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THE ROLE OF E-COMMERCE AS AN INNOVATIVE SOLUTIONS IN THE DEVELOPMENT OF THE SAUDI ECONOMY

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Abstract: *This research aims to study the role of e-commerce as an innovative solution for developing the Saudi economy by describing and analysing the extent to which electronic commerce contributes to the development of Saudi economic indicators and learning about the role of the Saudi government in supporting and developing the e-commerce sector. This development is due to the various types of support provided by the Saudi government to the e-commerce sector, which includes providing a good electronic structure, ensuring consumer rights, e-commerce platforms, enhancing consumer confidence in relying on e-commerce, and stimulating innovation through the Ministry of Commerce, the E-Commerce Council, the Maarouf platform and e-commerce law. Additionally, they learn about the challenges and obstacles facing them, as some individuals lack confidence in e-commerce transactions; fraud; spam; and misleading information about goods and services. Additionally, they are unfamiliar with some consumers using modern technology, such as e-commerce. Saudi Arabia is at the forefront of Middle Eastern countries in terms of the number of Internet users, the expansion of shipping and delivery options, and payment methods, in addition to identifying the types and advantages of these services. Statistical analysis tools such as simple linear regression will also be used. correlation coefficient. The coefficient of determination is used to measure the impact of e-commerce revenues on GDP and the impact of e-commerce revenues on total exports. The effect of e-commerce revenues on total imports. The impact of e-commerce revenues on the clothing and footwear sector. The impact of e-commerce revenues on the electronics sector. The impact of e-commerce revenues on the food and drug sector. The impact of e-commerce revenues on the furniture and home appliances sector. However, the results of the research showed that there is no correlation between e-commerce and GDP in the KSA. Despite the development witnessed in the field of electronic commerce, many Saudi companies have not kept pace with this development. Therefore, Saudi companies must work on finding innovative solutions to improve their business performance and improve the quality of their services and products.*

Keywords: economic sectors; exports; GDP; imports; innovation; Saudi Arabia.

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1. Introduction. E-commerce has undergone significant development since recently, allowing consumers to visit many markets, companies, and products to purchase various goods and services. Everyone has the right to enter the market, whether he or she is a seller, buyer, or marketer. E-commerce has become one of the most important factors affecting foreign trade and subsequently affecting the development of the economies of the countries of the world, and e-commerce in Saudi Arabia has undergone remarkable development during recent years, as Saudi Arabia is at the forefront of Middle East countries in terms of the number of Internet users, the expansion of shipping and delivery options, and payment methods during the period from 2015–2020. However, international companies, such as Namshi, Amazon, and Noon, still dominate e-commerce. Saudi Arabia has witnessed tremendous growth in Internet use compared to the world, as the percentage of Internet users out of the total population increased from 70% to 82.6% during the same period (2017–2020), while the same percentage increased worldwide from 54% to 62.3% during the same period. The contribution of e-commerce to Saudi national accounts (retail sector) increased from 1.53% to 3.77% during the same period. The Internet utilization rate increased for users by 34% in 2020 compared to 2019, according to the number of hours index, due to the coronavirus pandemic. (Riyadh Chamber, 2021). Saudi Arabia ranked second in the Arab world after the UAE, 49 globally, and 11 in The Group of Twenty. It is worth noting that this indicator measures the number of users of the Internet, websites, and electronic platforms; the degree of readiness for e-commerce; the infrastructure for buying and selling; and electronic payments between companies and consumers; and e-commerce in Saudi Arabia, which contributed to national accounts by approximately \$10482 million in 2020 (Riyadh Chamber, 2021). This development is due to the various forms of support provided by the Saudi government to the e-commerce sector. The main objective of this study is to determine the impact of e-commerce as an innovative solution to economic development in the Kingdom of Saudi Arabia based on the variables identified in this study (gross domestic product, total exports, total imports, and economic sectors). Despite the development witnessed in e-commerce, many Saudi companies needed to catch up with this development. Therefore, we will study the challenges and obstacles facing the development of e-commerce and propose recommendations to address them. This study aimed to describe and analyse the development of e-commerce and its impact on the development of the Saudi economy, the factors that contributed to the development of e-commerce, and the challenges facing the development of e-commerce in Saudi Arabia. In addition, we analyse the impact of e-commerce exports on GDP, total exports, total imports, and economic sectors, discuss the results, and write recommendations.

There are many definitions of e-commerce, as the legislature in the KSA defined it in e-commerce law as "an activity of an economic nature undertaken by the service provider and the consumer, in whole or in part, by electronic means, in order to sell products, provide services, advertise them, or exchange their data". (Ministry of Commerce, 2019), and the Tunisian legislature defined e-commerce in Law No. 83 of 2000 as commercial transactions that occur through electronic exchanges. These exchanges are made using electronic documents. The Dubai legislature defined it in Law No. 2 of 2002 as commercial transactions that occur through electronic correspondence. Electronic transactions are any dealings, contracts, or agreements entered into or executed in whole or part through electronic correspondence. The Bahraini legislature defined it as using electric, magnetic, or electromagnetic messages or similar technology (Aleze, 2020). E-commerce, in general, is defined as the buying and selling of goods and services or the transfer of money or data via an electronic network, mainly the Internet, and all activities related to delivery and the payment process (Anuj et al., 2018). Based on the above, e-commerce can be defined as sales, purchasing products, services, and all advertising, delivery, and payment activities through correspondence and electronic transactions. Innovation is defined in one of two ways: the introduction of something new or a new idea, method, or device. Innovation includes both types of marketing innovation. Business model innovation. and supply chain innovation. Innovation aims to reduce costs. Increasing the competitive advantage of products and services. The product and service can be improved by adding new features or options to the product, increasing sales and achieving profits. (Kahn, 2018). There are many types of e-commerce, ranging from company to consumer, from company to company, from company to government, from consumer to government, from government to government, and from government to consumer (Gupta, 2014). The most important of these are business-to-business (B2B) e-commerce. The buying and selling operations that take place between companies with each other using communication technology require two elements, the electronic structure and the electronic markets, and the markets refer to websites on the Internet, where buyers and sellers interact to obtain goods and services. Business to Consumer (B2C) E-commerce. This is manifested in the business sector trade with consumers, called electronic retail trade, which refers to selling products from companies to consumers. This type of e-commerce has contributed to reducing the costs of financial transactions and the ease of obtaining information about products. Business to government (B2G) E-commerce. This variable represents the buying

