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E-commerce and GDP nexus: Evidence across economic and continental groups

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A B S T R A C T

Information and Communication Technology (ICT) is currently developing rapidly along with its increasingly important role for both individuals and organizations. One form of ICT development is E-Commerce which serves as a comprehensive virtual marketplace. Based on macroeconomics context, the role of E-Commerce needs to be explored further, especially the relationship between Business to Consumer (B2C) E-Commerce and Gross Domestic Product (GDP), a topic that remains underexplored. The purpose of this study is to observe the nexus between B2C E-Commerce and GDP using two main classifications, namely: 1) economic status and 2) geographical continent. A panel-data regression analysis was conducted involving 117 countries from 2016 to 2020. The results showed that B2C E-Commerce had a positive and significant effect on GDP. In addition, the increase in e-commerce has been found to have the potential for nation growth in both developing and emerging economies. Notably, Africa and Asia-Oceania continents presented considerable opportunities to harness E-Commerce as a driver of national economic development. These findings provide important managerial and policy implications for governments and stakeholders in defining strategies to promote inclusive digital economic growth.

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1. Introduction

The development of ICT has presented various innovations supporting individual and institutional activities. One important dimension of ICT is e-commerce which has emerged as an innovative form of trade, transforming the economic structure in various regions and contributing significantly to global economic growth. E-commerce plays a strategic role in transforming conventional business models, strengthening logistics systems, and expanding market reach through digital platforms, thereby directly increasing economic efficiency and productivity (Heliyani et al., 2023; Hou, 2023; Tang & Wang, 2020). With its ability to overcome geographical barriers, e-commerce creates opportunities for business actors in various scales to reach global consumers, improve operational performance, and create new employment opportunities that support the growth of employment indicators (Imdadullah, 2023). This phenomenon is recognized as one of the most significant transformations in the modern digital economic landscape. Statista (2024) showed that the global e-commerce transaction value was estimated to reach USD 5.7 trillion in 2023, with an average annual growth rate of 14.3% since 2019. Among the various e-commerce models, Business-to-Consumer (B2C) has become dominant, characterized by direct sales from companies to consumers through digital platforms. This model changes people's consumption patterns and forms a new digital economic ecosystem that includes smart logistics, electronic payment systems, and artificial intelligence-based services (Hong et al., 2019). Therefore, e-commerce, particularly in B2C, is one of the keys to modern economic development and a critical force shaping the future global economy.

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Recently, the United Nations Conference on Trade and Development (UNCTAD) introduced the B2C E-Commerce Index, a composite metric designed to evaluate a nation's readiness to engage in B2C digital commerce. The index integrates four key dimensions: (1) internet penetration, measured by the individuals users in internet; (2) secure server density, indicated by the resilience of online transaction infrastructure; (3) postal reliability, reflected by logistics and delivery performance; and (4) financial inclusion, quantified by the proportion of the population with access to banking or fintech services (UNCTAD, 2023). The index serves not only as a proxy for digital readiness but also as a strategic benchmark to assess national capacity in the digital commerce ecosystem. This index is an important tool to measure the digital ecosystem of the countries, used for analysis purposes up to policy implementation. Numerous prior studies have demonstrated that nations with elevated digital adoption levels typically exhibit enhanced GDP development, increased digital employment, and more efficient resource allocation (Naseer et al., 2020). Nevertheless, previous research has seldom examined the utilization of e-commerce for optimal economic outcomes in depth. Consistent with the established positive correlation between technology and the economy, as corroborated by numerous prior research (Chen et al., 2023; Han & Liu, 2022; Pang et al., 2022; Ren et al., 2021; Suroso et al., 2022), this study assumes that well-adopted e-commerce can significantly improve a country's economic performance. Conversely, countries with underdeveloped digital infrastructure or limited digital literacy often encounter structural barriers that hinder their integration into the digital economy, resulting in relatively low economic growth (Rana et al., 2020).

The rapid expansion of the digital economy has prompted growing research which examines the relationship between technology and economic growth. However, most previous studies have focused on the effects of individual technological variables without accounting for the broader interaction of multiple elements that constitute a digital ecosystem (Bahrini & Qaffas, 2019; Edquist et al., 2021; Kang, 2020; Owolabi et al., 2021). Therefore, this study addresses the advantage of e-commerce for economic application and its gap of research using B2C E-Commerce Index as a main independent variable. The purpose of this study is to investigate the impact of the B2C E-Commerce Index on GDP and determine which countries based on their classification, have effectively leveraged e-commerce to increase GDP. The contribution of this study lies in two main aspects, first, it offers a comprehensive analysis of how a composite index consisting of internet access, server security, logistics infrastructure, and financial inclusion affect economic growth; second, it also categorizes countries according to their utilization of e-commerce as an economic resource, considering both economic status and continental classification.

