ASSESSMENT OF E-COMMERCE'S ROLE IN ECONOMIC DEVELOPMENT

Sharipov Kongratbay Avezimbetovich
Minister of Higher Education, Science, and Innovation of the Republic of Uzbekistan, Doctor of Science, Professor.
Karimova Shirin Zoxid qizi
Department of digital economy, TSUE, PhD senior teacher
E-mail: sh.karimova@tsue.uz
Sodiqova Dilafruz Zoxid qizi
Department of International Economy, UWED
E-mail: dsodiqova@uwed.uz

Abstract

This study investigates the relationship between e-commerce variables and GDP growth in developing countries using panel data estimation techniques. The analysis employs a regression model that includes key determinants such as e-commerce market growth, revenue from e-commerce, secure internet servers, the UNCTAD B2C E-commerce Index, the percentage of internet shoppers, and the share of individuals using the internet. By utilizing balanced panel data from 20 developing countries, this research aims to uncover the dynamic effects of e-commerce on economic growth. The results suggest significant relationships among the variables, highlighting the importance of e-commerce development for stimulating GDP growth in these economies.

Keywords: Digitalization, E-commerce, GDP Growth, Developing Countries, Panel Data Estimation, UNCTAD B2C E-commerce Index, Regression Analysis.

Annotatsiya

Ushbu tadqiqotda rivojlanayotgan mamlakatlarda elektron tijorat ko‘rsatkichlarining YaIM o‘sishiga ta’siri panel ma’lumotlar asosida baholandi. Regressiya modeliga elektron tijorat bozori hajmi, daromadi, xavfsiz internet serverlar soni, UNCTAD B2C indeksi, internet xaridorlari va foydalanuvchilari ulushi kabi asosiy omillar kiritildi. 20 ta davlatga oid muvozanatli ma’lumotlar asosida olib borilgan tahlil orqali elektron tijoratning iqtisodiy o‘sishga qo‘shgan hissasi aniqlab berildi. Natijalar ushbu ko‘rsatkichlar bilan YaIM o‘sishi o‘rtasida mustahkam bog‘liqlik mavjudligini ko‘rsatdi.

Kalit so‘zlar: raqamlashtirish, elektron tijorat, YaIM o‘sishi, rivojlanayotgan mamlakatlar, panel ma’lumotlar tahlili, UNCTAD B2C indeksi, regressiya tahlili.

Аннотация

В настоящем исследовании была оценена взаимосвязь между показателями электронной коммерции и ростом ВВП в развивающихся странах с применением панельного анализа. В регрессионную модель были включены такие ключевые переменные, как объем рынка электронной торговли, доходы, количество защищённых интернет-серверов, индекс UNCTAD, B2C, доля интернет-покупателей и пользователей. На основе сбалансированных данных по 20

странам была проведена оценка влияния электронной коммерции на экономический рост. Результаты показали наличие устойчивой связи между переменными и ростом ВВП.

Ключевые слова: цифровизация, электронная коммерция, рост ВВП, развивающиеся страны, панельный анализ, индекс UNCTAD B2C, регрессионный анализ.

INTRODUCTION

Electronic commerce, or "e-commerce" has grown to be a significant factor in the world economy, changing both how consumers and organizations conduct business. E-commerce has expanded quickly since the launch of the internet and the spread of digital technology, impacting several areas of economic growth. E-commerce affects economic development through a variety of complex and varied methods, including adjustments to consumer behavior, market accessibility, employment, and corporate practices. This paragraph explores these mechanisms in detail, highlighting the profound effects e-commerce has on economic development. E-commerce has transformed conventional business by allowing firms to reach a global audience, reduce operational costs, and streamline their operations. For consumers, on the other hand, it offers convenience, more products and services to choose from as well as competitive prices.

On the other hand, economic development refers to a process through which a country enhances its economic, social, and political condition. It focuses on increasing per capita income levels, reducing poverty, improving education and medical care, and strengthening infrastructure. With various sectors experiencing growth within an economy due to E-commerce drivers; innovation is enhanced leading to job creation that increases access to goods and services hence promoting Economic Development.

METHODOLOGY

This research adopts a mixed-methods design that integrates quantitative panel data analysis with qualitative insights to explore the impact of e-commerce on GDP growth in developing countries. The study relies on a balanced panel dataset covering 20 countries from Asia, Africa, and Latin America for the period 2019 to 2022.

Quantitative data were sourced from globally recognized institutions such as the World Bank, UNCTAD, and the Universal Postal Union. Key variables include GDP growth, e-commerce market growth (GE), e-commerce revenue (log-transformed), secure internet servers (SIS), internet penetration (SII), online shoppers (IShP), and the UNCTAD B2C E-commerce Index (B2Ci).

In parallel, qualitative data were collected through structured interviews with experts in digital commerce and policy. These inputs offered context-specific perspectives and complemented the statistical findings.

The econometric model employs panel regression techniques—both fixed and random effects—to account for country-specific heterogeneity over time. Variable selection was guided by existing literature, and model validity was confirmed through

standard diagnostic tests: multicollinearity (VIF), normality (Jarque-Bera), and autocorrelation (Durbin-Watson).

This combination of methods ensures a comprehensive analysis of how digital infrastructure and e-commerce readiness contribute to economic performance in the selected regions.

LITERATURE REVIEW

Determinants of GDP Growth: The role of various determinants, such as secure internet infrastructure and internet penetration, is critical in influencing GDP growth. The UNCTAD B2C E-commerce Index provides valuable insights into e-commerce readiness, showcasing its importance in this context. [21]

Panel Data Advantages: The use of panel data enables researchers to control for unobserved heterogeneity, improving the accuracy of the estimates. Research indicates that using panel data enhances the understanding of economic relationships by leveraging the time-series aspect [19]

Empirical Evidence from Developing Countries: Previous studies highlight that e-commerce positively impacts economic performance, especially in developing nations where internet access and digital infrastructure are rapidly evolving. The findings of this study align with existing literature that emphasizes the need for policy frameworks to enhance e-commerce capabilities to drive GDP growth.[22].