and selling operations between companies and the government. It also includes companies using the Internet to obtain licences, pay bills, and pay taxes and insurance. Purchasing through the Internet is more transparent than purchasing through the Internet and reduces the risks of manipulation and irregularities in government procurement processes. Consumer to government (C2G) E-commerce. It is the buying and selling operations between consumers and the government. For example, the family sector purchases government services online, such as paying fees for issuing a car licence or paying bills for some government services. Government-to-Business (G2B) E-commerce. It is represented in the buying and selling operations between companies and the government. It also includes companies using the Internet to obtain licences, pay bills, and pay taxes and insurance. Purchasing through the Internet is more transparent than purchasing through the Internet and reduces the risks of manipulation and irregularities in government procurement processes. Consumer-to-Consumer (C2C) E-commerce. It is the process of buying and selling goods and services between consumers and each other where interactions, such as work services, asset rental, and the sale of consumer and durable goods, take place directly through the Internet. E-commerce has many advantages, including contributing to increasing competitiveness and exports through easy access to local and global marketing centres for goods and services locally and globally, in addition to accelerating market analysis and responding to consumer needs (Alzele, 2020). It is characterized by a rapid response to customer requests compared to traditional paper transactions, saving expenses in general and the time required to complete purchase and sale operations; reducing postal correspondence, advertising and distribution costs; reducing telecommunications costs; and reducing transportation and distribution costs. In addition, it is characterized by providing many commissions and intermediaries, including exporters, importers, wholesale and retail traders, and commercial agents (Anuj et al., 2018). E-marketing websites contribute to supporting companies' relationships with customers by providing product information, sales, and distribution outlets; interacting with distributors; providing a shipping and delivery system; providing time and effort; and accelerating business completion, in addition to not having to hire a large number of employees. (Alzele, 2020), the relevance of website information attracts more customers and directly impacts the success of e-commerce companies through a clear vision of the product or service (Salehi et al., 2012). E-commerce faces several obstacles, including the lack of confidence in e-commerce transactions, especially the breach of privacy and the dissemination of private information (Najafi, 2012; heft and selling of invalid products and selling products owned by others; and their display on the Internet to sell without transferring their ownership to the seller; these obstacles have caused many problems when litigating the validity of the contract and its invalidity in Saudi courts (Almalki, 2021). The unfamiliarity of some consumers with the use of modern technology on which e-commerce depends and poor awareness of e-commerce, especially in developing countries, impedes the development of e-commerce. (Khan & Uwemi, 2018). The spread of e-commerce requires a set of essential elements. These elements aim to provide an appropriate and stimulating environment for E-commerce, the most important of which are the following: Electronic Infrastructure: Investment in electronic infrastructure is considered one of the essential elements of E-commerce, as E-commerce is linked to the extent of development of the information and communication technology used and the extent of its spread, including the Internet, wired and wireless networks, telephone services, available drivers, and human capital. There is no doubt that providing an appropriate and stimulating electronic primary environment is necessary for the spread of e-commerce, and the development of electronic infrastructure is necessary for the development of e-commerce and increasing brand loyalty in e-commerce (Akhmetova et al., 2020). Scientific and cultural awareness of society: The success of e-commerce depends on the extent to which the culture of using modern technology is spread in society, especially in the information and communication sector, the Internet, and application programs. This requires the development of educational policies and training programs (Khan & Uwemi 2018) and the establishment of specialized training centers to train workers on the use of modern technology in e-commerce (Mexmonov, 2020). An advanced financial and banking system: Advanced financial infrastructure and financial inclusion are among the most critical elements of e-commerce (Yusgiantoro et al., 2020). It contributes to the strengthening of electronic operations, the expansion of electronic payment system operations, and the facilitation of secure financial transactions. Credit cards are among the most popular payment methods used in e-commerce. The legal environment includes the availability of laws, legislation, and regulations to protect parties dealing in e-commerce, especially the protection of consumer rights (Akhmetova et al., 2020); protection from fraud and manipulation; the preservation of intellectual property rights; the regulation of tax laws; and laws related to resolving domestic and international electronic commercial disputes. These laws enhance trust between sellers and consumers and provide security in e-commerce transactions (Al-mani, 2020). E-commerce has dramatically developed in the KSA by spreading the culture of buying from electronic stores. Government support for developing the