2. Literature Review

Solow in 1957 constitutes a fundamental analytical framework in neoclassical economics for explaining the dynamics of economic growth in long-run form. This model postulates that economic output is a function of capital accumulation, labor input, and a residual component attributed to technological progress. The last factor is the key to output enhancement, meaning that the technology is the important thing for reaching the optimal production. This concept is commonly used as a foundation for analytical framework between technology and output. In the context of macroeconomy, technology has already explored its impact towards economic growth. In many cases in the previous studies, a positive and significant nexus of ICT were found on economic growth (Appiah-Otoo & Song, 2021; Awad & Albaity, 2022; Fernández-Portillo et al., 2020; Hussain et al., 2021; Nasab & Aghaei, 2009; Niebel, 2018). Specifically, in terms of the types of technology, several previous studies have also found that GDP were significantly impacted by several types of technology, such as the Internet (Li, 2019; Manyika & Roxburgh, 2011; Maurseth, 2018), Mobile Cellular (Gomes et al., 2022; Ibrahimi & Fetai, 2022) , Telephone (Luong & Nguyen, 2021; Sen & Saray, 2019), and IoT (Edquist et al., 2021). Therefore, it could be concluded that ICT is the main contributor for economic growth from aggregate or specific technology.

Previous literature has extensively investigated the nexus between E-commerce and economic growth. Anvari & Norouzi (2016) found the positive impact of e-commerce on GDP per capita measured by purchasing power parity, obtaining that e-commerce had a stronger development-enhancing effect compared to research and development (R&D). During global crises such as the Covid-19 pandemic, E-commerce has improved a country's economic stability as it becomes a vital medium platform for transactions without physical contact (Dianda & Pandin, 2021). (Batrancea, 2022) found that e-commerce contributed to economic growth by enhancing the economic performance of small-medium-enterprises (SMEs) in the European Union, also boosting value-added activities and attracting venture capital. Similarly, Criveanu (2023) also found that digital transformation and e-commerce had a significant impact on GDP growth and sustainable organizational development in EU countries, recommending policies to further promote this technology development for sustained economic improvement. Moreover, a positive and significant correlation between e-commerce and economic growth was also found in developing countries (Otarinia, 2024). Hence, these findings support that e-commerce plays important roles in enhancing economic performance across various contexts. However, the study examining the magnitude of e-commerce effect towards GDP in both developed and developing countries remains limited and required further investigation.

According to previous literature, studies of e-commerce are promising areas for further exploration particularly the nexus between B2C E-commerce and GDP, due to its important role in enhancing economic growth. Previous study by Zatonatska (2018) found that the uneven growth of e-commerce across regions had different impacts on economic development indicators such as GDP and unemployment rates in different countries. Similarly, Sodikova (2023) also emphasized that B2C E-Commerce, as defined by UNCTAD, was also an important factor in measuring its impact on the national economy, especially in developing countries. However, studies investigating the implications of B2C e-commerce within a wider economic

framework remains scarce, highlighting a substantial deficiency in the literature. This study seeks to fill this vacuum by creating a conceptual framework to examine the relationship between B2C e-commerce and economic performance.

3. Methodology

This study employed a panel-data regression that was applied in this study using a framework of production function, incorporating the indicator of technology to explore the relationship between B2C E-commerce and GDP. This framework was designed by Romer (1986), in response to the shortcomings of the growth model by (Solow, 1957). The Romer model includes technology as an endogenous variable, which can be represented by the B2C E-commerce index. The Romer endogenous growth theory posits that the real output of sectors is determined by technology, capital, and labor inputs, and articulates the aggregate production function as follows:

$$Y = F\,A(KL) \tag{1}$$

where Y represents the output, F denotes the function of input, K signifies capital, and L indicates labor. K and L serve as production factors, while A represents the technology input, indicated by B2C E-commerce. This study utilized this approach through several indicators that may be represented as output and input components. The equation presented in this paper can be articulated as follows:

