Yassine Mimouni*
Bessouyah Mouna**

THE IMPACT OF DIGITAL ECONOMY INDICATORS ON ELECTRONIC COMMERCE IN THE UNITED ARAB EMIRATES

Abstract: The digital economy plays a significant role in developing infrastructure, not to mention its contribution to supporting software related to managing economic, commercial, and financial activities, and increasing the number of subscribers to information technology. This study aims to demonstrate the impact of digital economy indicators on e-commerce in the United Arab Emirates during the period 2000-2023, using the Average Distributed Lag (ARDL) model. Based on the results of the standard modeling, it was found that all mobile phone users and internet users had a significant positive impact on total sales in the short term. Furthermore, it was found that both mobile phone users and internet users had a significant positive impact on total sales in the long term. Finally, the study recommended the need to open the door to e-commerce based on digital economy applications and to seek to benefit from pioneering international experiences in the digital economy, in addition to supporting e-commerce based on modern technology.

Keywords: Digital economy, mobile users, Internet users, information technology, e-commerce.

Introduction

With the vigorous development of the digital economy and globalization, cross-border electronic commerce has become one of the engines to promote international trade and business development. The rapid evolution of digital technology and the global connection of the Internet provide enterprises with unlimited opportunities but also bring unprecedented competitive pressure.

In this dynamic and changing era, innovative business models have become the key for enterprises to gain a foothold and flourish in cross-border electronic commerce[1]. The past few decades have witnessed a growth in the use of information and communications technology (ICT) infrastructure as a mechanism for development in many countries. The growth in worldwide ICT has contributed to globalization, enabling the integration of financial markets among groups of countries[2].

---

* **Yassine Mimouni** – Associate Professor at the Faculty of Economy at the Relizane University, Algeria, email : yassine.mimouni@univ-relizane.dz; https://orcid.org/0000-0002-9031-8682 1

** **Bessouyah Mouna** – Assistant Professor at the at the Faculty of Economy at the Relizane University, Algeria, email: mouna.bessouyah@univ-relizane.dz; https://orcid.org/0000-0002-6981-7145

[1] **Elia, S. Giuffrida, M. , Mariani, M. M. , & Bresciani, S.** Resources and digital export: an rbv perspective on the role ofdigital technologies and capabilities in cross-border ecommerce. *Journal of Business Research*, vol. 132, 2021, p. 158. Available at: https://doi.org/10.1016/j.jbusres.2021.04.010

[2] **Bankole, F. O**. The impact of information and communications technology infrastructure and complementary factors onintra-African Trade. *Information Technology for Development*, vol. 21 (1), 2013, p. 9.

Information and communication technologies (ICT) have a tremendous impact on society, particularly on organizations, businesses, and purchasers. Many countries' organizations are taking more innovative ways to maximize the use of ICT and grab the benefits of the internet from their business activities. The rapid use of ICT is boosting E-Commerce[3].

The Government of the United Arab Emirates is steadily moving towards establishing a strong digital economy and taking advantage of the great benefits of the country's digital transformation process. The UAE is one of the most advanced countries in the field of information technology and adopts modern technologies to serve the economy as it is one of the most used countries for smartphones in the world.

The UAE Government is taking concrete steps to establish a digital economy and take advantage of the advantages and benefits provided by digital transformation, taking advantage of its long history and track record of initiatives encouraging innovation. Dubai Foundation's initiative for the future (1 million Arabic programmers) has paved the way for Going forward in that direction.

Undoubtedly, the region's digital economy offers enormous potential, as well as the enjoyment of the younger generation. With great digital skills and expertise, there are enormous opportunities to benefit from demographic returns. digitally enhanced.

To enhance the status of the United Arab Emirates on the global map as a global center for technology and innovation, work on enhancing young people's digital expertise and skills should be on Head our agenda for the future. In fact, the UAE is among the most advanced countries in the field of technology and adopts modern technologies, and indeed, the Emirates has one of the highest rates of smartphone spread compared to the number of citizens is more than 100% which makes us able to use computer software and technology to solve problems[4].

On the one hand, a country's technology infrastructure plays a critical role in creating a nurturing environment for ICT evolvement and adoption. On the other hand, Internet technologies create the basis for continual advances with respect to new goods and services, new markets, and new business models in the digital economy.

This in return provides the basis for e-commerce development[5].

During this article, we will try to clarify the impact of digital economy indicators on the total sales volume of electronic commerce in the UAE and therefore from the above the following problem can be raised:

What is the impact of digital economy indicators on e-commerce in the UAE?

Importance of the study:

The importance of our study lies in our attempt to:

– Concepts on digital economy and e-commerce.

– The theoretical relationship between the digital economy and e-commerce.

– Impact of digital economy indicators on United Arab Emirates e-commerce (2000-2023).

The objectives of the study:

Through this study, we will pursue the following objectives:

* Identifying the relationship between digital economy indicators and e-commerce.

* Determine the impact and direction of the relationship between digital economy indicators and e-commerce in the UAE based on previous studies.

Study methodology:

In this study, we will rely on the descriptive curriculum by describing the study's variables. In addition to the inductive method, by using statistical analysis methods to study the relationship between digital economy indicators and e-commerce in the UAE.

---

[3] **Khan, A**. , Towards Digital Economy: The Development of ICT and E-Commerce in Malaysia. *Modern Applied Science,* (5), 2011, p. 171.

[4] **Oucine, N**. *Report The digital economy in the UAE. International Telecommunication Union*. 2023. p. 11.