The adoption of information technology similarly exhibits network externality brought about by more users, with the resulting benefits for the users, e.g., fax machine[17] and cellular phone [18]. Over the past few decades, numerous studies have considered R&D as a proxy variable for knowledge capital when examining the relationship between knowledge capital and productivity. Along with the substantial and rapid development of ICT, e-commerce technologies have emerged as an important type of knowledge capital for operating a business.

IMPORTANCE OF E-COMMERCE

Role of E-commerce in World Economy

Today e-commerce has become an important part of daily life. Accessibility to e-commerce platforms is not a privilege but rather a necessity for most people, particularly in the urban areas. There are alternative e-commerce platforms available (instead of the traditional physical platforms) for almost every aspect of our lives, starting from purchasing of everyday household items to online brokerage. As in 21st century as internet has become most important and frequently and most necessity device, it will surely race to achieve more growth and sales via internet.

On the other hand, the growing size of governments during the twentieth century, and especially since the 1960s, has captured the attention of many economists. They have tried to present different theories to explain this phenomenon. According to many theories of growth in the size of governments, with the development of countries, the structure and economic needs change and as a result, the size of government is affected too [19]

Empirical analysis

In our empiric analysis we learnt five main explanatory variables: growth of e commerce market (annual %,2022), revenue of e commerce (annual mln US $,2022), secure Internet servers (per 1 million people), UNCTAD B2C E-commerce Index*, Internet shoppers as a percentage of total population and share of individuals using the Internet. (Table 1)[1]

Table 1. Literature analysis on determinants affecting economic growth

Determinants	Positive impact	Negative impact	No impact
Growth of e commerce market (GE)	Ang (2008)[2], Demirhan and Masca (2008)[5], Rogmans and Ebbers (2013)[15], Zhang and He (2014)[16], Apaydin (2009)[3],	Quazi (2007)[13]	
Revenue of e commerce (RE)	Gastanaga et al. (1998)[7], Cevis and Çamurdan (2007) [4], Demirhan and Masca (2008)[5]	Apaydin (2009)[3], Rogmans and Ebbers (2013)[15]	Schmitz and Bieri (1972), Wheeler and Mody (1992)
Secure Internet servers (SIS)	Demirhan and Masca (2008) [5], Hoang and Goujon (2014)[9], Na and Lightfoot (2006) [12], Quazi (2007) [13]	Hubler and Keller (2010)[10], Liu et al. (2014)[11]	
Share of individuals using the Internet (SII)	Cevis and Çamurdan (2007)[4]		
Internet shoppers as a percentage of total population (IShP)	Na and Lightfoot (2006)[12], Rodrıguez and Pallas (2008)[14], Fosfuri et al. (2001)[6], Glass and Saggi (2002)[8]	Quazi (2007)[13]	
UNCTAD B2C E-commerce Index* (B2Ci)2	In our Dissertation work		

Description of variables and hypothesis.

Growth of e commerce market (GE). Examples of e-commerce markets include Amazon, eBay, Etsy and Shopify. E-commerce stores have become increasingly popular in recent years due to the convenience and accessibility they offer to customers, as well as the lower overhead costs for business owners compared to traditional brick-and-mortar stores. Growth of E-commerce market stimulates the economy by increasing productivity, encouraging innovation and improving the shopping experience. The main way in which e commerce will affect the economy, in general, is its impact on productivity and inflation. The continued expansion of electronic commerce could also lead to downward pressure on inflation through increased competition, cost savings and changes in sellers' pricing behavior.

Secure Internet servers (SIS). Secure servers are those servers that use the secure sockets layer protocol to protect communication from unintended recipients. More commonly referred to as SSL servers, secure servers will communicate between other Web servers and Web browsers using cryptography, or encrypted and decrypted communication. Digital connectivity increases economic growth and reduces poverty rates by raising household incomes and lowering consumer consumption.

[1] The factors were taken from the articles given in the table.

Share of individuals using the Internet (SII). Internet users are individuals who have used the Internet (from any location) in the last 3 months. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV etc. According to our extensive research: There are 4.9 billion active internet users worldwide. That's 62% of the world's total population. The digital and information revolution has changed the way the world learns, communicates, does business, and treats illnesses.

UNCTAD B2C E-commerce Index (B2Ci). The UNCTAD B2C E-commerce Index measures an economy's preparedness to support online shopping. The index consists of four indicators that are highly related to online shopping and for which there is wide country coverage. The extent to which people shop online in a country is highly correlated with the value of the index, with an adjusted R squared value of 0.79. The 2021 index includes the same number of economies as the last iteration (152). Data limitations affect compilation of the index. Internet user data for 2019 were limited at the time of index calculation and the latest data on accounts are for 2017 as the pandemic delayed the collection of data for the World Bank's Global Findex database. Hence, changes from the previous edition of the index are primarily influenced by changes in terms of secure servers and postal reliability. Inclusion of additional economies is dependent on the data sources. Account ownership data are generally not available for smaller economies and the postal reliability index does not include some economies. UNCTAD is investigating alternative index compositions with a view to widening the coverage and timeliness of the index.[21]

In conclusion, a key reason why e-commerce, especially the business-to-business segment, is growing so quickly is its significant impact on costs associated with inventories, sales execution, procurement, intangible like banking, and distribution costs. If these reductions become pervasive, e-commerce has the potential to be the application that ushers in the large productivity gains. Achieving these gains is therefore contingent on a number of factors, including access to e-commerce systems and the needed skills.