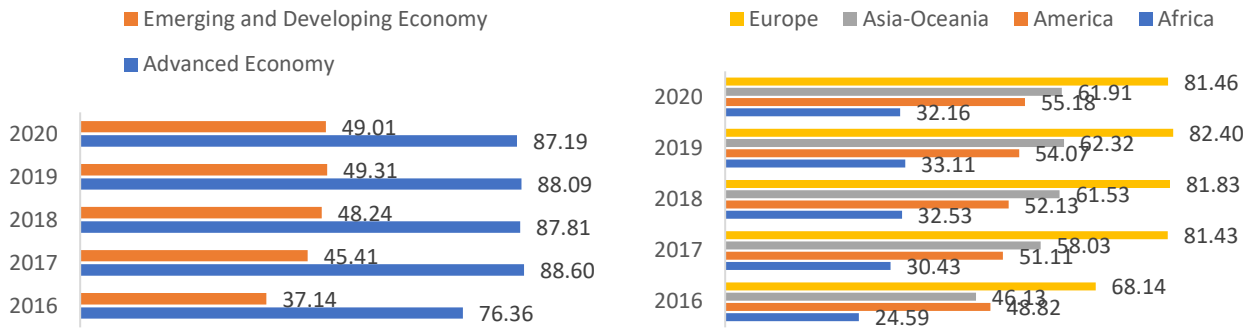
$$LogGDP_{it} = \beta_0 + \beta_1 LogGFCF_{it} + \beta_2 LogLABF_{it} + \beta_3 LogB2C_{it} + \beta_4 FDI_{it} + e_{it} \tag{2}$$

where GDP_{it} is the gross domestic product in country i and period t; $GFCF_{it}$ and FDI_{it} is the gross fixed capital formation and foreign direct investment inflows in country i and period t as the capital input; $LABF_{it}$ is the labor force in country i and period t as the labor input; $B2C_{it}$ is the B2C E-commerce index in country i and period t; β_0 is the constant, β_1 to β_4 is the coefficient, Log is the natural logarithm, and e_{it} is the residual form.

This study employed panel-data regression techniques, specifically ordinary least squares (OLS), random effects model (REM), and fixed effects model (FEM). This methodology is pertinent for analyzing the impact of the B2C E-Commerce Index on GDP, considering the brief time frame and substantial number of individuals, categorized by continent and the country makeup of World Economic Outlook (WEO) groups. The correlation matrix was initially conducted to assess multicollinearity, with the regression result required to be below 0.8 or 0.9 (Franke, 2010). Following the estimation of the three regression models, the Chow test (FEM or OLS) and the Hausman test (FEM or REM) were employed to choose the most suitable model for elucidating the determinants. The type of data in this study was a panel dataset, from 117 countries during the period of 2016 to 2020. The main source of data in this study was from UNCTAD for B2C E-Commerce Index and World Development Indicator (WDI) for GDP, gross fixed capital formation, labor force, and foreign direct investment. Furthermore, this study also categorized the analysis into two classifications, namely continent and economy groups in Appendix 1 and 2, respectively.

4. Result and Discussion

B2C E-commerce has already been discussed as the technology driving the economic performance by some previous studies (Jovanovic et al., 2020; Martini et al., 2023). However, the context of e-commerce and growth in macroeconomics is still not explained. Hence, this study produces the result about the impact of B2C e-commerce on growth of the national economy, proxied by GDP. The B2C E-Commerce scores as presented in Figure 1, showed significant differences within the group of countries classified by continent and economic group. Based on an economic group, this study revealed that developed countries had a higher B2C E-Commerce Index scores than developing and emerging countries during the observed years. Furthermore, Europe is the continent with the highest value of mean in the B2C E-Commerce Index with a range of 68.14 to 82.40. In contrast, Africa is the continent with the lowest mean score with a range of 24.59 to 33.11.



a) Economy Group b) Continent Group

Fig. 1. B2C E-Commerce Index across economics and continent countries from 2016-2020
Source: UNCTAD (2020)

In 2020, all country categories experienced a simultaneous decline in the index, a trend largely attributed to global supply chain disruptions and shifts in consumer behavior brought on by pandemic, especially COVID-19 crisis. While the overall impact was widespread, its intensity varied across countries (Monoarfa et al., 2023; Mouritz, 2020). Notably, the Asia-Oceania region exhibited a contrasting trend: although the index ranked second lowest in 2016, it demonstrated steady growth through to 2020. This upward trajectory can be linked to key factors such as the region's rapid development of digital infrastructure and significant strides in economic integration. Table 1 reveals the statistics descriptive contains means, median, maximum, minimum, Std.Dev, and observations. Based on this table, this study found that all variables had a lower variation due to the value of mean higher than Std.Dev, except for the FDI variable. FDI had an extreme value for both maximum and minimum values.