e-commerce sector and the Saudi economy The efforts of the Saudi government are considered to be among the essential factors that contributed to the development of e-commerce. The most important of which are the Ministry of Commerce. The Ministry of Commerce is the body supervising the e-commerce sector, and it is the competent authority to regulate e-commerce, issue commercial records, protect consumers and merchants alike, and stimulate and develop e-commerce activities. As the Saudi government has realized the need to develop the e-commerce sector and enhance confidence in electronic transactions, especially in light of the world's trend toward global trade through the Internet, the commercial register has also become a commercial electronic code (QR Code), which displays store information with government agencies, such as localization data, municipality licences, and chambers of commerce membership (Al-Hrbi & Al-Shah, 2021). E-Commerce Council: The E-Commerce Council was established in 2018 as the starting point for the integrated efforts of all relevant national authorities. One of the obstacles facing e-commerce is ensuring the effective implementation of "e-commerce stimulation" program projects and their recommendations. Therefore, the approval of the Council is a strategic step toward achieving the goals of the Kingdom's Vision 2030 by creating a diversified economy, establishing an attractive investment environment, and providing an environment that allows for entrepreneurship and generates job opportunities. In addition, E-Commerce significantly contributed to the implementation of the "E-Commerce Stimulation" program initiative, which developed the Saudi economy (e-commerce board, 2018). Maarouf platform: The Ministry of Investment seeks to attract and encourage investments in all economic sectors, including e-commerce, as it is the government agency responsible for issuing licences for foreign and local companies operating in the e-commerce sector. The Maarouf platform enables investors and entrepreneurs to issue commercial electronic registers. Through the (Marouf) platform in one step, the platform also enables viewing of the online store's evaluation, replacement, and return policies, and the platform also enables consumers to report about online stores, as well as enabling online store owners to direct consumer reports and work on addressing them (Hrbi and Al-Shah, 2021). E-commerce law: The Saudi government issued a law regulating e-commerce in 2019. The government has also issued many laws related to e-commerce, such as the Companies Law, the Cybersecurity Law, the Information Crimes Law, and the Communications Law, to organize and support all e-commerce transactions, especially increasing consumer confidence in the e-commerce sector (Al-mani, 2020). Therefore, these findings positively reflect the development of the Saudi economy. The E-Commerce Law includes 26 articles aiming to protect against fraud, deception, misleading, or spam, which preserve the rights of the online store owner and the consumer together. Among the most important provisions of the Saudi e-commerce law are disclosure and data protection, the right to retrieve or cancel the process, regulating the relationship with the practitioner, and supervising and regulating the sector. The executive regulations of the law regulating e-commerce specify penalties for anyone who violates the provisions of the system or the executive regulations. They are as follows: warning. A fine of up to one million riyals. The practice of e-commerce should be temporarily or permanently suspended. The online store should be blocked by coordinating with the competent authority, in part or in whole, or temporarily or permanently (Al-Hrbi & Al-Shah, 2021). The E-Commerce Law addresses the prohibition of trademark infringement on e-commerce platforms. Where it is prohibited to use any trademark owned by others or an unauthorized, counterfeit trademark, and the law also provides a system for protecting data privacy in E-commerce, where the service provider has no right to retain the personal information of consumers except as required for a commercial operation (Iqbal, 2019). The impact of the coronavirus pandemic on the development of e-commerce in Saudi Arabia: The first case of infection occurred in Saudi Arabia on March 2, 2020; thus, all recreational areas, such as cinemas and public parks, were closed, which contributed to a change in the behavior of Saudi consumers, so more consumers switched to e-commerce within the same period. In general, the tourism and transportation sectors were negatively affected. In contrast, retail sectors, especially nutrition, health sectors, and pharmacies, were positively affected. In contrast, the entertainment sector offers discounts on subscriptions to websites for watching movies and series, and it is worth noting that Saudi consumers have resorted to many of them using electronic payment methods. Statistics show that the value of e-commerce in the Middle East and North Africa has risen to \$17 billion, approximately \$5.5 billion in Saudi Arabia (Rasmussen et al., 2020). The COVID-19 crisis negatively affected the Saudi economy and positively affected e-commerce. Most consumers resort to e-commerce to adapt to exceptional circumstances (Abid et al., 2022). It is expected that the COVID-19 pandemic will be controlled soon after the behavior of consumers increasingly relies on e-commerce. Moreover, e-commerce will witness more investors and customers quickly to meet the market's needs (Abid et al., 2022). A successful e-commerce strategy should prioritize innovation, as an enterprise's ability to innovate has a direct impact on the results of its e-commerce initiative. (Fruhling & Siau, 2007). The study hypotheses are as follows:

- There is a statistically significant relationship between e-commerce and GDP.

- There is a statistically significant relationship between e-commerce and total exports.
- There is a statistically significant relationship between e-commerce and total imports.
- There is a statistically significant relationship between e-commerce and economic sectors.

The study was divided into the following sections: Introduction, Literature Review, Methodology and Research Methods, Results, Discussion and Conclusions.

2. Literature Review.

2.1. E-commerce and innovation.

Mohammed (2022) proved that the e-commerce industry is always looking to improve its fulfilment centres and warehouses using innovative technology. This helps to increase customer loyalty, which has become even more important due to the COVID-19 pandemic. The pandemic has highlighted the need for e-commerce companies to be able to quickly and efficiently fulfil orders for essential items such as medicine. The study of Sazu (2022) suggested that to improve innovation efficiency, it is important to gather big data on customer requirements, behavior, competition, services, products, marketing, and technological applications. This can lead to increased sales and profits. Salem and Nor (2020) showed that technological innovation can help e-commerce companies achieve profitability by improving their competitive advantage, product and service quality, and decision-making speed and by enabling them to take advantage of the global conditions that favor e-commerce. The study of Bogue (2016) evoked warehouse management can greatly benefit from the use of robots, which rely on advanced technologies such as 3D imaging, artificial intelligence, stick-based handles, and remote control for safe loading and unloading of goods. This innovation can lead to a significant boost in electronic commerce, particularly for large global companies such as Amazon that prioritize the implementation of new technologies.