[5] **Xing, Z**. , The impacts of Information and Communications Technology (ICT) and E-commerce on bilateral trade flows. *Int Econ Econ Policy,* (05), 2018, p. 2.

Study Themes:

During this study, we will address the following elements:

• theoretical foundation of the study,

• study the impact of digital economy indicators on e-commerce in the UAE from 2000 to 2023.

Previous studies:

There are many studies on the digital economy and e-commerce, which can be summarized according to:

Alamgir Khan, 2011: This study aims to illustrate the potential growth of ICT and ICT in e-commerce development, with results showing that Internet users' behaviour to buy online through the growth of ICT infrastructure. An increasing rate of Internet users, online spending, and the adoption of new technologies are key drivers of Malaysia's e-commerce development.

Marwa Adel Saad Al-Hasnain, 2023: This study aims to illustrate the impact of information technology, which is an important element in the digital economy, on electronic commerce in COMESA countries. It relies on standard analysis and joint integration to assess the relationship. The existence of an impact of information technology on e-commerce dealers has been found. The impact has been positive, as this technology has facilitated the flow of goods and services and opened new channels for electronic trade.

Xing, 2017: This study illustrated the analysis of ICT's role with electronic commerce in export performance in the Africa Evil Caucus, where the introduction of modern ICTs based on e-commerce applications has made it possible to stimulate trade flows at various levels.

Bankole, 2013: This study aims to illustrate the impact of ICT on e-commerce in 28 African countries, where the modeling of micro-square structural equations was relied upon to analyze data. The results show that telecommunications infrastructure has an impact on e-commerce among African countries.

Yifu Ma, 2024: This study aims to illustrate the opportunities and challenges, facing electronic commerce in the digital economy through a detailed analysis of successful enterprises that reveal the positive role of digitization and their contribution to improving user experience, expanding market boundaries, and promoting global competition. Emerging technologies have been found to promote the digitization of the supply chain customization user experience and globalization of market position. Successful cross-border e-commerce enterprises stand out in the competitive environment in the digital age as it is not only adapted to the changing market through continuous technology business model „ but also achieve the development and sustainable development of the business model with the support of users, Global perspective, and strategic cooperation.

The UAE's digital economy contributes 4.3 per cent of the country's GDP, with expectations that this rate will increase in the coming period. 40% of the UAE's population use digital government services more than once a week. At the heart of retail sales e-commerce in the UAE is growing rapidly and playing a key role in growing sales volumes, while traditional retail sales in the UAE are declining. The State is expected to place itself significantly in the digital economy, which is supported by many factors such as the development of e-commerce, improved ICT infrastructure, the spread of e-services, the use of smartphones, and the expansion of e-payment systems, as well as substantial government support for digital transformation[6].

Research gap:

The gaps in the study were:

– Theoretical gap: studying the relationship between the variables represented by indicators of the digital economy and e-commerce.

– Methodological gap: applying standard modeling to study the impact and relationship between digital economy indicators and e-commerce changes.

---

[6] **Zyaed.** 2023 Available at: https://u.ae/ar-ae/about-the-uae/economy/digital-economy

– Applied gap: applying the study model in all variables, including dependent and independent variables, and its projections on the experience of the United Arab Emirates, where this study focuses on determining the impact of digital economy indicators on the volume of sales in e-commerce.

1. LITERATURE REVIEW

1.1. Digital Economy

The digital economy is based on several components, including technological infrastructure, hardware, software, and networks, as well as digital mechanisms through which business and economics are conducted including e-commerce and electronic transactions made entirely on the Internet.[7]

It is defined as the digital information technology-based economy that employs information and knowledge in its management, as the revolution's new resource, and as an inspiration for new innovations[7].

It is also defined as the label used to refer to the Internet-based economy or the WAP economy, which deals with digital digitization or information, digital customers and digital companies, digital technology, and digital products[8].

1.2. Indicators for measuring the digital economy:

In 1995, the concept of the digital economy was introduced by Canadian economist Don Tapscott, a delegation that was after the beginning of the spread of the Internet as a global network. More than 20 years later, the latter became familiar with a tremendous development in the innovation of many technologies such as smartphones and their applications, interactive sites, social networks, and cloud computing, as well as economic development[9].

After the widespread spread and controversy caused by the digital economy, a major problem arose over the development of specific indicators. and because its measurement is subject to many difficulties and has been highly controversial, as some market research organizations consider it necessary to distinguish between the direct and indirect digital economy. A direct contribution is an economic activity related to exclusive online business activities, while an indirect contribution is linked to the digital activity of mixed business[10].

1.3. Knowledge Economy Index:

UNDP's Knowledge Economy Index is based on the following pillars:

✓　**Innovation**: An effective system of business linkages with academic institutions and other organizations that can keep pace with the growing knowledge revolution and try to adapt it to local needs.

✓　**Education**: A basic need for economic productivity and competitiveness, where governments must provide labour or human capital capable of integrating modern technology into work as well as creative skills into educational curricula.

1.4. Information and communications technology infrastructure facilitates the dissemination and processing of information and knowledge and the extent to which it is adapted to local needs, to support economic activity and stimulate projects to produce high value-added.

1.5. Good governance:

Based on strong economic foundations that can provide legal, and policy frameworks aimed at increasing productivity and growth, these policies aim at making ICT more accessible and accessible, while reducing tariffs on technology products and increasing the competitiveness of SMEs.