Table 1
Descriptive Statistic

Variable	Mean	Median	Maximum	Minimum	Std.Dev	Observations (N)
Log(GDP_{it})	25.425	25.179	30.701	21.443	1.863	585
Log($GFCF_{it}$)	23.921	23.824	29.462	19.316	1.901	585
Log($LABF_{it}$)	15.726	15.491	20.476	12.244	1.512	585
Log($B2C_{it}$)	3.922	4.050	4.570	1.099	0.566	585
FDI_{it}	6.159	2.357	452.221	-296.013	38.461	585

Table 2 shows the result of correlation matrix among independent variables. All variables had a value below 0.8 or 0.9, meaning that all independent variables could be maintained for panel regression, particularly the effect of the B2C E-Commerce Index on GDP.

Table 2
Correlation Matrix

	Log($GFCF_{it}$)	Log($LABF_{it}$)	Log($B2C_{it}$)	FDI_{it}
Log($GFCF_{it}$)	1.000			
Log($LABF_{it}$)	0.715	1.000		
Log($B2C_{it}$)	0.538	-0.057	1.000	
FDI_{it}	-0.088	-0.177	0.081	1.000

Table 3 reveals the result of panel regression estimation by involving countries in the world. According to a selection test for an appropriate model through Chow and Hausman Tests, this study determined the FEM to estimate the impact of the B2C E-Commerce Index on GDP. All traditional variables, namely input and labor had a positive and significant impact on GDP. This result was also in line with several previous literatures which found the positive and significant effect from both capital and labor force towards output (Bui Minh & Bui Van, 2023; Murindahabi et al., 2019; Qu et al., 2017; Suroso et al., 2022). Moreover, the B2C E-Commerce Index exerted a favorable and considerable influence on GDP, indicating that the adoption of E-Commerce may bolster the economic advancement of a nation. This study empirically confirms that e-commerce significantly influences macroeconomic conditions, consistent with prior studies (Anvari & Norouzi, 2016; Criveanu, 2023; Hou, 2023). Riyanto et al. (2021) stated that the emergence of innovative business models through e-commerce has contributed to lower operating costs and increased ability to oversee global commercial operations, thereby fostering a more resilient economic environment. In addition, e-commerce serves as a major engine of economic activity by increasing trade efficiency, which in turn stimulates broader economic growth (Kee et al., 2023). (Silva, 2023) also asserted that e-commerce could contribute to the economic development of local entrepreneurs, highlighting the availability of growth opportunities for enterprise development. Overall, E-Commerce could be approved as a source of economic growth for the nation.

Table 3
Panel Regression Estimation, All Countries

Variable	OLS	FEM	REM
Constant	1.982*** (0.144)	8.437*** (1.520)	4.240*** (0.274)
Log($GFCF_{it}$)	0.876*** (0.015)	0.394*** (0.021)	0.672*** (0.014)
Log($LABF_{it}$)	0.105*** (0.016)	0.443*** (0.101)	0.279*** (0.020)
Log($B2C_{it}$)	0.214*** (0.035)	0.152*** (0.020)	0.184*** (0.019)
FDI_{it}	0.000 (0.000)	2.75E-05 (9.30E-05)	1.44E-05 (9.26E-05)
R-Squared	0.980	0.999	0.874
Adjusted R-Squared	0.980	0.999	0.873
F-Statistic (Prob)	7068.748*** (0.000)	3815.524*** (0.000)	1005.801*** (0.000)
Chow-Test (Prob)	-	1748.239*** (0.000)	-
Hausman-Test (Prob)	-	-	360.408*** (0.000)