2.2. Small and medium-sized companies and e-commerce.

Faid et al. (2020) demonstrated a statistically significant relationship between the use of e-commerce and the marketing opportunities available for minor projects in the KSA and the transition to a knowledge economy. Jalali & Soleimani (2014) suggested that the reliance of small and medium-sized companies on e-commerce gives them a competitive advantage in exporting their products compared to other companies, significantly facilitating the process of communicating with customers, whether at home or abroad, as well as improving communications with suppliers and partners. Nevertheless, fluctuations in the exchange rate and export barriers are among the most critical challenges facing SMEs.

2.3. Factors in the development of e-commerce.

Mekhmonov & Temirkhanova (2020) suggested that there is no single methodology for determining the level of development of e-commerce and the need to pay attention to insurance for trading entities, licensing activities in e-commerce, commitment to information security, the e-commerce stock market, and legal legislation to enhance the responsibility of participants in e-commerce. Alyoubi (2015) advocated that e-commerce is a powerful tool for reducing the digital divide and an opportunity to achieve economic equality between developing and developed countries. However, the development of national strategies and policies is needed to develop e-commerce in developing countries, especially in terms of education and training human resources, investing in electronic infrastructure, and establishing a legal climate that regulates transactions in e-commerce. According to the study of Ordanini and Rubera (2010), to maximize profits through electronic commerce, companies need to have strong information technology capabilities. This can be achieved by hiring trained professionals with exceptional skills in IT. A study showed that nontechnological resources have little impact on e-commerce. In addition, top management needs to take advantage of IT innovations. To successfully implement IT innovation, companies need to carefully select external partners and involve customers and suppliers. Suppliers who are not ready for e-commerce can hinder the implementation of innovation. However, the benefits of electronic commerce, including the acceleration of market expansion to attract more customers, can outweigh the costs. Lawrence and Tar (2010) concluded that the level of education, the availability of technology, and the development of banking services are among the most critical factors that contribute to the development of e-commerce and that e-commerce has significant benefits in developing countries. The study of Fruhling & Siau (2007) concluded that the technological revolution has greatly affected the world of electronic commerce. A competitive edge can be gained in the market through an e-commerce strategy that includes innovative capabilities. A successful e-commerce strategy should prioritize innovation, as an enterprise's ability to innovate has a direct impact on the results of its e-commerce initiative.

3. Methodology and research methods. Research design is defined as the conceptual framework within which research is conducted. It is the primary and basic procedure for collecting, measuring, and analysing data (Thomran & Alshammari, 2023). The descriptive approach helps in understanding the phenomenon,

which helps in finding the results (Kemp et al., 2018). A descriptive approach involves providing comprehensive sensory descriptions of products that allow comparisons of multiple sensory characteristics within and between products. The descriptive approach helps guide product developers in developing innovative products. It also helps to analyse competitors (Schober et al., 2018). The analytical method is considered one of the most important scientific research methods. The analytical method depends on analysing information and linking it by displaying the details in depth to determine the reasons for its existence and effects and then arriving at the best possible solutions to the research problem; reliance was placed on descriptive and analytical methods. These research objectives can be addressed quantitatively by correlation analysis, which provides information about the strength of the relationship and its direction. Correlation is a measure of the association between variables. In linked data, a change in the magnitude of one variable is related to a change in the magnitude of another variable, either in the same direction (positive correlation) or in the opposite direction (negative correlation). The term correlation is often used in the context of a linear relationship between two continuous variables (Schober et al., 2018). The data and information were collected from the World Bank, the General Authority for Statistics in the Kingdom of Saudi Arabia, a literature review, and scientific references. To study the role of e-commerce as an innovative solution in the development of the Saudi economy, a descriptive approach and an analytical approach are needed. This is done by defining the definition, types, advantages, challenges and elements of e-commerce. In addition, the development of e-commerce in Saudi Arabia should be monitored, especially the role of the Saudi government in supporting and developing e-commerce. The impact of the coronavirus pandemic on the development of electronic commerce in Saudi Arabia. The most important economic sectors in e-commerce. The most important electronic markets in Saudi Arabia in 2020. Statistical analysis tools such as simple linear regression will also be used. correlation coefficient. The coefficient of determination was used to measure the impact of e-commerce revenues on GDP during the period 2015–2020. The impact of e-commerce revenues on total exports. The effect of e-commerce revenues on total imports. The impact of e-commerce revenues on the clothing and footwear sector. The impact of e-commerce revenues on the electronics sector. The impact of e-commerce revenues on the food and drug sector. The impact of e-commerce revenues on the furniture and home appliances sector during the same period.

4. Results. E-commerce underwent significant development during the period 2015–2020, accompanied by development in gross domestic product, exports, imports, and economic sectors during the same period; Table 1 shows this development.