---

[7] **Al-Razu, H**. **M.** *Digital Economy and Internet Economics Entry*. Riyadh: Research Center, 2006 .

[8] **Najm, N. A.** *Electronic Governance: Strategies, Functions and Problems*. Saudi Arabia: Mars House, 2005.

[9] **ESCWA, U. N.**. *Perspectives on the digital economy in the Arab region*. Beirut: Lebanon, 2018.

[10] **lambin, J. j.** *Rethinking the Market Economy*. (Vol. 1st edition). ,England: Palgrave macmillan, 2014.

1.6. ICT Development Index:

The IDI contains indicators of the potential of countries influencing society's ability to use ICT efficiently. The ICT Development Index is designed to directly reflect progress in countries. Three main indicators include:[11]

Access: assesses the readiness of communications and information technology and the availability of infrastructure and access.

Usage: assesses the intensity of the use of communications and information technology.

Skills: assesses the skills and potential necessary and capable of using communications and information technology with high efficiency

Table 1. Information and Communications Technology Development Index

Access to ICT 40%
–The number of subscriptions to the fixed telephone service per 100nometer.
– The number of subscriptions to the cellular service per 100 breezes.
– Display the Internet's international range for each Internet user.
– Percentage of families with computers.
– Percentage of families with Internet access.
Use of ICT 40%
– Percentage of individuals using the Internet.
– The number of subscriptions to the fixed broadband service per 100nometer.
– The number of subscriptions to the wireless broadband service per 100 breezes.
ICT Skills20%
– Adult literacy rate.
– Gross secondary school enrolment rate.
– Gross enrolment rate in higher education institutions.

Source: (International Telecommunication Union, 2015)

1.7. Digital Development Index: This indicator was released by Feltcher College, The Fletcher Schools Institute, which identifies the progress that countries are making in developing their digital economy and ensures the following indicators:[12]

Demand conditions: Know the extent of consumers' ability to integrate into the digital system by determining the availability of the means and tools needed by consumers to integrate into the digital economy.

Display Terms: Shows the infrastructure that facilitates digital interactions and features, where this type measures the quality of the digital structure.

Institutional environment: In addition to direct investment in infrastructure, actions, and government policies play a key role in supporting the distribution of digital technologies.

Innovation and change: Innovation is used to find new solutions to all challenges, and through its changes, it contributes to change in driving the limits of the digital system.

1.8. Global Innovation Index: This indicator is a sophisticated and renewable project including recent data and surveys of the latest research on the measurement of innovation. This indicator is based on two sub-indicators: innovation inputs consisting of institutions, human capital and research, greeting

---

[11] **Tuniza Teño, M. D**. The reality of the digital economy in the Arab world. *Journal of Economics, Management and Commercial Sciences*, vol. 12 (1), 2019, p. 301

[12] **Mastercard, T. F**. *Digital Planet*, 2017.

environment, market development, and business development. The second indicator is innovation outputs consisting of two pillars: technological and knowledge outputs, or creative outputs.[13]

1.9. Mesh readiness indicator:
The Network Readiness Index shows states' willingness to use ICT effectively by dividing four axes, including: (Economic, 2016).
– ICT infrastructure and the cost of accessing it with the necessary skills to ensure optimal use.
– The readiness of the three poles of society, individuals, companies, and governments, to use ICT and how to benefit from it.
– Business environment, innovation, and political and regulatory framework.
– Economic and social implications of ICT.

1.10. E-commerce:
A new term in the world of economics refers to the process of selling, buying, or exchanging services and information using means and information and communication technologies, including Internet, is defined by the World Trade Organization as an integrated package of production,[14] distribution, marketing, and sale of products by electronic means (Daho, 2018). Electronic commerce can be classified into several levels, including:
– The company B2B trades between one enterprise and another, such as a manufacturing company buying raw materials from another company.[15]
– From a company to a company C2B represented in the trade from individual consumers to companies was a craftsman selling his manual occupancy to a company.
– From consumer-to-consumer C2C is a consumer-to-consumer trade that directly consumes as a sale and purchases a car, phone, and computer.[16]

1.11. Relationship between the digital economy and electronic commerce:
Given the importance of the digital economy, it is necessary to identify indicators to measure its aspects. in which a set of indicators was identified as evidence of its basic structure. With regard to the relationship between the digital economy and e-commerce, developments in the ICT sector have facilitated transactions in e-commerce. Customer-to-customer proximity between partners is no longer required because ICT innovations have become a substitute for face-to-face interactions. Thus, entrepreneurs and small businesses have better access to international markets. Thus, states investing more in ICT infrastructure can overcome these barriers and increase their trade with their trading partners by improving the flow of information and minimizing transaction costs, thereby affecting the creation and promotion of trade[17].

Digital Technology Using digital technologies such as the Internet of Things, big data, and artificial intelligence, cross-border electronic commerce can optimize logistics and supply chain management and improve efficiency. Reducing logistics time and cost improves the accuracy of order distribution, realizes accurate management of inventory and production, and promotes the smooth progress of global cross-border trade. In the era of the digital economy, big data analysis and artificial intelligence technology enable enterprises to understand customer needs more accurately and realize personalized marketing and services.