Note: *** significant at 1% level

Table 4 and Table 5 provide the finding about the impact of B2C E-Commerce on GDP by categorizing into two classifications: continent and economy groups. Table 4 revealed a positive and significant influence of B2C E-Commerce towards GDP across both economic groups. Notably, the coefficient value of E-commerce in advanced economies was higher compared to that of developing economies. This finding is supported by the statistical data from UNCTAD (2023) which highlighted a clear disparity in the B2C E-commerce index between advanced economies and developing economies. Advanced economies countries possess more sophisticated technological infrastructure and have already integrated E-Commerce into their business practices. (Hoque & Boateng, 2017) emphasized that developed countries had a significantly higher level of technological readiness compared to developing countries, which directly correlated with the effectiveness of e-commerce implementation. Furthermore, these countries benefit from more stable economies and higher disposable incomes contributing to greater participation in online shopping (Trung et al., 2019). On the other hand, developing countries face ongoing challenges such as inadequate infrastructure and regulatory frameworks, which hinder the effective adoption of E-Commerce (Mapeshoane & Pather, 2016; Waseem, 2020). Therefore, it can be concluded that B2C E-Commerce exerts a stronger influence on the economic growth of advanced economies than on that of emerging and developing ones. FDI may not have shown a significant impact on GDP due to the time lag between the inflow of investments and their tangible effect on economic output, which often does not manifest immediately under current economic conditions.

Table 4
Panel Regression Estimation for impact of B2C on economic growth based on Economic Group Classification

Variable	Advanced Economies Best Model: FEM	Emerging and Developing Economies Best Model: FEM
Constant	2.923 (1.957)	9.196*** (1.882)
Log($GFCF_{it}$)	0.410*** (0.037)	0.391*** (0.025)
Log($LABF_{it}$)	0.804*** (0.146)	0.381*** (0.123)
Log($B2C_{it}$)	0.235*** (0.046)	0.148*** (0.023)
FDI_{it}	4.75E-05 (4.97E-05)	-0.001** (0.001)
R-Squared	0.999	0.999
Adjusted R-Squared	0.999	0.998
F-Statistic (Prob)	11,600.16*** (0.000)	2459.018*** (0.000)
Chow-Test (Prob)	566.507*** (0.000)	1188.868*** (0.000)
Hausman-Test (Prob)	39.490*** (0.000)	151.062*** (0.000)

Note: ** and *** significant at 5% and 1% level

Based on the classification of continents, Table 5 shows interesting results from panel regression analysis. The findings indicated that B2C e-commerce had a positive and significant influence on economic growth across three continents, namely Africa, Asia Oceania, and Europe.

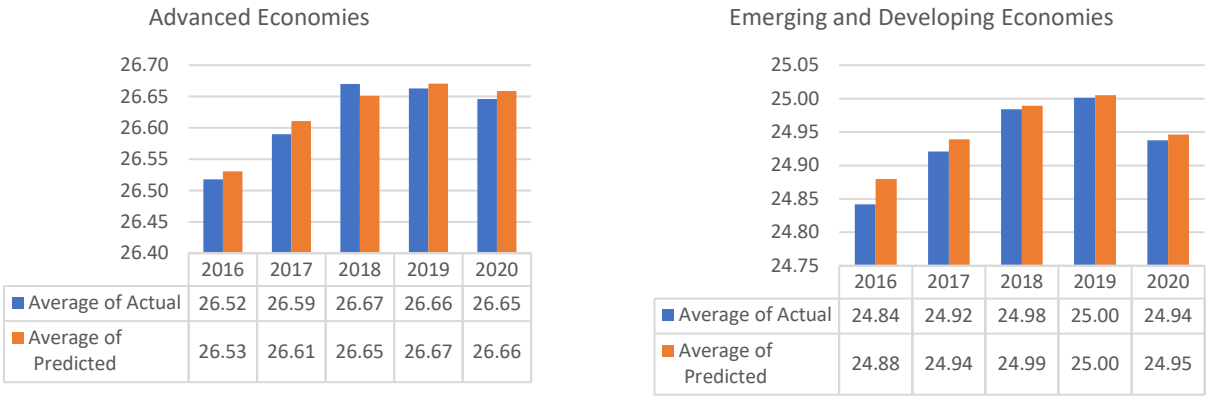
Table 5
Panel Regression Estimation for impact of B2C on economic growth based on, Continent Group

