, SMEs can enter new markets with low financing without high costs.

E-commerce compatibility, external environmental pressure, and perceived usefulness of E-commerce, which are the dimensions of the E-commerce applicability variable, have been determinants of the variable of the impact on SMEs' financial performance. For SMEs, the efficiency, increased business performance, or simplified business processes that they achieve by using E-

commerce tools increase their financial performance, translating into reduced cost items and favorable contribution growth rates. Similarly, E-commerce applications and the positive effects of the competitive market also contribute positively to SMEs' profitability figures and growth rates. Arslandere (2010) [58] reveals in his study that E-commerce reduces enterprises' inventory, labor, and transportation costs and, as a result, achieves direct financial efficiency. The results of the study are consistent for both 2016 and 2025.

In addition, the study has made important contributions to researchers studying E-commerce and business performance, and business managers engaged in E-commerce. It has been proved that the researchers can use the scales used in the study, especially those introduced to the Turkish literature, in future studies. The high internal consistency coefficient for each dimension in both the study conducted in 2016 and the scales used in this study (between 0.740 - 0.910) shows internal consistency reliability. The confirmatory factor analysis concluded that the construct validity of the E-commerce strategic value perception and E-commerce applicability scales was appropriate.

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References

1. Brestschger L.; Jo, A. Complementarity Between Labor and Energy: A Firm-Level Analysis, *Journal of Environmental Economics and Management*, 2024, 124.
2. Aktan, C.C.; Vural, I. Information Society, New Basic Technologies and New Economy, Yeni Türkiye Publishing: Ankara, Türkiye, 2016, 88.
3. Kocan, A.; Guner Gultekin, D.; Bastug, M. New Economy and Business Models: Circular Economy and Sharing Ecosystems, *International Congress of Economic Research and Financial Markets*, Gaziantep, Türkiye, 08.11.2019
4. Pinar, A. E-Commerce and SMEs, 1st ed., Egitim Publishing: Ankara, Türkiye, 2022.
5. Doganlar, T. Electronic Commerce Market in Türkiye and Its Development, Istanbul Commerce University, Türkiye, 2016.
6. Altunisik, R., Ozdemir, S., Torlak, O. Marketing Principles and Management, 1st ed., Beta Publishing: Istanbul, Türkiye, 2014.
7. Abtahi, A. T.; Farhana, N.; Hasan, M. A Study on the Impact of E-Commerce Adoption for Enhancing Supply Chain Efficiency in Bangladesh SMEs, *Business and Economics in Developing Countries*, 2023, 1, 29-33.
8. Seyedghorban, M.; Taheri, B.; Malek, A. E-Commerce Adoption and Its Impact on Supply Chain Performance: An Empirical Study of Iranian Small and Medium-Sized Enterprises, *Telematics and Informatics*, 2017, 34, 62-77.
9. Yu, R.; Wu, C.; Yan, B.; Zhou, X.; Yu, Y.; Chen, N. Analysis of the Impact of Big Data on E-Commerce in Cloud Computing Environment, *Complexity*, 2021.
10. Chang, K.; Jackson, J.; Grover, V. E-Commerce and Corporate Strategy: An Executive Perspective, *Information Management*, 2003, 40, 663-675.
11. Kucukyilmazlar, A. Electronic Commerce Guide, Istanbul Chamber of Commerce Publishing: Istanbul, Türkiye, 2006.

12. Schneider, G. Electronic Commerce, Cengage Learning: USA, 2016.

13. Suleymanli, J. Econometric Analysis of Factors Affecting E-Commerce Volume: Azerbaijan Example, Journal of Social, Humanities and Administrative Sciences, 2021, 39, 402 - 409.

14. State Planning Organization. Tenth Development Plan, Ministry of Development of the Republic of Türkiye: Ankara, Türkiye, 2013.

15. Canpolat, O. E-Commerce and Developments in Türkiye, Ministry of Industry and Trade: Ankara, Türkiye, 2001.

16. Terbeck, H. Delphi-Based Scenario and Trend Analysis for the Future of Digital Commerce, University of Twente, Holland, 2014.