Enterprises in cross-border electronic commerce can better meet customers' needs, enhance the user experience, establish closer customer relationships, and thus improve customer loyalty [8-9]. The

---

[13] **Daoudi, A.** *The role of innovation in activating the performance of the telecommunications sector*. Thesis for PhD in Economic Sciences, 2017, p. 56.
[14] **Al-Sabouni, A.** *ICT in the New Economy. Economic Symposium*, 2011, p. 5.
[15] **med.sh**e *Commerce definition*, 2018 . Available at: http://www.alyaum.com
[16] **B. Bathlot**. *L'encyclopédie De Marketing*, 2018: Available at: https://Www.DefinitionsMarketing.Com
[17] **Al-Hasnain, M. A.** Using cross-sectional templates in measuring the impact of information technology on electronic commerce in COMESA countries. *Journal of Studies*, 2023, p. 88.

application of emerging technologies, such as blockchain, smart contracts, and virtual reality (VR), has injected innovation power into cross-border electronic commerce and improved the security and transparency of transactions. It reduces the trust cost in cross-border transactions, prevents information tampering and fraud, and promotes the trust construction of international trade. The rise of the digital economy has not only profoundly changed cross-border electronic commerce's business model but also provided enterprises with a broader international market and more efficient management means. In the wave of digital transformation, adapting and adopting new technologies will become the key factor for enterprises to gain advantages in global competition[18].

2. METHODOLOGY AND DATA

In order to study the impact of digital economy indicators on the overall sales of e-commerce in the UAE during the period 2000-2023 using the self-regression model of distributed time gaps, we will familiarize ourselves with the study variables and test their stability for the purpose of building the standard model.

2.1. Hypotheses*:*
From the study's main problem, the following hypotheses can be formulated:
H1: Long-term digital economy indicators positively affect e-commerce.
H2: Short-term digital economy indicators positively affect e-commerce.
2.2. The model used and the study variables used:
This study aims to build a standard model showing the impact of digital economy indicators on the overall sales volume of e-commerce while neglecting the rest of the variables that fall within the prototype. In order to determine the impact of independent variables on the dependent variable, the following function can be formulated:

$$EC)t(=f (MP)t(, IN)t(, FLS)t ,\varepsilon t,) \qquad (1)$$

Where:
EC (t): Total e-commerce sales: Affiliate variable.
(FLS, IN, MP): Digital Economy Indicators (Mobile Users, Internet Users, Cell Phone Subscriptions) The independent variables interpreted for the affiliate variable.εt: Represents random error.
The following table shows the study's variables:

Table 2. Study variables

Variable	Significant	Variable Code	Type	Data source
E-commerce	Total e-commerce sales	EC	Variable dépendante	WDI data
Mobile phone users		MP	Variable indépendante	WDI data
Internet users		IN	Variable indépendante	WDI data
Cell Phone Subscriptions		FLS	Variable indépendante	WDI data

Source: Prepared by researchers

For this, the general model formula of (bessouyah mouna, 2022)is adopted, which includes the dependent variable SI and the independent variables X, which can be expressed by a set of explanatory variables X1, X2..Xt, as follows:

---

[18] **Ma, Y**. Exploring Innovative Business Models in Cross-border E-commerce under Digital Economy. Frontiers in Business. *Economics and Management* , vol. 13 (1), 2024, p. 205. DOI: https://doi.org/10.54097/xhccmn82

$$EC_t = c + (2) \sum_{i}^{p} \boldsymbol{\beta_1} \Delta y_{t-1} + \sum_{i=0}^{q_2} \boldsymbol{\beta_3} \Delta x_{2_{t-1}} + \ldots + \Delta \sum_{i=0}^{q_k} \boldsymbol{\beta_k} \Delta x_{k_{t-1}} \, \boldsymbol{\alpha_1} y_{t-1} + \boldsymbol{\alpha_2} y_{t-1} + \boldsymbol{\alpha_3} x_{2_{t-1}} + \cdots +$$
$$\boldsymbol{\alpha_k} x_{k_{t-1}} + \boldsymbol{\varepsilon_t} \tag{2}$$

Where:

c: is any constant,

Δ: first-order difference,

k: the independent variable number,

p: slowdown period of the dependent variable y,

q 1 ,q2, ...,qk: the intervals of the independent variables x1,x2,….xk; respectively,

β1, β2,…., βk: coefficients of short-term relationship,

α1, α2,…., αk: long-term relationship coefficients,

tε: random error.

3. Results and discussion

3.1. Test the stability of time series of study variables:

In the realm of time series analysis, the stationarity of variables must be rigorously examined before model estimation and cointegration tests. The stability of these variables is often a prerequisite for conducting meaningful analysis due to their inherent instability over time. In this study, to account for the sensitivity of the model to the clustering of research variables, various unit root tests were employed. The first unit root test utilized in this research is the Augmented Dickey-Fuller (ADF) test. This test is widely accepted and has been used in previous studies, to estimate. ARDL models commonly contend with autocorrelation of error terms, which arises from the presence of an endogenous variable with lagged explanatory variables[19].

Test of stationarity is conducted by employing the Dickey-Fuller testing procedure. The test involves testing without a constant and trend, with a constant, and with a constant and a trend. The procedure is conducted against all the variables[20].