Variable	Africa Best Model: FEM	America Best Model: FEM	Asia-Oceania Best Model: FEM	Europe Best Model: FEM
Constant	8.302*** (2.806)	2.013 (2.773)	8.146** (3.182)	7.606*** (2.353)
Log($GFCF_{it}$)	0.342*** (0.047)	0.482*** (0.050)	0.364*** (0.038)	0.520*** (0.035)
Log($LABF_{it}$)	0.491** (0.194)	0.769*** (0.189)	0.519** (0.211)	0.310* (0.163)
Log($B2C_{it}$)	0.110*** (0.034)	-0.039 (0.061)	0.111*** (0.036)	0.207*** (0.045)
FDI_{it}	-0.024*** (0.004)	-0.012*** (0.005)	4.70E-05 (0.000)	6.79E-05 (9.76E-05)
R-Squared	0.997	0.999	0.999	0.999
Adjusted R-Squared	0.996	0.999	0.998	0.999
F-Statistic (Prob)	1287.912*** (0.000)	7062.528*** (0.000)	3268.452*** (0.000)	7565.791*** (0.000)
Chow-Test (Prob)	409.235*** (0.000)	248.220*** (0.000)	492.182*** (0.000)	602.343*** (0.000)
Hausman-Test (Prob)	37.949*** (0.000)	41.379*** (0.000)	95.684*** (0.000)	85.286*** (0.000)

Note: ** and *** are significant at 5% and 1% level

In contrast, no statistically significant relationship was observed in the Americas. In developing regions, particularly in Africa and Asia, e-commerce was still in the process of being integrated into domestic economic structures, supported by continuous infrastructure development and increasing internet penetration. In these conditions, e-commerce acted as a new driver of

economic activity. Conversely, in more developed economies where e-commerce has been deeply embedded into everyday life, its role tended to be more complementary, primarily facilitating the shift of traditional offline transactions into online platforms rather than creating additional economic value. Consequently, in more mature markets such as those in the Americas, e-commerce may have reached a point of diminishing marginal returns in terms of its impact on GDP. Overall, this study approved that some continents still have a potential to boost GDP through the development and utilization of B2C E-Commerce.

