



Research Article

Nexus between Digitalization and Economic Growth: Evidence from Developing Countries

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Abstract

Information, communication, and technology have played a tremendous role in fostering the economic growth of developing economies. To highlight the significant role of digitalization on growth, this research has focused on the contributing role of education, financial development, and urban population. We have used data from the time span of 2002 to 2020 of 12 developing economies to check the relationship between dependent and independent variables. GDP per capita was taken as the dependent variable. Independent variables were digitalization, education, financial development, and urban population. By using the random effect technique, it was found that digitalization has boosted the economic growth of developing countries. Moreover, education, financial development, and urban population also enhanced the economic growth of developing economies. The study suggested more education and usage of information and communication technology in these selected countries. Finally, more employment opportunities should be provided in urban areas to absorb more population in production processes for achieving high economic growth.

Keywords: Digitalization, Financial development, Human capital, Developing countries.

Introduction

Education is an incredibly significant pillar that is put into society in all its magnitudes. In this prism, all education levels as a community investment are a subject of debate regarding their influence on economic growth. Encouraging progress and development, not merely in the economic field, but in every field of life, depends on the prospect. Enticement for schooling paved the way for expectations. If the educated look forward to their education will improve their wellbeing, and after that, the intent to educate will add to raising output and making the economic growth of the nation generally. Education is an important issue for the economy that endorses economic growth. Hanushek and Woessmann (2010) pointed out economic growth as a function of the eminence of education, but they did not find confirmation of the significance of years of schooling, they give arguments for the significance of cognitive skills and an essential literacy ratio for economic growth (Goczek et al., 2021). The advantages of a child's education extend not only to the teenager as a human being or to his or her parents, but in addition to new people in society. Therefore, my child's education adds to your comfort or security by promoting a secure and self-governing culture (Friedman and Friedman, 2002).

High technical development continued to be inspiring. Kurzweil (1999) explains that it pursues a sample of exponential growth or which he named the 'Law of Accelerating Returns'. After that, there is the well-known Moore's law that the microprocessor compactness becomes twice concerning every two years, a tendency that has kept up itself for more than 40 years. Regarding such astoundingly unstable expansion in digitalization,

this tended to inspire a lot of investigation into ICT's aid to economic growth. Recognizing the growth resources is significant for every country, particularly for underdeveloped nations, and it is, in reality, most excellent rank matter in development economics (Dougherty and Jorgenson, 1996; Hall and Jones, 1999).

Hypothetically, the majority of investigators propose that information and communication technology would be a major motivator of growth. Along with the neoclassical theory of growth, growth is determined by exogenous industrial transformation. On the contrary, the endogenous growth conjecture focused on how growth logically clarify as of investing in education and knowledge progress. This theory examines information communication and technology as adding to economic growth by improving novel goods, procedures, and industry models (Czernich et al., 2011). The high technological growth more the current decades and the increasing influence of Moore's law are expected to have a significant influence on information communication and technology on economic growth not just noticeable, although clear. On the other hand, the nonappearance of an obvious and big effect is precisely what a few economists have long challenged, possibly most excellently demonstrated by Brynjolfsson's (1993) writings about 'Productivity Paradox'. He comments that in spite of the exponential growth in computing power, growth leftovers relatively slow.

Considering the significance of education, Marquez-Ramos and Mourelle (2019) focused on the association between education and economic growth in Spain. The study concluded the positive effect of education on economic growth. Majeed and Ayub (2018) analyzed the impact of ICT on growth by using data from 1980 to 2015. The authors have used ordinary least squares, 2SLS, and GMM to check the relationship between dependent and independent variables. Findings highlighted that information, communication, and technology accelerated growth at the regional and global. The study suggested more investment in information, communication, and technology. Again focusing on the role of education in increasing growth, Hanushek and Kimko (2000) found that foreigners' spending on education and human capital resulted in enhancing the economic growth of the nation. Azam et al. (2016) have checked the effect of CO₂ and energy consumption with other variables on growth in underdeveloped and capitalist nations. Results showed that CO₂ emissions and energy affected growth negatively. Though trade and human capital led to improved growth. Tartiyus et al. (2015) emphasized how the growing population affected economic growth in Nigeria by using data from 1980 to 2010. The result showed that population caused more economic growth. Moreover, fertility and export also boosted economic growth. Khan et al. (2019) emphasized how digitalization may lead to high economic growth by using data from 1990 to 2014. It was found that ICT has boosted economic growth. By using data from 1950 to 2020, Hasnawati et al. (2024) showed how life expectancy affected growth. The study concluded that growth was increased because of life expectancy. Abu Alfoul et al. (2024) used data from 2000 to 2020 to find a relationship between ICT and growth. Findings indicated that growth was boosted by information and communication.

Empirical research work has been focused on the factors affecting growth in developing and developed economies. However, we have checked the effect of digitalization and education, with other factors, on developing countries. Our empirical work reveals how digitalization with education affects the economic growth of developing countries. We have also checked the role of financial development and urban population on the economic growth of developing countries.

Significance of the Study

The substantial factors seemed to be influencing the economic growth of developing and developed countries. Though we have found that how does digitalization, education, financial development, and urbanized population have an effect on developing countries' growth.