Table 1. Development of e-commerce and GDP, exports, imports, and economic sectors of e-commerce during the period 2015–2020

Sector/Year	2015	2016	2017	2018	2019	2020
GDP (billion dollars)	654,27	644,94	688,59	816,58	803,62	703,37
Exports (billion dollars)	218,01	200,86	239,99	314,92	285,86	184,43
Imports (billion dollars)	215,21	229,90	255,38	247,31	198,11	201,98
E-commerce (million dollars)	5059.3	7227.4	7962.7	8744.5	9610.2	10482.7
Clothes and shoes (million dollars)	159.1	1893.5	2188.9	2510.7	2866.5	3209.5
Electronics (million dollars)	1805.5	2037.6	226207	2487.6	2747.2	2998.9
Food and medicine (million dollars)	409.8	47202	452.1	615.3	693.1	776.8
Furniture and household appliances (million dollars)	669.9	808.1	952.0	1112.9	1284.4	1477.5

Sources: developed by the authors based on (KSA, n.d.; World Bank database, n.d.).

Table 1 clearly shows that the volume of e-commerce increased from 5059 to 10483 million dollars during the period 2015–2020. An increase of approximately 207% was estimated, and the average annual revenue increase was approximately 34.5% during the same period. This increase is due to the interest of the Saudi

government in developing e-commerce. In addition to the coronavirus pandemic and the closures that the country witnessed, the volume of exports fluctuated between declining and increasing during the same period; for example, approximately 315 billion dollars were recorded in 2019, which was the highest value of exports as a result of high oil prices, and the lowest value of exports was approximately 184 billion dollars in 2020. As a result of the decline in global demand for oil and the closures that the world has witnessed, nonoil exports still account for a modest percentage of Saudi exports; therefore, their impact on the development of e-commerce is still limited (GAS, 2019). The volume of imports also fluctuated between the rise and fall. During the same period, imports increased from 215 in 2015 to 255 billion dollars in 2017, which was the highest value of imports. However, it decreased to approximately 200 billion dollars at the end of the period due to the closure that the world witnessed, which was accompanied by a decline in domestic and foreign investments, as industrial imports still acquired most of the Saudi imports. Therefore, the impact of these factors on the development of e-commerce has been limited (GAS, 2019). Moreover, Saudi Arabia's GDP increased from 656 to 916 billion dollars during the period 2015-2018 as a result of the increase in oil prices and domestic and foreign investments. The increase in domestic production and exports decreased relatively in 2019 and then declined to 703 billion dollars in 2020. The COVID-19 outbreak was affected by the negative repercussions that the world witnessed due to the pandemic. While the volume of e-commerce doubled during the period 2015-2020, exports and imports decreased. The volume of GDP increased from 654 to 703 billion countries during the same period. Blazquez et al. (2020) indicated the importance of reducing oil consumption in Saudi Arabia and increasing oil exports by increasing prices and reducing oil consumption, which has positive effects on GDP.

It is also clear from the table that the value of e-commerce in the KSA doubled during the period 2015–2020. Clothing and shoes topped the e-commerce sectors in 2020, with an estimated increase of more than 20 times over six years due to increased demand for clothes and shoes. E-commerce in clothes and shoes increased from 15.91 to 3209.5 million dollars, and e-commerce in electronics increased from 180505 to 2998.9 million dollars, estimated at more than 16 times. On the other hand, the value of e-commerce in food and medicine increased from 409.8 to 776.8 million dollars, an increase estimated at less than two times, which was the lowest percentage during that period due to the importance of quickly obtaining medicine as well as food. The value of e-commerce in furniture and household appliances increased from 669.3 to 1477.5 million dollars, an increase estimated at more than two times during that period due to the importance, sensitivity, and purchase of moving household appliances, in addition to the fact that they are durable goods that differ from clothes and shoes.

The answers to these questions were determined using the simple linear regression coefficient, which includes the correlation coefficient between e-commerce as an independent variable and each of the gross domestic product, total exports, total imports and economic sectors (ready-made clothes, electronics, food and medicine, furniture and household appliances). The first question: There is a statistically significant relationship between e-commerce and GDP.

Table 2 shows the relationship between e-commerce and GDP. The statistical analysis results revealed no statistically significant correlation between e-commerce and GDP, as the correlation coefficient reached 0.046, and the R-square was 0.002. Moreover, these findings confirm that there is no correlation with the calculated (q) value, which is equal to 0.009, and with the level of significance, which is 0.93; this correlation is not significant because it is greater than the significance level (0.05); therefore, the alternative hypothesis is rejected. Therefore, the zero hypothesis is accepted, which states that there is no statistically significant relationship between e-commerce and GDP.

Table 2. Simple linear regression coefficient between e-commerce and GDP

Item	Correlation coefficient	R Square	F value	B regression coefficient	Significance level
The relationship between E-commerce and GDP	0.046	0.002	0.009	7.47	0.93

Sources: Developed by the authors based on KSA, n.d.; World Bank database, n.d.).

The second question: There is a statistically significant relationship between e-commerce and total exports. Table 3 shows the relationship between e-commerce and total exports. However, the statistical analysis results showed no statistically significant correlation between e-commerce and total exports, as the correlation

coefficient was 0.177, and the R squared was 0.031. 0.737), which is insignificant because it is greater than the significance level (0.05). Therefore, the alternative hypothesis is rejected, and the null hypothesis is accepted, which states that there is no statistically significant relationship between e-commerce and total exports.

Table 3. Simple linear regression coefficient between e-commerce and total exports

Item	Correlation coefficient	R Square	F value	B regression coefficient	Significance level
The relationship between E-commerce and total exports	0.177	0.031	0.129	4.67	0.737

Sources: Developed by the authors based on KSA, n.d.; World Bank database, n.d.).