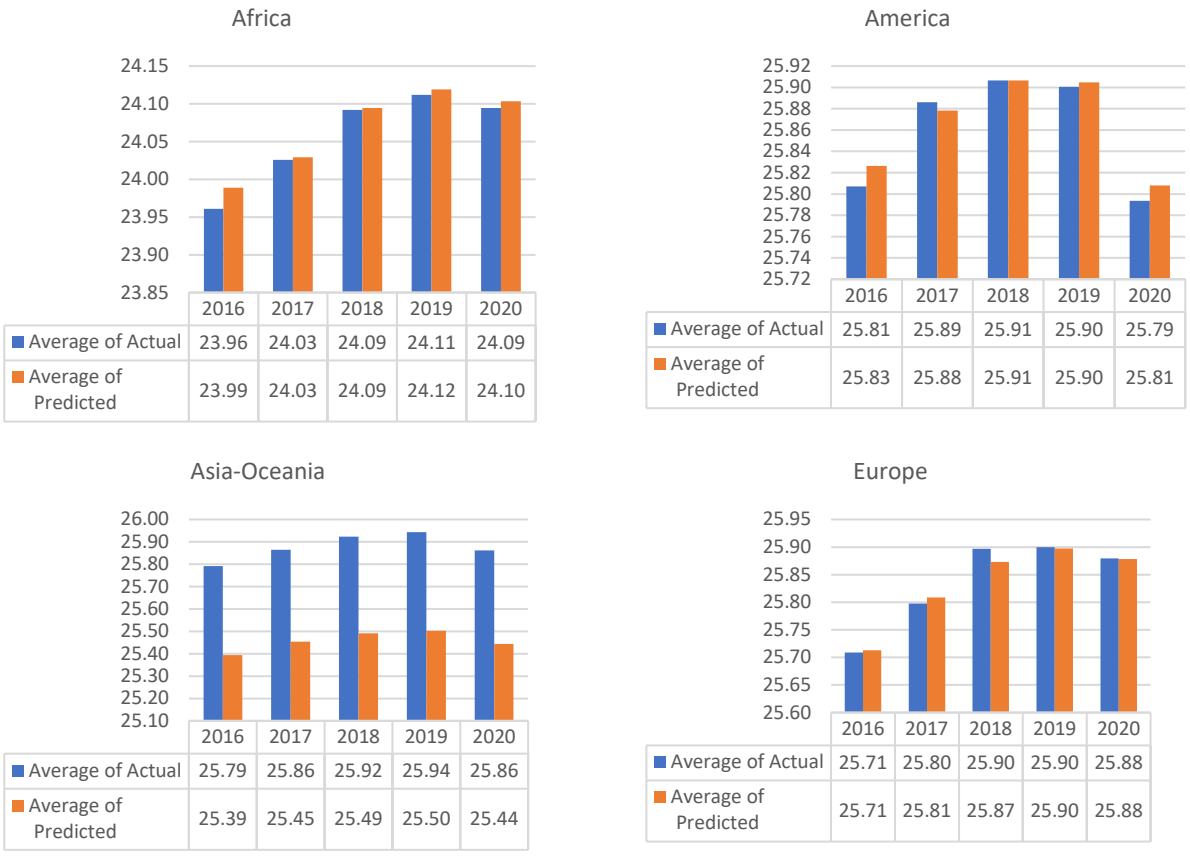


	2016	2017	2018	2019	2020
Average of Actual	26.52	26.59	26.67	26.66	26.65
Average of Predicted	26.53	26.61	26.65	26.67	26.66

	2016	2017	2018	2019	2020
Average of Actual	24.84	24.92	24.98	25.00	24.94
Average of Predicted	24.88	24.94	24.99	25.00	24.95

Fig. 2. Actual and Predicted GDP in Economy Group Analysis

Using the regression coefficient between economic groups and continents, this study also compares the actual and predicted GDP values. This comparison can be used as an evaluation of which country categories have not yet optimized E-Commerce in economic development or vice versa. Fig. 2 and Fig. 3 show the comparison of actual and predicted GDP in economic groups and continents, respectively. Fig. 2 shows that developed countries showed higher predicted GDP values compared to their actual GDP, while developing and emerging countries showed the opposite pattern.



	2016	2017	2018	2019	2020
Average of Actual	23.96	24.03	24.09	24.11	24.09
Average of Predicted	23.99	24.03	24.09	24.12	24.10

	2016	2017	2018	2019	2020
Average of Actual	25.81	25.89	25.91	25.90	25.79
Average of Predicted	25.83	25.88	25.91	25.90	25.81

	2016	2017	2018	2019	2020
Average of Actual	25.79	25.86	25.92	25.94	25.86
Average of Predicted	25.39	25.45	25.49	25.50	25.44

	2016	2017	2018	2019	2020
Average of Actual	25.71	25.80	25.90	25.90	25.88
Average of Predicted	25.71	25.81	25.87	25.90	25.88

Fig. 3. Actual and Predicted GDP in Continent Group Analysis

This comparison suggests that developed countries have entered a phase of digital market maturity, where the incremental impact of B2C e-commerce on economic growth has diminished. As a result, predictive models tend to overestimate the

contribution of e-commerce in these countries. Additionally, countries in developing and emerging countries categories were still undergoing a digital transformation process, with limited integration of e-commerce services into the wider economy. This interpretation is further supported by the evidence in Fig. 1, which showed that developing and emerging countries consistently had a lower B2C e-commerce index than developed countries. Fig. 3 presents a cross-continental comparison of actual and predicted GDP values. Consistent with previous observations, the study found that in the Americas, Asia-Oceania and Europe, predicted GDP values exceed actual results. In the case of both continents, e-commerce acts as a transformation mechanism rather than a growth engine, thus reducing its incremental contribution to GDP. In contrast, Africa still had growth opportunities as actual values were higher than predicted values. This indicates that e-commerce is not the main source of growth for GDP but has the potential to be improved as its impact is positive and significant on GDP.

5. Conclusion

This study has attempted to explore the influence of B2C e-commerce on GDP and assess which economic groups and continental regions have effectively leveraged B2C e-commerce to enhance economic performance. This study showed that B2C e-commerce had a positive and statistically significant impact on GDP, reinforcing the theoretical framework proposed by Romer, which emphasizes the essential role of technology to drive output at both microeconomic and macroeconomic levels. Furthermore, the results suggested that countries classified as emerging and developing economies showed greater potential to expand e-commerce to enhance GDP, as digital trade integration in these regions is still in its formative stages. In contrast, developed economies may have reached a saturation point, where e-commerce has become fully embedded in everyday market transactions, limiting its marginal contribution to economic growth.