Research Hypothesis

The major hypotheses are being presented as:

H₁: There is a positive relationship between information, communication, and technology and economic growth in developing countries.

H 2: The Higher the secondary school enrollment, the higher the growth.

H 3: The financial development is positively associated with growth.

H 4: A Higher urban population leads to much growth in developing countries.

Methodology

We have focused on the role of information, communication, and technology in education on the economic growth of developing countries. Considering this objective, we have taken data for the analysis from 2002 to 2020 on the major variables. This research is an endeavour highlighting the role of ICT, education, financial development and urban population in fostering developing economies. The existing work has chosen data for 12 countries as Bangladesh, India, Indonesia, Iran, Jordan, Malaysia, Pakistan, and the Philippines. The data of 12 developing countries were taken from World Development Indicators. Here, we have taken per capita growth and ICT, education, financial development and urban population as dependent and explanatory factors.

The econometric model, which is used, is signified as:

$$LGDP = \beta_0 + \beta_1 ICTIND_{it} + \beta_2 FINDVP + \beta_3 SSENRL_{it} + \beta_4 URBANP_{it} + u_{it} \quad (1)$$

LGDP = Log GDP per capita

ICTIND = Index of (per 100 people plus Mobile cellular subscriptions (per 100 people)

FINDVP = Domestic credit to private sector (% of GDP)

SSENRL = Secondary school enrollment

URBANP = Urban population as % of GDP

SSENRL = Secondary school enrolment ratio

it = (time trend)

u_{it} = (error term)

Results and Discussion

Table 1 shows that on average, LGDP is 0.3706 percent. Though, range of ICTIND starts from -1.6130 TO 2.2435 percent. Data also reveals that foreign direct investment is 56.9007 percent in developing economies. It has also been observed that secondary school enrollment is 71.14121 percent. Finally, the urban population is 45.03467 percent in these economies. The sample ranges from 14.24 to 91.203 percent.

Table 1. Descriptive statistics.

Factors	Observations	Mean	Standard deviation	Minimum	Maximum
LGDP	216	0.3706	0.3582	2.6652	4.0964
ICTIND	216	4.73e-09	1.0000	-1.6130	2.2435
FINDVP	216	56.9007	35.7889	15.9055	164.6643
SSENRL	216	71.14121	18.7254	22.5115	100.3352
URBANP	216	45.03467	20.9662	14.24	91.203

Table 2 reveals the results of the random effect method. Since Chi2 value is 4.92 and the probability value is 0.2551, which suggests the use of the random effect method.

Table 2. Random effect outcomes.

Variables	Coefficients, Standard Errors and Z-values
ICTIND	0.0387* 0.0051 (7.58)
FINDVP	0.0008* 0.0002 (4.14)
SSENRL	0.0042* 0.0004 (10.33)
UARBANP	0.0077* 0.0012 (6.22)
C	2.6764 0.0768 (34.84)
Wald Chi2	1032.00
Probability	0.0000
R2 Within	0.83
R2 Between	0.78
R2 Overall	0.77

z-values are in parentheses; ** p<0.05, * p<0.1 and *** p< 0.01.

Information and communication technology plays a contributing role in boosting economic growth. People with their education use this modern technology and enhance economic growth. The results show that a unit increase ICT index results in enhanced economic growth by 0.0387 percent. The result is inconsistent with Khan et al. (2019). The urban population also seems helpful in increasing the economic growth of developing economies. A lot of the working workforce seemed to be involved in the industrial sector in urban areas. They are experiencing growth with their efficiency and potential, and skills. It is found that a one percent increase in urbanization will lead to much growth by 0.0077 percent. The result is supported by Tartiyus et al. (2015). Financial development is very important for economic growth and development. Much domestic credit to the private sector enhances the chances for more investment and businesses. So, this will result in more economic growth. Results show that a one percent increase in domestic credit to the private sector resulted in a boost in growth by 0.0008 percent in developing nations. Finally, education contributed much to boosting up growth of nations. Secondary school enrolment will lead to more involvement of educated and efficient people in the economy. All this results in high economic growth. It is found that a unit increase in education will result in enhanced growth by 0.0042 percent. The finding is favoured by Hanushek and Kimko (2000).

Conclusions

Research makes an effort to point out the major factors affecting economic growth in developing countries. We have checked the role of digitalization in education in enhancing economic growth among the concerned countries. By collecting data from 2002 to 2019, we have confirmed how digitalization has boosted economic growth. The authors have used the random effect technique. The dependent variable is economic growth. Independent variables are information, communication and technology, education, financial development

and urban population. The study findings confirmed that information, communication, and technology, along with education, have increased the level of economic growth in developing economies. Moreover, financial development also helped enhance growth to be enhanced among these economies. Finally, the study concludes that much knowledge of modern technology and education is an important tool for increasing economic growth. Considering study results, it is suggested that there should be improved monetary rights to use to augment far-above-ground investments and economic growth in developing countries. The government must provide more utilization of modern technology with more free of cost technical education to the people of the economy. Additionally, there should be more job opportunities for the population to utilise their potential.

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