In economic literature, there are numerous studies regarding the impact of IT with GDP growth and trade as macroeconomic variables, but the studies addressing e-commerce and development are not many and most discussion has been centered on statistical expression and discretion. In our study, we look at secondary financial data for 2019-2022 for 20 developing countries in South, East and Southeast Asia and South America and Africa. The data is taken mostly from the World Bank (2021) indicator, and the analyzes were conducted in 20 countries. UNCTAD (2020), This Classification of 20 Developing Countries Based on the World Investment Report, provides a table listing the 20 developing countries and the codes included in the analysis. GDP growth was considered as the dependent variable in this study and the explanatory variables were carefully selected based on the literature review.

Table 2. A summary of sample countries[1]

№	Country	Country code
1	Bangladesh	BGD
2	Bhutan	BTN
3	Cambodia	KHM
4	China	CHN
5	India	IND
6	Indonesia	IDN
7	Malaysia	MYS
8	Mongolia	MNG
9	Nepal	NPL
10	Pakistan	PAK
11	Singapore	SGP
12	Sri Lanka	LKA
13	Thailand	THA
14	Vietnam	VNM
15	Philippines	PHL
16	Republic of Korea	KR
17	Brazil	BR
18	Mexico	ME
19	Nigeria	NG
20	Saudi Arabia	SA

Our study is based on panel data estimation, which analyzes the dynamic behavior of the parameter and can clearly account for heterogeneity by allowing for subject-specific variables such as firm, company, states, and individuals. Panel data regression is used because of its superiority over cross-sectional and time-series data in using all available evidence that cannot be measured in pure cross-sectional and time-series data. [1]

The relationship between GDP growth in developing countries and its influencing e-commerce variables is modeled as follows:

$$GG = f(GE, RE, SIS, B2Ci, IShP, SII) \quad (1)$$

where represents *GG* - the annual flow of GDP growth in developing countries; GE- growth of e commerce market (annual %,2022), *RE* - revenue of e commerce (annual mln US $,2022), *SIS* - secure Internet servers (per 1 million people), *B2Ci* - UNCTAD B2C E-commerce Index*, *IShP* - Internet shoppers as a percentage of total population and *SII* - share of individuals using the Internet.

These factors affect the GDP growth and the model, which can be expressed as a regression equation after transforming the *Revenue of e commerce* into logarithmic form constitutes a part. Logarithmic transformation of RE reduces the initial data of the variables and creates better estimation results:

[1] Source: http://data.worldbank.org/indicator, World Development Index

$$GG_{it} = \beta_{1i} + \beta_{2i}GE_{it} + \beta_{3i}LnRE_{it} + \beta_{4i}SIS_{it} + \beta_{5i}IShP_{it} + \beta_{6i}SII_{it} + \beta_{7i}B2Ci_{it} + u_{it} \quad (2)$$

where (i 1 … N, where N is the number of cross-sectional units, t 1 … T, where T is the time period) represents the annual flow of GDP growth in developing countries; growth of e commerce market (annual %,2022), revenue of e commerce (annual mln US $,2022), secure Internet servers (per 1 million people), UNCTAD B2C E-commerce Index*, Internet shoppers as a percentage of total population and share of individuals using the Internet. Table 2 provides the definition and data source of variables with expected signs used in the study (Table 3).

Table 3. The analysis of the determinants influencing Economic growth.[1]

Determinant	Definition and source of information	Sign	Expected result
GDP growth	The annual average rate of change of the gross domestic product (GDP) at market prices based on constant local currency, for a given national economy, during a specified period of time. Source: http://data.worldbank.org/indicator, World Development Index	GG	
Growth of e commerce market	The process of increasing revenue, expanding your customer base, entering new markets, earning a bigger market share. Source: http://data.worldbank.org/indicator, World Development Index	GE	+
Secure Internet servers	Those servers that use the secure sockets layer protocol to protect communication from unintended recipients. Source: http://data.worldbank.org/indicator, World Development Index	SIS	+
UNCTAD B2C E-commerce Index	Developed by the UNCTAD, the B2C E-commerce Index is based on the following indicators: Percentage of individuals using Internet. Credit card (% of age 15+). Secure Internet servers (per 1 million people). Percentage of the population having mail delivered at home. Source: The UNCTAD B2C E-commerce Index measures an economy's preparedness to support online shopping. https://unctad.org/system/files/official-document/tn_unctad_ict4d17_en.pdf	B2Ci	+
Share of individuals using the Internet	Individuals using the Internet (% of population) Internet users are individuals who have used the Internet (from any location) in the last 3 months. Source: http://data.worldbank.org/indicator, World Development Index	SII	+

The study analyzes selected determinants affecting GDP growth in developing countries. Panel data were used for the analyses, as they provide useful information, consistency, less linearity between variables, efficiency, and greater degrees of freedom. Furthermore, effects that cannot be measured in panel data or pure time series

[1] Authors' work

data can be identified and measured. The most important advantage of panel data is that it minimizes bias in the results. Ordinary least squares (fixed and random effects) methods were used because they provide reliable and competent estimates of α and β. For this study, balanced panel data from 20 developing countries were obtained. In our study, Equation (3) initiates the regression analysis. Instead of treating β1 as a constant, we assume it is a random variable with mean β1. Hence, the volatility of an individual developing country represents the intercept as follows:

$$\beta_{1i} + \beta_i + \varepsilon_i \quad (3)$$

Here *ei* is a random error term with zero mean and variance *s2*.

For the 20 developing countries studied, the overall average value for the intercept is 1. The individual deviation in the intercept values of each country is reflected in the error term ei.