Table 3. Unit Root Teste Test Results Using ADF

| Order of integration | Fuler Dicckey Augmentez) | | | Variables |
| | First Difference | | | |
	None	Trend And Intercept	Intercept	
I (1)	-7.275270 0.0000	6.893046- 0.0001	-6 .543217 0.0000	EC
I (1)	-4.884334 0.0000	-4.647719 0.0070	-5.543267 0.0011	IN
I (1)	-2.270871 0.0000	-4.944739 0.0000	-4.491894 0 .0001	FLS
I (1)	1.303815 0.0003	-2.569609 0.0000	-2.392684 0 .0004	MP

Source: Prepared by the author using Eviews12

[19] **Rezagholizadeh, M**. Investigation of The Financial Resources Curse' Hypothesis in Iraq: Application of ARDL and NARDL Models. *Iranian Economic Review*, 2024, p. 9. Doi: 10.22059/IER.2024.367447.1007836

[20] **Ponziani, R. M.**. Inflation forecasting using autoregressive distributed lag (ARDL) models. *Jurnal Ekonomi & Studi Pembangunan, vol. 24* (2), 2023, p. 324. Available at: v10.18196/jesp.v24i2.17620

These results allow us to estimate the error model of the Panel ARDL (long-term equilibrium speed[21], where the module root test of the obtained time series indicated that: all-time series (FDI, FLS (EC, IN,) are first-class integrated I (1) or stable at the first difference, and we can apply the ARDL model to test long-term relationships and estimate parameters for study variables.

3.2. Optimal slowing periods:

In order to arrive at the optimal model, we identify optimal slows using the Akaike standard through the results shown in the next format:
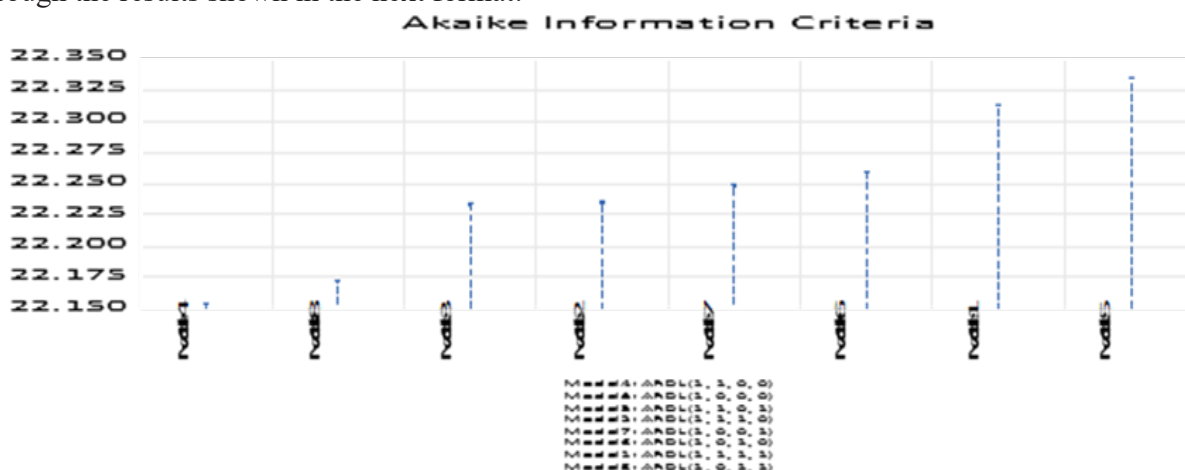

Figure 1. Homeopathic slows for ARDL model

Through the results obtained from the optimal slowing periods test and adjusted based on the Akaike standard, and the AIC standard for study variables, it can be said that optimal slowing periods were: (ARDL (1,1,0,0(.

3.3. Joint Integration Test: (A bound test)

A bound test is a statistical method used to determine whether a series of variables are cointegrated. The test involves testing the null hypothesis that the series of variables are not cointegrated and the alternative hypothesis that they are cointegrated. The test is used to identify whether there is a long-term equilibrium relationship between the variables and whether the variables move together over time. The test typically involves estimating a regression equation and testing the significance of the coefficients[22].

For the purpose of ensuring a long-term balance of study variables, we test the possibility of joint integration, by means of a Study boundary test through the following two hypotheses:

$$H0 : \eth 0 = \eth 1 = \eth 2 = \eth 3 = 0$$

$$H1 : \eth 0 \neq \eth 1 \neq \eth 2 \neq \eth 3 \neq 0$$

[21] **Kripfganz, S**. Estimating autoregressive distributed lag and equilibrium correction models. *The Stata Journal*, vol. 23, (4), 2014,. Retrieved from doi: DOI: 10.1177/1536867X231212434

[22] **Kumar, K. K.** Symmetric and asymmetric association between foreign direct investments and macroeconomic variables: an ARDL approach. *Revista de Gestão Social e Ambiental,* 2024·, vol. 8, (1), p. 15. DOI: https://doi.org/10.24857/rgsa.v18n1-103

Table 4. Results from a bound Test

F-Bounds Test		Null Hypothesis: No levels of Relationship		
Test Statistic	Value	Signif	I (0)	I (1)
F-Statistic	5.224740	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Prepared by the author using Eviews12

Based on the results obtained in the table above, we note that the Fischer F-Sat statistical values are estimated at 5.22 and are greater than the critical values of the upper limit at all moral levels, thus accepting the alternative hypothesis of a common integration relationship and rejecting the zero hypotheses, i.e. a long-term relationship between the study variables.