The third question: There is a statistically significant relationship between e-commerce and total imports. Table 4 shows the relationship between e-commerce and total imports. The results showed no statistically significant correlation between e-commerce and total imports. When the correlation coefficient reached 0.263 and the R-square reached 0.069, there was no correlation with the calculated F value, which was 0.298 at the level of significance (0.61); this result was not significant because it was greater than the level of significance (0.05); therefore, the alternative hypothesis was rejected. Therefore, the zero hypothesis is accepted, which states that there is no statistically significant relationship between e-commerce and total imports.

Table 4. Simple linear regression coefficient between e-commerce and total imports

Item	Correlation coefficient R	R Square	F value	B regression coefficient	Significance Level
The relationship between E-commerce and total imports	0.263	0.069	0.298	-3.25	0.61

Sources: Developed by the authors based on KSA, n.d.; World Bank database, n.d.).

Fourth question: A statistically significant relationship exists between e-commerce revenues and economic sectors (clothing, shoes, electronics, food, medicine, furniture, and household appliances). Table 5 shows the relationship between e-commerce revenues and economic sectors (clothes and shoes). The statistical analysis revealed a statistically significant correlation between e-commerce revenues and economic sectors (clothes and shoes). The correlation coefficient was 0.98, with a Rsquare of 0.96, which confirms the existence of a correlation in which the calculated F value is 100.77 at a level of significance of 0.001, which is significant at the 0.05 level.

Table 5. Simple linear regression coefficient between e-commerce revenues and economic sectors (clothes and shoes)

Independent variable	Dependent variable	Correlation coefficient R	R Square	F value	B Regression coefficient	Significance Level
E-commerce revenues	Clothing and shoes	0.98	0.96	100.77	0.55	0.001

Sources: Developed by the authors based on KSA (n.d.).

This finding indicates that an increase in e-commerce revenues at a rate of one million dollars leads to an increase in economic sectors (clothes and shoes) of 0.55. Therefore, the alternative hypothesis is accepted, and the zero hypothesis is rejected, which states that there is a statistically significant relationship between e-commerce revenues and economic sectors (clothing and shoes).

Table 6 shows the relationship between e-commerce revenues and economic sectors (electronics). The results of the statistical analysis showed that there is a statistically significant correlation between e-commerce revenues and economic sectors (electronics). The correlation coefficient was 0.97, with an R2 of 0.95, which confirms the existence of a correlation in which the calculated (q) value is 76.19 at the level of significance (0.001), which is significant at the 0.05 level.

Table 6. Simple linear regression coefficient between e-commerce revenues and economic sectors (electronics)

Independent variable	Dependent variable	Correlation coefficient R	R Square	F value	B Regression coefficient	Significance Level
E-commerce revenues	electronics	0.97	0.95	76.19	0.226	0.001

Sources: Developed by the authors based on KSA (n.d.).

This finding indicates that an increase in e-commerce revenues at a rate of one million dollars leads to an increase in economic sectors (electronics) of 0.226. Accordingly, the alternative hypothesis is accepted, and the zero hypothesis is rejected, which states that there is a statistically significant relationship between e-commerce revenues and economic sectors (electronics). Table 7 shows the relationship between e-commerce revenues and economic sectors (food and medicine). The findings showed a statistically significant correlation between e-commerce revenues and economic sectors (food and medicine). The correlation coefficient was 0.94, with an R-square of 0.89, which confirms the existence of a correlation in which the calculated F value is 32.7 at the level of significance (0.005), which is significant at 0.05, indicating that an increase in e-commerce revenues at a rate of one million dollars leads to an increase in economic sectors (food and medicine) of 0.072. Accordingly, the alternative hypothesis is accepted, and the zero hypothesis is rejected, which states that e-commerce revenues and economic sectors (food and medicine) have a statistically significant relationship.

Table 7. Simple linear regression coefficient between e-commerce revenues and economic sectors (food and medicine)

Independent variable	Dependent variable	Correlation coefficient R	R Square	F value	B Regression coefficient	Significance level
E-commerce revenues	food and medicine	0.94	0.89	32.70	0.072	0.005

Sources: Developed by the authors based on KSA (n.d.).

Table 8 shows the relationship between e-commerce revenues and economic sectors (furniture and home appliances). The statistical analysis results revealed a statistically significant correlation between e-commerce revenues and economic sectors (furniture and household appliances). The correlation coefficient was (0.96), with an R-square of (0.93), which confirms the existence of a correlation in which the calculated (q) value amounted to (57.91) at a level of significance (0.002), which is significant at (0.05), meaning that an increase in e-commerce revenues at a rate of one million dollars leads to an increase in economic sectors (furniture and home appliances) of 0.152.

Table 8. Simple linear regression coefficient between e-commerce revenues and economic sectors (furniture and household appliances)

Independent variable	Dependent variable	Correlation coefficient R	R Square	F value	B Regression coefficient	Significance level
E-commerce revenues	furniture and home appliances	0.96	0.93	57.91	0.152	0.002

Sources: Developed by the authors based on KSA (n.d.).

Therefore, the alternative hypothesis is accepted, and the zero hypothesis is rejected, which states that there is a statistically significant relationship between e-commerce revenues and economic sectors (furniture and home appliances).