Subtracting equation (3) from equation (2), we get:

$$GG_{it} = \beta_{1i} + \beta_{2i} GE_{it} + \beta_{3i} SIS_{it} + \beta_{4i} SII_{it} + \beta_{5i} B2Ci_{it} + \varepsilon_i + \mu_{it} \quad (4)$$

After that, it is transformed into another equation:

$$GG_{it} = \beta_{1i} + \beta_{2i} GE_{it} + \beta_{3i} SIS_{it} + \beta_{4i} SII_{it} + \beta_{5i} B2Ci_{it} + \beta w_{it} \quad (5)$$

where:

$$w_{it} = \varepsilon_i + u_{it} \quad (6)$$

Table 4. Regression analysis[1].

```
Call:
lm(formula = y ~ x1 + x3 + x4)

Residuals:
    Min      1Q  Median      3Q     Max
-2.5106 -1.4530 -0.1852  0.9471  3.9137

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  7.101e+00  2.373e+00   2.993  0.00861 **
x1(GE)      -6.170e-02  1.520e-01  -0.406  0.04909 *
x3(SIS)      3.410e-05  1.652e-05   2.064  0.04561 *
x4(SII)     -3.561e-02  1.903e-02  -1.871  0.04978 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.927 on 16 degrees of freedom
Multiple R-squared:  0.2676, Adjusted R-squared:  0.1303
F-statistic: 1.949 on 3 and 16 DF,  p-value: 0.1625
```

[1] Authors' work

On the next level, we have a new model with 3 predictors which are GE, SIP, SII.As we can see all of the 3 variables are counted as a significant because of their p-values getting successfully accepted according to the t-test.

$$\boldsymbol{y = (9.764e-01) + (-6.348e-02)GE + (1.671e-05)SIP - (1.411e-01)SII} \qquad \textit{(8)}$$

As it is seen from the table, Standard Error for the model is 0.9539 which is high though. Adjusted R-squared: 0.787. And according to F-test p-value is 3.28e-06 < $alfa(0.05)$. Which means the model itself is significant. (Table 4)

Regression analysis with new predictor. We decided to add new indicator as a news in our Dissertation work. Which is called UNCTAD B2C E-commerce Index*. We discussed a lot of articles on the topic and none of them added this indicator as it is relatively new compared to other predictors. Small European countries top the ranking of 130 economies according to their readiness for business-to-consumer (B2C) e-commerce, a new UNCTAD study shows.

Among developing and emerging economies, the front-runners are all in East Asia, namely the Republic of Korea, Hong Kong (China) and Singapore (see table). Meanwhile, in terms of actual levels of online shopping, countries with large populations – such as Brazil, China and the Russian Federation – are performing better than predicted, suggesting that large markets facilitate e-commerce. The Information Economy Report 2015, subtitled "Unlocking the Potential of E-commerce for Developing Countries", was released on 24 March. Its B2C E-commerce Index draws on data on Internet use, secure servers, credit card penetration and postal delivery. Assessing e commerce readiness can serve as a first step towards formulating a national e-commerce strategy.[21]

The Index allows countries to identify their relative strengths and weaknesses. For example, in Latin America and the Caribbean and in Asia and Oceania, extending postal home delivery is particularly important. In Africa, e-commerce readiness is hampered especially by low Internet penetration levels.

Table 5. Regression analysis with B2Ci.[1]

```
Call:
lm(formula = y ~ x3 + x4 + x1 + x6)

Residuals:
    Min      1Q  Median      3Q     Max
-0.89224 -0.52044 -0.03178  0.23225  2.08758

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.127e+00  1.056e+00   2.014  0.06236 .
x3(SIS)      2.764e-05  8.360e-06   3.307  0.00479 **
```

[1] Authors' work

*x4(SII) 1.527e-01 1.649e-02 9.260 1.36e-07 **** *x1(GE) -1.461e-01 7.503e-02 -1.947 0.04055 ****
*x6(B2Ci) -3.221e-02 1.398e-02 -2.304 0.03593 *** --- *Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1* *Residual standard error: 0.8467 on 15 degrees of freedom* *Multiple R-squared: 0.8675, Adjusted R-squared: 0.8322* *F-statistic: 24.56 on 4 and 15 DF, p-value: 1.957e-06*

$$\mathbf{GG} = (\mathbf{2.127e+00}) * (\mathbf{-1.461e-01})\boldsymbol{GE} + (\mathbf{2.764e-05}) * \boldsymbol{SIP} + (\mathbf{1.527e-01}) * \boldsymbol{B2Ci} + (\mathbf{-3.221e-02}) * \boldsymbol{SII} \quad (7)$$

In the given model we can clearly see that the Index shows the highest impact of GDP Growth in t- test, which means the predictor is surely significant. Apart from this all of the other indicators also stay significant, which means it is highly correleted positively with other predictors too. The model itself passes from F-test with 1.957e-06 exactly lower than $alpha$=0.05. Another noteworthy fact is that, even Residual standard error decreases from the previous model with 0.8467 (Table 5).

x3(SIP) x4(SII) x1(GE) x6(B2Ci)
1.498161 1.125759 1.308729 1.940753

In the VIF test, all values should be less than 5. If it is large, there will be a problem of multicollinearity. In our case, all of the variables passed from VIF test with: 1.498161 1.125759 1.308729 1.940753 numbers. So they don't have any multicollinearity problem.

Table 6. Test for homoscedasticity[1]

jarqueberaTest(res)
Title: *Jarque - Bera Normalality Test* *Test Results:* *STATISTIC:* *X-squared: 7.6639* *P VALUE:* *Asymptotic p Value: 0.02167*
library(lmtest) ***dwtest***(myre) **# If p-value < alpha=0,05, residuals are correlated. If it > 0,05, not correlated. In our situation p-value = 0.817, which means p-value < alpha=0,05, residuals are not correlated.**
Durbin-Watson test *data: myre*

[1] Authors' work

DW = 1.6093, p-value = 0.1644 *alternative hypothesis: true autocorrelation is greater than 0*

In testing for homoscedasticity, we work with residuals. In this we need to determine 2 things, namely "Are the residuals normally distributed?" and "Are the residuals correlated?" we will answer the questions. For this we use JarqueberaTest and Durbin Watson Tests. In Jarquebera Test, if the p-value < alpha=0.05, the residuals are not normally distributed, otherwise, they are normally distributed. In our case p Value: 0.02167, which is smaller than 0.05. This means that the residuals are not normally distributed. That is, the condition of homoscedasticity is not fully fulfilled. In the Durbin Watson test, if the p-value < alpha=0.05, the residuals are autocorrelated, otherwise, they are not autocorrelated. In our case, p-value = 0.1644 > alpha=0.05, which means that the residuals are not autocorrelated (Table 6).