3.4. Estimate ARDL model:

After confirming the stability of the time chains, and after confirming the existence of a long-term balance relationship to the study variables, we can now estimate the ARDL study model according to the following table:

Table 5. ARDL Rating Results

Variable	Coefficient	Std-Error	T-Statistic	Prob
EC (-1)	-0.217769	0.243418	-0.894630	0.3835
FLS	0.009813	0.012659	0.775190	0.4489
FLS(-1)	0.018198	0.013212	1.377402	0.1863
IN	-0.463647	0.374797	-1.237063	0.2329
MP	-0.001936	0.001266	-1.529000	0.1447
C	374451.8	281683.4	1.329336	0.2013
R-Squared	0.787293	Mean dependent var		5.059426
Adjusted R-Squared	0.724732	S.D dependent var		2.654356
S.E of Regression	0.434003	Akaike info criterion		1.435678
Sum squared resid	0.342356	Schwarz criterion		1.435678
Log-likelihood	-0.654323	Hannan-Quinn crite		1.54321
F-Statistic	10.435678	Durbin-Watson stat		3.324567
	Prob(F-statistic)	0.000032		

Source: Prepared by the author using Eviews12

Through the results of the ARDL model estimation, we note that:

The delay periods were distributed according to the study model equally, i.e. one delay period for each of the independent variables and the dependent variable.

A coefficient value of 0.78 $R^2 =$, i.e. independent variables explain the dependent variable by 78%.

The probability value of Fisher P (F-Statistic) = 0.000032, i.e. the study model is moral and statistically significant.

Durdin -Watson equals 3.324567, indicating an absence of error correlations.

3.5. Estimate of short-term transactions:

After confirming the joint integration of the study model, we will try to test the extent to which the latter is free of other problems through the error correction coefficient according to the following:

Table 6. Short-term transaction assessment results.

Variable	Coefficient	Std-Error	T-Statistic	Prob
D(EC)	-0.090064	0.027279	-3.301602	0.0214
D(MP)	0.156037	0.050446	3.093161	0.0271
D(IN)	0.467665	0.083797	5.580962	0.0025
CointEq(1)*	-0.897634	0.062029	-10.73493	0.0001
R-Squared	0.787293	Mean dependent var		5.059426
Adjusted R-Squared	0.724732	S.D dependent var		2.654356
S.E of Regression	0.434003	Akaike info criterion		1.435678
Sum squared resid	0.342356	Schwarz criterion		1.435678
Log-likelihood	-0.654323	Hannan-Quinn crite		1.54321
	Durbin-Watson stat	3.324567		

Source: Prepared by the author using Eviews12

Based on the results obtained, the CointEq error correction coefficient is negative (0.897634) and moral P = 0.0001 (at all levels, where the error correction parameter indicates that when e-commerce sales deviate in t-1 the defect in both terms can be adjusted by 89% in t in order to maintain the long-term balance.

The results also show that:

There is a positive effect of statistically significant mobile users in the short term on the overall sales of e-commerce, following which it can be said that the increase in the one-unit MP index leads to a sales volume of 0.15 units.

There is a positive effect for statistically significant Internet users in the short term on the overall sales of e-commerce, following which it can be said that the increase in the IN index in one unit leads to a sales volume of 0.46 units.

3.6. Long-term assessment results:

Investigation proceeds to estimate the Long Run Form of the ARDL model, specifically an ARDL configuration, which delineates the enduring relationship between the variables over an extended period. The estimation captures the equilibrium dynamics and persistent effects that characterize the long-term interplay between the series. Findings from this comprehensive estimation, encapsulating the depth and direction of the long-run associations, (Apaydin, 2023) In order to analyze the long-term relationship, this can be explained according to the following:

Table 7. Long-term transaction assessment results

Variable	Coefficient	Std-Error	T-Statistic	Prob
FLS	-0.516169	0.003846	5.980413	0.0001
IN	0.380735	0.305026	1.248206	0.0063
MP	0.01590	0.000946	-1.681074	0.0273
C	32.43789	18.76547	1.343393	0.1299

				EC=EC-(-0.023* FLS-0.3807*IN-0.0016* MP+307489.9969)

With regard to the long term, as explained in the previous table, the long-term equation is written from the figure:

EC=EC-(0.516* FLS+0.3807*IN+0.0015 MP+32.43789)

From the equation, it can be said that:

• There is a negative effect of long-term statistical cellular users on total sales of electronic commerce, and the next can be said that the increase in the FLS index in one unit leads to a reduction in sales volume by 0.51 units.

• There is a positive long-term statistical impact of Internet users on the overall sales of e-commerce, and the increase in the IN index in one unit can be said to increase sales volume by 0.38 units.

• There is a positive impact of long-term statistical mobile users on the overall sales of e-commerce, following which it can be said that the increase in the single-unit MP index in one unit can be said to increase sales volume by 0.001 unit.

3.7. Study the validity of the ARDL model:

In order to assess the validity of our model, we conducted some diagnostic tests. The Jarque-Bera test was employed to examine the normality of residuals. To investigate serial correlation, we used the Breusch-Godfrey LM test. In order to test for Heteroskedasticity, a Breusch Pagan test is performed; to assess the presence of specification errors we employed the Ramsey RESET test. For testing towards model stability CUSUM and CUSUMSQ were used (Qasim, 2023)

– Brush God Fry Test:

Table 8. Brush God Fry Test Results

Brush God Fry ARCH Test			
F-statistic	1.330106	Prob F(1.20)	0.2624
Obs*R-Squared	1.371880	Prob ChiSquare(1)	0.2415