17. Samil, B. E-Commerce and Development of E-Banking in Türkiye, Marmara University, Türkiye, 2014.

18. Senol, I. Designing an Effective E-Commerce Site in Business-to-Business E-Commerce: “Yasar Marketing” E-Commerce Website Research Project, Yaşar University, Türkiye, 2016.

19. Hock-Doepgen, M.; Clauss, T.; Kraus, S.; Cheng, C. Knowledge Management Capabilities and Organizational Risk-taking for Business Model Innovation in SMEs, Journal of Business Research, 2020.

20. OECD, OECD SME and Entrepreneurship Outlook 2019, OECD Publishing: Paris, France, 2019.

21. OECD, OECD SME and Entrepreneurship Outlook 2023, OECD Publishing: Paris, France, 2023.

22. European Investment Fund, The European Small Business Finance Outlook 2023/96, 2023. Available online: https://www.eif.org/news_centre/publications/EIF_Working_Paper_2023_96.htm (accessed on: 20.12.2024)

23. Lu, Q.; Qin, W.; Yan, R.; Zhang, S.; Ma, L. The Effect of SMEs’ Digitalization on Supply Chain Financing Performance: Based on the Resource Orchestration Theory, Journal of Theoretical and Applied Electronic Commerce Research, 2025, 20.

24. Knouse, S. B.; Giacalone, R. A. Ethical Decision-Making in Business: Behavioral Issues and Concerns. Journal of Business Ethics, 1992, 11, 369–377.

25. Larkin, J. Business Ethics, Wadsworth Press: Los Angeles, USA, 2013.

26. Kilci, H. Strategic Management Applications in Small and Medium Enterprises: A Study on Manufacturing SMEs in Tokat Province, Tokat Gaziosmanpasa University, Türkiye, 2013.

27. KOSGEB, Türkiye Official Gazette, 2005. Available online: <https://www.resmigazete.gov.tr/eskiler/2005/11/20051118-5.htm>. (accessed on: 04.02.2016).

28. Kaya, A. Entrepreneurship and SME Management in the Light of Information and Communication, Egitim Publishing: Ankara, Türkiye 2007.

29. TURKSTAT, Small and Medium Enterprise Statistics, 2023. Available online: <https://data.tuik.gov.tr/Bulten/Index?p=Kucuk-ve-Orta-Buyuklukteki-Girisim-Istatistikleri-2023-53543>. (accessed on: 06.11.2024).

30. Rahayu, R.; Day, J. Determinant Factors of E-Commerce Adoption by SMEs in Developing Country: Evidence from Indonesia, Procedia - Social and Behavioral Sciences, 2015, 195, 142 - 150.

31. Cenamor, J.; Parida, V. How Entrepreneurial SMEs Compete Through Digital Platforms: The Roles of Digital Platform Capability, Network Capability and Ambidexterity, Journal of Business Research, 2019, 100, 196 - 206.

32. Matt, C.; Hess, T.; Benlian, A. Digital Transformation Strategies, Business & Information Systems Engineering, 2015, 57, 339 - 343.

33. Taiminen, H.; Karjaluoto, H. The Usage of Digital Marketing Channels in SMEs, Journal of Small Business and Enterprise Development, 2015, 22, 633 - 651.

34. Dallochio, M.; Lambri, M.; Sironi, E.; Teti, E. The Role of Digitalization in Cross-Border E-Commerce Performance of Italian SMEs, Sustainability, 2024, 16, 508.

35. Ghobajhloo, M.; Arias-Aranda, D.; Benitez-Amado, J. Adoption of E-Commerce Applications in SMEs, Industrial Management and Data Systems, 2011, 111, 1238 - 1269.

36. Ankara Ivedik Organized Industrial Zone, About Ankara Ivedik Organized Industrial Zone, 2024. Available online: <https://www.ivedikosb.org.tr/hakkimizda/>. (accessed on: 17 12 2024).

37. Grandon, E.; Pearson, J. Electronic Commerce Adoption: An Empirical, Information and Management, 2004, 42, 197 - 216.