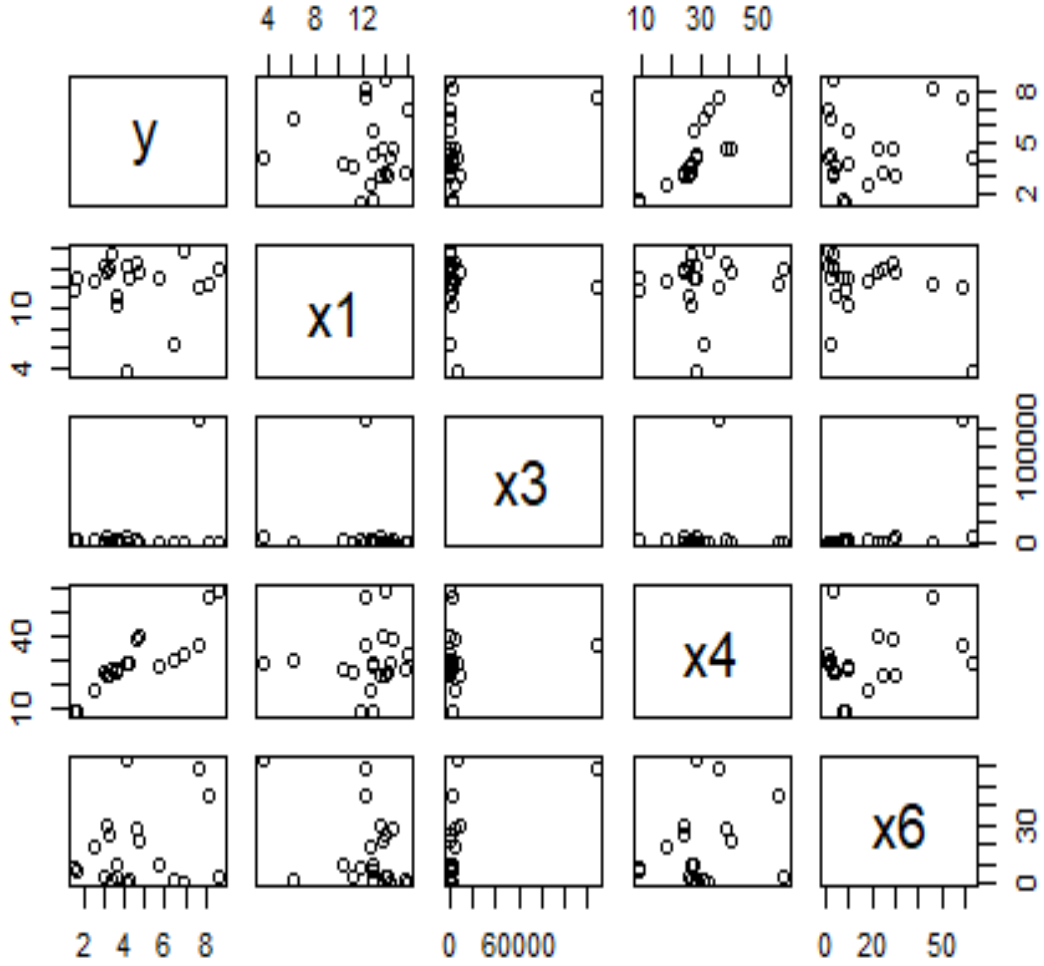

Figure 1. Pairs of linear graphs of indicators.[1]

From our plot, we can see that there is a strong, positive, linear relationship between the predictors x4 and y. There is also a positive, linear relationship between predictors x1, x3 and x6 (Figure 2.3.1). Before building the polynomial model, I chose y and x4 for my simple linear model (they have the largest correlation of 72%) and for this reason I also build the models with the x4 predictor.

[1] Authors' work

Table 7. Regression analysis of B2Ci.[1]

```
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  0.22887    0.62187   0.368    0.717
x6(B2Ci)         0.14396    0.01918   7.507 5.99e-07 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.045 on 18 degrees of freedom
Multiple R-squared:  0.7579, Adjusted R-squared:  0.7445
F-statistic: 56.36 on 1 and 18 DF,  p-value: 5.985e-07
```