ARCH test results demonstrate the constant variability of the error limit through the ChiSquare probability value of 0.2415 (immoral) at a probability of 0.2624 enabling us to accept the zero hypothesis that the retention is homogeneous and there are no homogeneity errors.
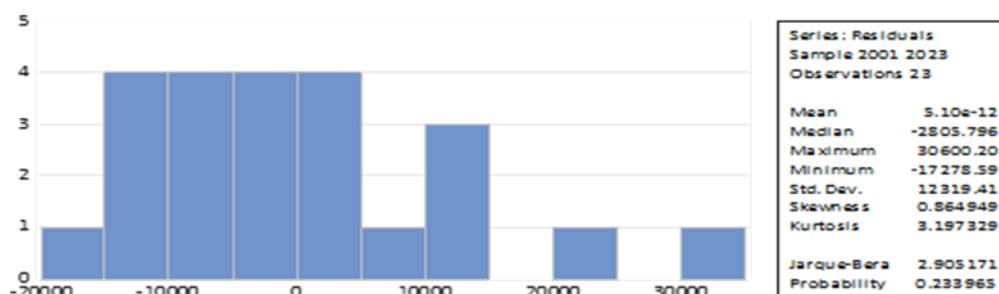
3.8. Jarque Bera Test Results:

Figure 3 Jarque Bera Test Results

The results of the Jarque Bera natural distribution test show that:

– The value of the Skewness coefficient has reached (0.86) and devolves to 0, and the value of the Kurtosis coefficient has reached 3.19 troll to 3

– The value of Jarque-Bera is 2.9 and therefore we accept the zero hypothesis. It can be said that the retention follows the normal distribution.

The findings of the diagnostic test are represented The Breusch-Godfrey Lagrange Multiplier (LM) test demonstrated that the model is free from serial correlation. The Breusch-Pagan test results suggested that the model is homoscedastic rather than heteroscedastic. Further, the Ramsey RESET probability value demonstrated that the model is free from the specification error. The residuals from the model were found to follow a normal distribution, as confirmed by the Jarque-Bera test.

3.9. Stability Test:

CUSUM and CUSUMSQ tests are used to check the model stability. CUSUM and CUSUMSQ tests are well-regarded as effective tools for detecting shifts in time series and for ensuring parameter stability. Both CUSUM and CUSUMSQ statistics lie inside the 5% level of significance interval marked by dotted red lines. Therefore, there are not any deviations or abrupt changes during the analyzed period in Finland[23].
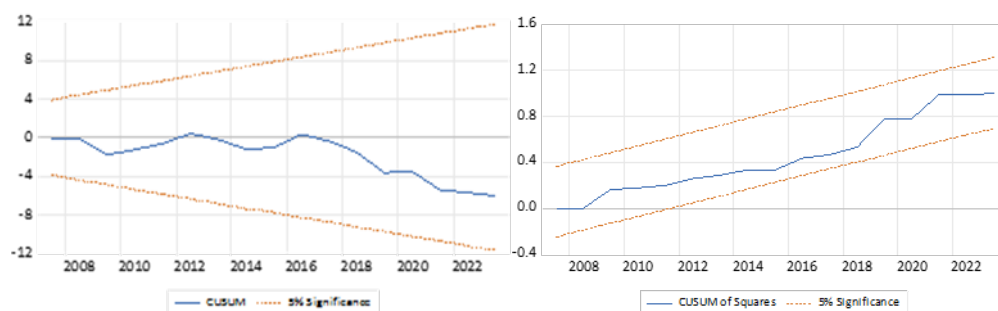

Figure 4. Estimated Model Stability Test

Through the above two forms, we note that: the curve is within the limits of the 5% morale level, and this justifies the stability of long and short-term, therefore we can say that the short and long models do not contain any structural change, also stays within the confidence bounds, indicating no evidence of volatility in the variance of the residuals. Collectively, these findings endorse the structural integrity of the model throughout the study period, confirming that the parameter estimates do not suffer from instability issues and thus the model is adequately specified for the data.

In the light of standard modeling, the following results have been achieved:

All time series related to study variables are integrated from the I (1) grade and this enabled us to apply the ARDL model in order to test long-term relationships and estimate parameters. Based on the results of the ARDL model estimate, slowing periods were distributed according to the study model equally, i.e. one slowing period for each of the independent and dependent variables.

The independent variables (FLS MP IN) explain the EC variant by 78%, and the probability of Fisher P (F-Statistic) = 0.000032, i.e. the study model is moral and statistically significant. Durdin-Watson's statistic was 3.324,567, indicating the absence of error associations.

In the short term, there has been a positive and moral impact of mobile and Internet users' indexes on the overall sales volume of e-commerce. In the long run, it has been shown that there is a positive and moral impact of the indicators of mobile and internet users on the total sales volume of e-commerce.

When studying the structural stability of transactions, we found that there is stability in long and short-term parameters and therefore structural stability in the study model and the data used in the study do not have any structural changes,

---

[23] **Kinnunen, I. G**. Effects of FDI, GDP and energy use on ecological footprint in Finland: an ARDL approach. *Journal Pre-proof*, 2024, p. 9. DOI: https://doi.org/10.1016/j.wds.2024.100157

The positive impact of digital economy indicators on e-commerce in the long and short term is due to the UAE's components of advanced digital infrastructure, strong telecommunications networks, and Internet speed. This has resulted in an evolution in total sales volume. through its use of modern technical means from smart websites, platforms, or applications. A paradigm shift towards transforming the UAE into a global hub for the new economy enhances its readiness to attract foreign investment in its promising sectors while enhancing consumer protection and digital trade growth, which supports its growing global competitiveness as a hub for business activities.