5. Discussion. By studying the role of e-commerce as an innovative solution in the development of the Saudi economy, the results clarify the hypotheses of the present study, which include analysing the statistical relationships between e-commerce revenues as an independent variable and GDP, total exports, total imports, and economic sectors as dependent variables. The results of the study also indicated that despite government efforts to support and develop trade, more support is still needed, and the results are as follows:

- There is no statistically significant relationship between e-commerce and GDP, which differs from the findings of previous studies (He & Wang, 2019), the results of which indicate that there is a positive relationship between GDP and e-commerce and that GDP growth is a driving force for the development of e-commerce. One study (Maghrebi et al., 2018) indicated a strong correlation between oil prices and gross domestic product in Saudi Arabia. However, the Saudi GDP still depends mainly on the price of oil exports. Instead, the oil price is the main determinant of Saudi government spending, determining the gross domestic product. Therefore, the KSA's (2020-2030) vision aims to diversify its economy to reduce its dependence on the oil sector (Foudeh, 2017). Undoubtedly, government support is a critical component of the progress of e-commerce. However, other essential facets require attention, such as education, training, electronic infrastructure, modern technological innovations, and diverse electronic financial services. Establishing a legislative and legal environment that fosters consumer trust in electronic commerce is equally crucial. It may be valuable to conduct research from both the Saudi consumer and national e-commerce companies' perspectives to identify potential barriers to the growth of e-commerce.

- There is no statistically significant relationship between e-commerce and total exports. This differs from the results of Gregory et al. (2017), whose results indicate that there is a positive relationship between e-commerce and total exports and that product development, and the efficiency of pricing, distribution, and communication are integrated factors that affect e-commerce marketing and export development. These findings differ from the results of the study by He and Wang (2019), whose results indicate that there is a positive relationship between e-commerce and total exports through the development of transportation, storage, marketing, and financial services; the reduction of barriers and customs costs; and the reduction of external trade risks. Nonoil exports still represent only approximately 23% of Saudi exports, while oil exports represent approximately 77% of total exports (GAS, 2019). Therefore, nonoil exports have a limited contribution to the development of e-commerce in Saudi Arabia. Technological innovations can help e-commerce companies achieve profitability by improving their competitive advantage, product and service quality, and decision-making speed and by enabling them to take advantage of global conditions that favor e-commerce (Salem & Nor, 2020). The e-commerce sector must focus on developing transportation services, warehouses, storage facilities, marketing strategies, and financial services. Additionally, it is crucial to support technological innovations and improve the quality of goods and services offered. It is necessary to reduce barriers and customs duties, ultimately developing e-commerce exports to enhance the competitive advantage of e-commerce companies. To stay ahead in the e-commerce industry, attention must be given to developing transportation services, warehouses, storage facilities, marketing strategies, and financial services. It is also essential to support technological advancements and elevate the quality of goods and services. Reducing barriers and customs tariffs is vital to gaining a competitive edge, which can lead to the growth of e-commerce exports.

- There is no statistically significant relationship between e-commerce and total imports, which differs from the findings of Ma et al. (2021), whose results indicate a positive relationship between e-commerce and the development of imports, and that e-commerce represents a driving force working on the development of the Chinese economy. Industrial imports of machinery, transport equipment, manufactured goods and various goods still account for approximately 68% of the total Saudi imports. In contrast, food, beverages, tobacco, oils, and fats account for only approximately 13% of total imports (GAS, 2019). These sectors are among the essential sectors of e-commerce in Saudi Arabia; therefore, they are not significantly influential in developing e-commerce.

- There is a statistically significant relationship between e-commerce revenues and economic sectors (clothing and shoes). The technological revolution has greatly affected the world of e-commerce. A competitive edge can be gained in the market through an e-commerce strategy that includes innovative capabilities (Fruhling & Siau, 2007). This indicates that the clothing and footwear sector has undergone relative development and is expected to witness further development in the future through government support for small and medium-sized companies and through the reliance of these companies on communications and information technology; the use of innovative marketing methods; and attention given to the quality of goods. Additionally, these products are offered at competitive prices that contribute to attracting more customers and subsequently growing the clothing and footwear sector.

- There is a statistically significant relationship between e-commerce revenues and economic sectors (electronics). For e-commerce companies to thrive, they need to balance cost-effective manufacturing, timely shipping, automated fulfilment centres, and efficient call centres. Additionally, selecting the right location for a central warehouse can minimize distribution costs to sub warehouses (Kostikov et al., 2021). Thus, the company's sales and profits increase. The advent of the technological revolution has greatly influenced the

evolution of electronic commerce. Additionally, the global electronics industry has made notable progress during the pandemic, with Saudi Arabia becoming an attractive market for the electronics trade. These combined factors have significantly aided in the advancement and prosperity of the electronics sector.

- There is a statistically significant relationship between e-commerce revenues and economic sectors (food and medicine). The e-commerce industry is always looking to improve its fulfilment centres and warehouses using innovative technology. This helps to increase customer loyalty, which has become even more important due to the COVID-19 pandemic. The pandemic has highlighted the need for e-commerce companies to be able to quickly and efficiently fulfil orders for essential items such as medicine. (Mohammad, 2022). The e-commerce sector has experienced significant growth in the food and medicine sectors, particularly during the COVID-19 pandemic. Food and medicine are among the most essential basic consumer goods, and the reliance on communication and information technology, as well as innovative methods such as social media, has contributed to the development of these sectors. Both government and private companies have used these advancements to market their food and medicine products.