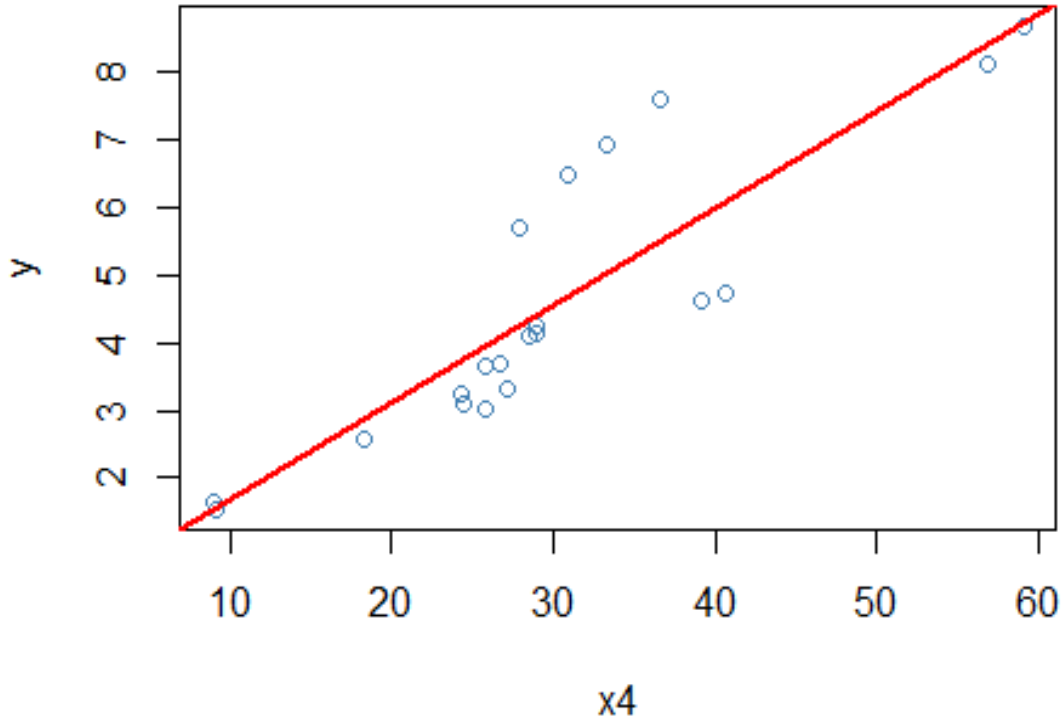

Figure 2 Linear graph of indicators[2]

```
cor(y, x6)
 [1] 0.92241837
```

$$y = (0.22887) + (0.14396)x2$$

We can see from the model that the p-value is 5.99e-07<alpha (0.05), that is, the model is significant and valid. The correlation coefficient is 0.8705962. The closer the correlation coefficient is to -1 or +1, the stronger the correlation between the indicators. The closer to 0, the weaker the linear relationship (Figure 2.3.2). The correlation coefficient indicates the degree of linear association rather than the desired degree of association. We have 0.8705962 which is close to +1, meaning we have a strong linear relationship. Standard error of the model 1.045 Adjusted R Sq: 0.7445 (Table 7).

[1] Authors' work
2 Table was prepared with the help of R Studio from the given data above

Table 8. Matrix of correlations (with B2Ci)[1]

	y	x1(GE)	x3(SIS)	x4(SII)	x6(B2Ci)
y	1.00000000	0.02961117	0.32740164	0.87059616	0.9224184
x1(GE)	0.02961117	1.00000000	-0.04491156	0.08401928	0.7950722
x3(SIP)	0.32740164	-0.04491156	1.00000000	0.10953717	0.5420114
x4(SII)	0.87059616	0.08401928	0.10953717	1.00000000	0.7547623
x6(B2Ci)	0.92241837	0.79507219	0.54201136	0.75476230	1.0000000

Analyzing the correlation matrix, we can see that GE and B2Ci are almost 80% correlated (0.795%). Correlation of B2Ci with SII is also high 75,47%. After adding B2Ci to the model, we also see that the indicators have changed slightly (Table 8).

The effect of Internet shoppers as a percentage of total population on GDP growth was found to be positive and insignificant at the 5 percent significance level. This finding is consistent with previous studies by Kalirajan and Singh (2010) and Schneider and Frey (1985). Internet shoppers as a percentage of total sometimes show insignificant change in GDP growth, as it doesn't show the profit coming from them. In some years there are bigger numbers of e-shoppers with less profit, which shows shoppers purchased less products or cheap goods. (Schneider and Frey, 1985; Kalirajan and Singh, 2010). Interestingly, Singhania and Gupta (2011) found a positive and significant relationship between SIP and GDP growth. GDP growth and SII are found to have a positive and significant relationship at the 5 percent level of significance. This means that if SII increases by 1 percent, FDI inflows will increase by 2.764e-05 percent. Thus, the empirical results of this study reveal that Share of individuals using the Internet, Secure Internet servers, Growth of e-commerce and UNCTAD B2C E-commerce index are important determinants for attracting GDP Growth in developing countries.

Table 9. Top 10 developing economies in the UNCTAD B2C E-commerce index 2020[21]

2020 Rank	Economy	Share of individuals using the Internet (2019 or latest)	Share of individuals with an account (15+, 2017)	Secure Internet servers (normalized 2019)	UPU postal reliability score (2019 or latest)	2020 Index value)	Index value change (2019-20 data)	Rank 2019
4	Singapore	89	98	94	97	94.4	-0.3	3
10	China, Hong Kong SAR	92	95	88	92	91.8	0.3	14
18	Korea, (Republic of)	96	95	68	100	89.8	0.0	19
30	Malaysia	84	85	71	85	81.3	1.5	31
37	United Arab Emirates	99	88	61	64	78.2	0.0	8

[1] Authors' work

2020 Rank	Economy	Share of individuals using the Internet (2019 or latest)	Share of individuals with an account (15+, 2017)	Secure Internet servers (normalized 2019)	UPU postal reliability score (2019 or latest)	2020 Indexvalue)	Index value change (2019-20 data)	Rank 2019
42	Thailand	67	82	59	97	76.0	0.5	48
44	Iran (Islamic Republic of)	70	94	57	79	75.0	-1.5	45
49	Saudi Arabia	96	72	43	78	72.3	0.0	49
50	Qatar	100	66	50	73	72.1	0.0	47
54	Oman	92	74	43	73	70.6	0.0	60

Countries at the opposite end of the index are trailing the most behind in terms of the readiness to engage in and benefit from e-commerce. Out of the 20 economies with the lowest value in the 2020 index, 18 are least developed countries (LDCs), with Congo and Syrian Arab Republic being the only non-LDCs in this group. It is against this background that UNCTAD has been undertaking 25 Rapid eTrade Readiness Assessments of LDCs in the past couple of years.15 These assessments seek to provide an analysis of what needs to be addressed in various policy areas in order to increase the capacity of countries to participate effectively in e-commerce. For most LDCs, these assessments can help to overcome a significant market failure: the fact that LDCs have lacked the information and awareness to formulate effectively their needs for development assistance in the area of e-commerce, and that donors as a result have witnessed limited demand for such assistance (Table 9).