38. Bulut, C.; Yilmaz, C.; Alpan, L. The Effects of Market Orientation on Firm Performance: An Empirical Research in Turkey, Ege Academic Review, 2009, 9, 513 - 538.

39. Kuivalainen, O.; Sundqvist, S.; Servais, P. Firms’ Degree of Born-Globalness, International Entrepreneurial Orientation and Export Performance, Journal of World Business, 2004, 42, 253 - 267.

40. Weerawardena, J. Towards a Model of Dynamic Capabilities in Innovation Based Competitive Strategy: Insights from Project-Oriented Service Firms, *Industrial Marketing Management*, 2011, 40, 1251 - 1263.
41. Baumgartner, H.; Homburg, C. Applications of Structural Equation Modeling in Marketing and Consumer Research: A Review, *International Journal of Research in Marketing*, 1996, 13, 139 - 161.
42. Bentler, P. *Structural Equations Program Manual*, Multivariate Software: Encino, USA, 2004.
43. Bentler, P.; Bonett, D. Significance Tests and Goodness of Fit in the Analysis of Covariance Structures, *Psychological Bulletin*, 1980, 88, 588 - 606.
44. Browne, M.; Cudeck, R. *Alternative Ways of Assessing Model Fit*, *Testing Structural Equation Models*, Sage: Beverly Hills, USA, 1993, 136 - 162.
45. Byrne, B. *Structural Equation Modeling with AMOS, EQS, and LISREL: Comparative Approaches to Testing for the Factorial Validity of a Measuring Instrument*, *International Journal of Testing*, 2001, 1, 55 - 86.
46. Hu, L.; Bentler, P. Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria versus New Alternatives, *Structure Equation Modeling*, 1999, 6, 1 - 55.
47. Kline, R. *Principles and Practice of Structural Equation Modeling*, The Guilford Press: New York, USA, 2011.
48. Marsh, H.; Hau, K.; Artelt, C.; Baumert, J.; Peschar, J. OECD's Brief Self-Report Measure of Educational Psychology's Most Useful Affective Constructs: Cross-Cultural, Psychometric Comparisons Across 25 Countries, *International Journal of Testing*, 2006, 6, 311 - 360.
49. Meyers, L.; Gamst, G.; Guarino, A. *Applied Multivariate Research: Design and Interpretation*, Sage: London, UK, 2006.
50. Onag, O. *The Effect of Organizational Learning Capability on New Product and Business Performance through Organizational Innovation*, Manisa Celal Bayar University, Turkiye, 2014.
51. Schermelleh-Engel, K.; Moosbrugger, H. Evaluating the Fit of Structural Equation Models: Tests of Significance and Descriptive Goodness-of-Fit Measures, *Methods of Psychological Research Online*, 2003, 8, 23 - 74.
52. Glantz, M.; Mun, J. *Credit Engineering for Bankers*, Academic Press: Cambridge, UK, 2011.
53. Tarkan, G.; Tepeci, M. The Effects of Organizational Justice and Centralization in Management on Employee Theft: A Study on Mersin University Tourism and Hotel Management School Student Perceptions, *Journal of Tourism Research*, 2006, 17, 149.
54. Stockdale, R.; Standing, C. A Classification Model to Support SME E-Commerce Adoption Initiatives, *Journal of Small Business and Enterprise Development*, 2006, 13, 381 - 394.
55. Kasik, S. *SMEs and Electronic Commerce: The Case of Istanbul Province*, Beykent University, Turkiye, 2015.
56. Kalayci, C. *Electronic Commerce and Its Effects on SMEs*, *International Journal of Economics and Administrative Studies*, 2008, 1.
57. Abebe, M. *Electronic Commerce Adoption, Entrepreneurial Orientation and SME Performance*, *Journal of Small Business and Enterprise Development*, 2014, 21, 100 - 116.
58. Arslandere, M. *A Research on Electronic Commerce and SMEs in Karaman*, Karamanoglu Mehmetbey University, Turkiye, 2010.

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