- There is a statistically significant relationship between e-commerce revenues and economic sectors (furniture and home appliances). Despite the development of government information technology infrastructure and the initiatives presented by the Saudi Monetary Agency, the bulk of e-commerce sales are in the B2B sector, not the B2C sector. This is due to the high costs of creating a B2C website and the resistance to change from traditional to e-commerce (Ezzi, 2016). To maximize profits through e-commerce, companies need strong capabilities in terms of IT innovation. This can be achieved by hiring trained professionals with exceptional skills in IT (Ordanini & Rubera, 2010). Government support is undoubtedly crucial in developing e-commerce, but other vital aspects require attention. Education, training, electronic infrastructure, modern technological innovations, and diverse electronic financial services are essential to the growth of e-commerce. Creating a legislative and legal environment that enhances consumer confidence in e-commerce is also necessary.

The results of the statistical analysis indicated that there is no correlation between e-commerce and GDP. The reason for this is that although e-commerce has increased, it is not comparable to the increase in or size of gross domestic product, which depends on global oil prices. This is also the case when comparing the volume of e-commerce to the volume of exports that depend on oil exports, or imports, most of which are industrial imports. The results of the statistical analysis indicated that there is a correlation between e-commerce and economic sectors because these sectors form the structure of e-commerce, which increases the volume of trade in clothing, shoes, electronics, food, medicine, furniture and household appliances. This has contributed to increasing the volume of e-commerce.

The time period is one of the limitations of the study that must be taken into account, given that it is only six years. However, this is the period during which official data were issued by the Saudi Statistics Authority relating to the economic sectors of e-commerce, while the results of the statistical analysis were logical about whether e-commerce revenues were an independent variable. GDP, exports, and imports are all dependent variables, data issued by the World Bank during the period 2015–2020.

6. Conclusions. This research analysed the role of e-commerce as an innovative solution for developing the Saudi Arabian economy. Several hypotheses were tested, and the results can be divided into two groups. First, it was found that there is no statistically significant relationship between e-commerce and GDP, exports, or imports, which are important indicators of overall performance. Second, there was a statistically significant relationship between e-commerce and the following sectors: clothes and shoes, electronics, furniture, and household appliances, as well as food and medicine. Despite the Saudi government's interest in developing the e-commerce sector and the trend toward developing nonoil economic sectors, the impact of e-commerce on the Saudi Arabian economy is still modest. This does not mean a contradiction in the results; rather, the development of economic sectors that represent e-commerce, such as clothes and shoes, electronics, furniture, and household appliances, as well as food and medicine, contributed to the development of the volume of e-commerce, while the volume of e-commerce was still very low compared to the output. The GDP or the volume of exports or imports.

Saudi e-commerce companies must find innovative solutions by relying on advanced technology. In addition, business performance and the quality of services and products offered in local and foreign markets should be improved. They can also exploit global conditions that drive consumers and businesses to rely on e-commerce and increase global competition between e-commerce companies, especially during global crises such as the coronavirus pandemic. Moreover, the development of legislation, rules and regulations governing e-commerce transactions is essential, especially with regard to consumer protection and resolving security and privacy issues. Providing safer online payment methods and increasing trust between consumers and

retailers. Raising awareness of the economic benefits of e-commerce and encouraging the use of social media in developing e-commerce are innovative solutions for developing the Saudi economy. In addition to supporting emerging companies in the e-commerce sector, research can be conducted in the future to identify obstacles to the growth of e-commerce from the perspective of Saudi consumers and national e-commerce companies. The role of the government in supporting technological innovations to develop e-commerce, global models in the development of e-commerce.

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Електронна комерція як інноваційне рішення забезпечення розвитку саудівської економіки

Це дослідження спрямоване на вивчення ролі електронної комерції як інноваційного рішення для розвитку саудівської економіки. Авторами описано та визначено внесок електронної комерції у розвиток показників економічного розвитку Саудівської Аравії, а також досліджено роль уряду Саудівської Аравії у підтримці та розвитку сектору електронної комерції. Розвиток цього сектору пов'язаний з різними формами підтримки, яку надає уряд Саудівської Аравії. Ця підтримка включає створення ефективної електронної інфраструктури, гарантування прав споживачів, розвиток платформ електронної комерції, підвищення довіри споживачів до використання електронної комерції та сприяння інноваціям через Міністерство торгівлі, Раду електронної комерції, платформу Maagouf та законодавство про електронну комерцію. У статті систематизовано виклики та перешкоди, з якими стикаються учасники електронної комерції, такі як недовіра до електронних транзакцій, шахрайство, спам і недостовірні інформації про товари та послуги. Деякі споживачі також не ознайомлені з використанням сучасних технологій, таких як електронна комерція. Авторами наголошено на тому, що Саудівська Аравія лідирує серед країн Близького Сходу за кількістю користувачів Інтернету, розширенням варіантів доставки, методами оплати та ідентифікацією типів та переваг цих послуг. У дослідженні використано інструменти статистичного аналізу, такі як проста лінійна регресія та коефіцієнт кореляції для оцінювання впливу доходів від електронної комерції на ВВП, експорт та імпорт, а також на розвиток секторів економіки. Незважаючи на той факт, що в електронній комерції спостерігається розвиток, багато саудівських компаній відстають від цього розвитку. Тому важливо, щоб саудівські компанії працювали над пошуком інноваційних рішень для покращення продуктивності та якості наданих послуг і товарів.

Ключові слова: економічні сектори; експорт; ВВП; імпорт; інновації; Саудівська Аравія.