Conclusion

This paper examined a standard study on the impact of digital economy indicators on electronic commerce in the United Arab Emirates (2000-2023) using the ARDL time gap model. The results demonstrated that the application of digital economy indicators, especially the indicators (mobile users, and internet users) achieved positive results in the overall volume of e-commerce sales. The UAE relies on a series of strategic plans to develop its national economy, mainly based on the digital economy. The latter contributes to the creation of real opportunities for investment in various fields.

The UAE is implementing plans to promote the digital economy through the adoption of the UAE's Strategy for the Fourth Industrial Revolution. One of its objectives is to promote digital security, which is achieved through the adoption of digital economy policies and digital transaction techniques in services and financial and commercial transactions.

The government uses highly digital services, which are considered the hub of total sales. As the UAE's e-commerce grows rapidly and plays a key role in the growing volume of sales, the country is expected to place itself significantly in the digital economy, supported by many factors such as the development of e-commerce and the improvement of ICT infrastructure, The spread of electronic services, the use of smartphones, the expansion of electronic payment systems, as well as substantial government support for digital transformation.

Study Recommendations:

– Finally, the study recommended the need to open the way for e-commerce based on digital economy applications.

– Raise awareness among society and individuals about new technology and open the way for them to provide services based on digital economy applications.

– Establish a set of laws that protect individuals from the risks of digitization and technology, particularly with regard to fraud, deception, and even piracy.

– Attempt to benefit from leading international experiences in the digital economy, while supporting e-commerce based on modern technology.

REFERENCES

Al-Hasnain, M. A. Using cross-sectional templates in measuring the impact of information technology on electronic commerce in COMESA countries. *Journal of Studies*, 2023, p. 88.

Al-Razu, H. M. *Digital Economy and Internet Economics Entry*. Riyadh: Research Center, 2006.

Al-Sabouni, A. ICT in the New Economy. *Economic Symposium*, 2011, p. 5.

B. Bathlot. L'encyclopédie de Marketing, 2018. Available at: https://www.definitionsmarketing.com

Bankole, F. O. The impact of information and communications technology infrastructure and complementary factors on intra-African Trade. *Information Technology for Development*, vol. 21 (1), 2013, p. 9.

Daoudi, A. The role of innovation in activating the performance of the telecommunications sector. Thesis for PhD in Economic Sciences, 2017, p. 56.

Elia, S., Giuffrida, M., Mariani, M. M. , & Bresciani, S. Resources and digital export: an RBV perspective on the role of digital technologies and capabilities in cross-border e-commerce. *Journal of Business Research*, vol. 132, 2021, p. 158–169. Available at: https://doi.org/10.1016/j.jbusres.2021.04.010

ESCWA, U. N. Perspectives on the digital economy in the Arab region. Beirut: Lebanon, 2018.

Khan, A. Towards Digital Economy: The Development of ICT and E-Commerce in Malaysia. *Modern Applied Science*, no. 5, 2011, p. 171.

Kinnunen, I. G. Effects of FDI, GDP and energy use on ecological footprint in Finland: an ARDL approach. *Journal Pre-proof*, 2024, p. 9. DOI:: https://doi.org/10.1016/j.wds.2024.100157

Kripfganz, S. ardl: Estimating autoregressive distributed lag and equilibrium correction models. *The Stata Journal*, vol. 23 (4), 2014. DOI: https://doi.org/10.1177/1536867X231212434

Kumar, K. K. Symmetric and asymmetric association between foreign direct investments and macroeconomic variables: an ARDL approach. *Revista de Gestão Social e Ambiental*, vol. 18 (1), 2024, p. 15. DOI: https://doi.org/10.24857/rgsa.v18n1-103

Lambin, J. J. Rethinking the Market Economy. 1st ed. England: Palgrave Macmillan, 2014.

Ma, Y. Exploring Innovative Business Models in Cross-border E-commerce under Digital Economy. *Frontiers in Business, Economics and Management*, vol. 13 (1), 2024, p. 205. DOI: https://doi.org/10.54097/xhccmn82

Mastercard, T. F. Digital Planet, 2017.

med.she. Commerce definition, 2018. [онлайн] [прегледан: 09.04.2025]. DOI: http://www.alyaum.com

Najm, N. A. Electronic Governance: Strategies, Functions and Problems. Saudi Arabia: Mars House, 2005.

Oucine, N. Report: The digital economy in the UAE. *International Telecommunication Union*, 2023, p. 11.

Ponziani, R. M. Inflation forecasting using autoregressive distributed lag (ARDL) models. *Jurnal Ekonomi & Studi Pembangunan*, vol. 24 (2), 2023, p. 324. DOI: https://doi.org/10.18196/jesp.v24i2.17620

Rezagholizadeh, M. Investigation of 'The Financial Resources Curse' Hypothesis in Iraq: Application of ARDL and NARDL Models. *Iranian Economic Review*, 2024, p. 9. DOI: https://doi.org/10.22059/IER.2024.367447.1007836

Tuniza Teño, M. D. The reality of the digital economy in the Arab world. *Journal of Economics, Management and Commercial Sciences*, vol. 12 (1), 2019, p. 301

Xing, Z. The impacts of Information and Communications Technology (ICT) and E-commerce on bilateral trade flows. *International Economics and Economic Policy*, no. 5, 2018, p. 2.

Zyaed. Digital Economy in the UAE. 2023. DOI:: https://u.ae/ar-ae/about-the-uae/economy/digital-economy