This pattern is further reflected in the continental analysis. While regions such as the Americas and Europe demonstrate higher predicted GDP values, their actual performance indicates a plateau in E-Commerce-driven growth. In contrast, Africa and Asia-Oceania show considerable untapped potential for B2C E-Commerce to accelerate economic development. A key policy implication of these findings is the importance of targeted efforts to advance the e-commerce ecosystem in developing economies. This includes developing strategic digital infrastructure and establishing regulatory frameworks that facilitate the adoption and scaling of digital platforms. Effective governance by coordinating public or private investment in digital infrastructure is critical to ensure that e-commerce can serve as a sustainable driver of economic growth. However, this study is not without limitations. The most prominent limitation is the limited time frame, as the analysis relies on B2C e-commerce data that is only available up to 2020 due to limitations of the original data source. Future study must integrate longitudinal data and investigate simulation-based policy modeling to evaluate the prospective economic benefits of e-commerce under diverse policy interventions, thereby offering a framework for enhanced governmental decision-making.

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Appendix

Appendix 1. Continent Group

Classifications	Country
Africa	Algeria; Angola; Benin; Botswana; Burkina Faso; Burundi; Cameroon; Cote d'Ivoire; Egypt, Arab Rep.; Ethiopia; Ghana; Guinea; Kenya; Lesotho; Madagascar; Mali; Mauritius; Morocco; Niger; Rwanda; Senegal; Sierra Leone; South Africa; Sudan; Tanzania; Togo; Tunisia; Uganda
America	Argentina; Bolivia; Brazil; Canada; Chile; Colombia; Costa Rica; Dominican Republic; Ecuador; El Salvador; Honduras; Mexico; Nicaragua; Panama; Paraguay; Peru; United States; Uruguay
Asia-Oceania	Armenia; Australia; Bangladesh; Bhutan; Cambodia; China; Cyprus; Georgia; India; Indonesia; Iran, Islamic Rep.; Iraq; Israel; Japan; Jordan; Kazakhstan; Korea, Rep.; Kuwait; Kyrgyz Republic; Lebanon; Malaysia; Mongolia; Nepal; New Zealand; Oman; Pakistan; Philippines; Saudi Arabia; Singapore; Sri Lanka; Thailand; Turkiye; Uzbekistan
Europe	Albania; Austria; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Croatia; Czechia; Denmark; Estonia; Finland; France; Germany; Greece; Hungary; Iceland; Ireland; Italy; Latvia; Lithuania; Luxembourg; Malta; Moldova; Montenegro; Netherlands; Norway; Poland; Portugal; Romania; Russian Federation; Serbia; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; Ukraine; United Kingdom

Source: Statistic Times (2025)

Appendix 2

Economy Group

Classifications	Country
Advanced Economies	Australia; Austria; Belgium; Canada; Cyprus; Czechia; Denmark; Estonia; Finland; France; Germany; Greece; Iceland; Ireland; Israel; Italy; Japan; Korea, Rep.; Latvia; Lithuania; Luxembourg; Malta; Netherlands; New Zealand; Norway; Portugal; Singapore; Slovak Republic; Slovenia; Spain; Sweden; Switzerland; United Kingdom; United States
Emerging and Developing Economies	Albania; Algeria; Angola; Argentina; Armenia; Bangladesh; Belarus; Benin; Bhutan; Bolivia; Bosnia and Herzegovina; Botswana; Brazil; Bulgaria; Burkina Faso; Burundi; Cambodia; Cameroon; Chile; China; Colombia; Costa Rica; Cote d'Ivoire; Croatia; Dominican Republic; Ecuador; Egypt, Arab Rep.; El Salvador; Ethiopia; Georgia; Ghana; Guinea; Honduras; Hungary; India; Indonesia; Iran, Islamic Rep.; Iraq; Jordan; Kazakhstan; Kenya; Kuwait; Kyrgyz Republic; Lebanon; Lesotho; Madagascar; Malaysia; Mali; Mauritius; Mexico; Moldova; Mongolia; Montenegro; Morocco; Nepal; Nicaragua; Niger; Oman; Pakistan; Panama; Paraguay; Peru; Philippines; Poland; Romania; Russian Federation; Rwanda; Saudi Arabia; Senegal; Serbia; Sierra Leone; South Africa; Sri Lanka; Sudan; Tanzania; Thailand; Togo; Tunisia; Turkiye; Uganda; Ukraine; Uruguay; Uzbekistan

Source: IMF (2025)

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