Table 10. LDCs that have benefitted from an eTrade Readiness Assessment, February 2021[21]

Afghanistan	Cambodia	Madagascar	Niger	Tanzania
Bangladesh	Kiribati	Malawi	Togo	Tuvalu
Benin	Lao PDR	Mali	Samoa	Uganda
Bhutan	Lesotho	Myanmar	Senegal	Vanuatu
Burkina Faso	Liberia	Nepal	Solomon Islands	Zambia

Table 11 shows the highest ranked economies in each region while

Table 11. Top 10 developing and transition economies in the UNCTAD B2C E-commerce Index 2020, by region[21]

East, South & Southeast Asia	West Asia	Africa	Latin America and the Caribbean	Transition economies
Singapore	United Arab Emirates	Mauritius	Costa Rica	Belarus
China, Hong Kong SAR	Saudi Arabia	South Africa	Chile	Russian Federation
Korea, Republic of	Qatar	Tunisia	Brazil	Serbia

East, South & Southeast Asia	West Asia	Africa	Latin America and the Caribbean	Transition economies
Malaysia	Oman	Algeria	Dominican Republic	Georgia
Thailand	Turkey	Ghana	Colombia	Ukraine
Iran (Islamic Republic of)	Kuwait	Libya	Uruguay	North Macedonia
China	Lebanon	Kenya	Jamaica	Republic of Moldova
Mongolia	Bahrain	Nigeria	Trinidad and Tobago	Kazakhstan
Viet Nam	Jordan	Morocco	Peru	Azerbaijan
India	Iraq	Senegal	Argentina	Bosnia and Herzegovina

Table shows that there are wide regional differences. In the case of Internet access, less than a third of the population in Africa uses the Internet compared to three quarters in Western Asia. The relative strengths and weaknesses generally differ. East, South and Southeast Asia tends to have fairly equivalent values across the four indicators; the only indicator being below the world average is Internet use. In Latin America and the Caribbean,the main opportunities for improvement are in postal reliability.

Table 12. Regional values for the UNCTAD B2C E-commerce index, 2020[21]

	Share of individuals using the Internet (2019 or latest)	Share of individuals with an account (15+, 2017)	Secure Internet servers (normalized, 2019)	UPU postal reliability score (2019 or latest)	2020 Index value	2019 Index Value (2018data)
Africa	30	40	28	21	30	31
East, South & Southeast Asia	57	60	54	58	57	58
Latin America and the Caribbean	64	53	50	29	49	48
Western Asia	77	58	45	50	58	59
Transition economies	71	58	60	59	62	63
Developed economies	88	93	84	80	86	87
World	60	60	53	47	55	55

To facilitate more inclusive e-commerce, African countries would benefit from catching up in all policy areas. Compared with the 2019 index, there is no global change in the index value. The only regional value thatimproved was Latin America and the Caribbean, which is the region that is studied in more detail below (Table 12).1

1 Prepared based on UNCTAD (2020).

CONCLUSION AND SUGGESTIONS

This study highlights the growing importance of e-commerce as a powerful engine of economic growth in developing countries. Through a rigorous analysis of panel data from 20 nations, the findings clearly demonstrate that advancements in digital infrastructure and readiness significantly contribute to national GDP performance. Among the key indicators examined, the UNCTAD B2C E-commerce Index emerged as a particularly strong predictor, emphasizing the importance of holistic digital ecosystems that encompass secure connectivity, internet accessibility, online transaction capability, and logistics efficiency.

The results also show that broader digital engagement—such as internet usage and the availability of secure servers—plays a meaningful role in fostering economic dynamism. These elements not only support smoother digital transactions but also enable small businesses, entrepreneurs, and consumers to connect more efficiently in national and international markets.

One of the most promising insights from this research is the clear potential for e-commerce to serve as a bridge between economic opportunity and inclusive development. For countries seeking to unlock new sources of growth, digital commerce provides a pathway that is both scalable and sustainable.

Based on these insights, several practical recommendations emerge:

- Adopt the UNCTAD B2C E-commerce Index as a national diagnostic tool This index provides a comprehensive picture of a country's e-commerce readiness and should be used regularly to guide policy decisions and track progress.
- Expanding access to high-speed internet and increasing the availability of secure servers can empower both businesses and consumers, especially in rural or underserved areas.
- Governments and stakeholders should develop targeted programs to help SMEs embrace e-commerce platforms, including training, simplified digital onboarding, and financial support.
- Policies should ensure that women, young people, and marginalized groups have equal access to the tools and knowledge needed to participate in the digital economy.
- Regional collaboration around e-commerce regulations, data standards, and logistics can facilitate smoother digital trade and attract international investment.
- For countries with growing digital ambitions, such as Uzbekistan, adopting the UNCTAD index offers a structured way to measure progress and design evidence-based strategies for growth.

In conclusion, this research offers a clear and optimistic message: when supported by sound policies and investments, e-commerce can act as a transformative force for economic advancement. It creates new avenues for growth, strengthens competitiveness, and enhances access to goods and services for millions. With commitment and vision, developing countries can harness this momentum to build a more connected, resilient, and inclusive future.

REFERENCES

1. Choi, I. (2006). Nonstationary panels. Econometric Theory, 1, 511-539. https://scholar.google.co.kr/citations?user=q44EBDMAAAAJ&hl=en

2. Ang, J. B. (2008). What is the impact of foreign direct investment on economic growth? The Journal of Economic Studies, 35(5), 389-414. https://doi.org/10.1108/01443580810906271

3. Apaydin, F. (2009). The impact of foreign direct investment on economic growth: A case study of Turkey. International Journal of Economics and Finance, 1(1), 75-84. https://doi.org/10.5539/ijef.v1n1p75

4. Cevis, I., & Çamurdan, A. (2007). Determinants of foreign direct investment: Evidence from Turkey. International Journal of Business and Management, 2(3), 29-38. https://doi.org/10.5539/ijbm.v2n3p29

5. Demirhan, E., & Masca, M. (2008). Foreign direct investment and economic growth: A panel data analysis. Journal of Economic Cooperation, 29(2), 33-54. https://doi.org/10.1007/s10273-008-1086-0

6. Fosfuri, A., Motta, M., & Ronde, T. (2001). Foreign direct investment and spillovers through workers' mobility. Journal of International Business Studies, 32(1), 157-177. https://doi.org/10.1057/palgrave.jibs.8490941

7. Gastanaga, V. M., Nugent, J. B., & Pashamova, B. (1998). Host country reforms and FDI inflows: A nine-year panel study. The World Economy, 21(3), 389-405. https://doi.org/10.1111/1467-9701.00109

8. Glass, A. J., & Saggi, K. (2002). Innovation and spillover through foreign direct investment. International Economic Review, 43(3), 859-888. https://doi.org/10.1111/1468-2354.t01-1-00070

9. Hoang, H. V., & Goujon, A. (2014). The impact of foreign direct investment on economic growth: Evidence from Vietnam. Economic Change and Restructuring, 47(2), 117-145. https://doi.org/10.1007/s10644-013-9125-5

10. Hubler, M., & Keller, W. (2010). Trade and innovation: The role of FDI. Review of International Economics, 18(3), 550-570. https://doi.org/10.1111/j.1467-9396.2010.00906.x

11. Liu, X., Wang, C., & Wei, Y. (2014). Do foreign direct investment and domestic investment complement or substitute each other? The Journal of International Trade & Economic Development, 23(4), 562-584. https://doi.org/10.1080/09638199.2013.797131

12. Na, K., & Lightfoot, H. (2006). The effect of foreign direct investment on economic growth: A comparative study of China and India. International Business Review, 15(6), 625-641. https://doi.org/10.1016/j.ibusrev.2006.08.002

13. Quazi, R. (2007). The role of foreign direct investment in the economic development of a small island developing state: The case of the Maldives. Journal of International Development, 19(5), 685-696. https://doi.org/10.1002/jid.1303

14. Rodríguez, F., & Pallas, M. (2008). Foreign direct investment and economic growth: A global perspective. Global Economic Review, 37(2), 167-180. https://doi.org/10.1080/12265080801921903

15. Rogmans, T., & Ebbers, J. J. (2013). The impact of foreign direct investment on the host country's economic growth. International Journal of Economic Sciences and Applied Research, 6(1), 5-18. https://doi.org/10.25103/ijesar.61.01

16. Zhang, J., & He, Y. (2014). The impact of foreign direct investment on regional economic growth in China: A case study of Shandong Province. China Economic Review, 31, 30-45. https://doi.org/10.1016/j.chieco.2014.05.002

17. Economides, N., & Himmelberg, C. P. (1995). Critical mass and network size with application to the US fax market. NYU Stern School of Business EC-95-11. http://neconomides.stern.nyu.edu/networks/Critical.pdf

18. Jha, R., & Majumdar, S. K. (1999). A matter of connections: OECD telecommunications sector productivity and the role of cellular technology diffusion. Information Economics and Policy, 11(3), 243-269. https://econpapers.repec.org/article/eeeiepoli/v_3a11_3ay_3a1999_3ai_3a3_3ap_3a243-269.htm

19. Tanzi, V., & Schuknecht, L. (2000). Public spending in the 20th century: A global perspective. Cambridge University Press. https://catdir.loc.gov/catdir/samples/cam032/99040258.pdf

20. Statista. (n.d.). Digital & trends. Retrieved from https://www.statista.com/

21. UNCTAD. (2020). The UNCTAD B2C e-commerce index 2020: spotlight on Latin America and the Caribbean. UNCTAD Technical Notes on ICT for Development. Retrieved from https://unctad.org/system/files/official-document/tn_unctad_ict4d17_en.pdf

22. Karimova, Shirin. "O ‘zbekistonda elektron tijoratning rivojlanish bosqichlari." YASHIL IQTISODIYOT VA TARAQQIYOT 1.9 (2023). https://green-eco.uz/index.php/GED/article/download/2512/2620

Marketing

ilmiy, amaliy va ommabop jurnali

2025-yil, may, 5-son

Mazkur jurnalda maqolalar chop etish uchun quyidagi havolalarga murojaat qilish mumkin.
Ilmiy maqola, ommabop maqola, reklama, hikoya va boshqa ilmiy-ijodiy materiallar yuborishingiz mumkin.
Materiallar va reklamalar pullik asosda chop etiladi.

Elektron pochta: info@marketingjournal.uz
Bot: @marketinjournalbot
Tel.: +998977838464, +998939266610

Jurnalning rasmiy sayti: https://marketingjournal.uz

Marketing jurnali O‘zbekiston Respublikasi Oliy ta’lim, fan va innovatsiyalar vazirligi huzuridagi **Oliy attestatsiya komissiyasi rayosatining 2024-yil 04-oktabrdagi 332/5 sonli qarori** bilan milliy ilmiy nashrlar ro‘yxatiga kiritilgan

“Marketing” ilmiy, amaliy va ommabop jurnali 2024-yil 15-martdan O‘zbekiston Respublikasi Prezidenti Administratsiyasi huzuridagi Axborot va ommaviy kommunikatsiyalar agentligi tomonidan **C-5669517** reyestr raqami tartibi bo‘yicha ro‘yxatdan o‘tkazilgan. **Litsenziya raqami: №240874**

“Marketing” ilmiy, amaliy va ommabop jurnalining xalqaro darajasi: **9710.** ГОСТ 7.56-2002 " Seriyali nashrlarning xalqaro standart raqamlanishi" davlatlataro standartlari talablari. **Berilgan ISSN tartib raqami: 3060-4621**