The Impact of Digitalization on the Economic Growth of Bangladesh

Masud Rana¹*, Rebeka Sultana Rekha² and Hasibul Islam³

ABSTRACT

Purpose: The study showed the impact of digitalization on the economic growth of Bangladesh.

Methodology: The researcher used secondary data to analyze the relationship between variables. Linear regression analysis was used to estimate the effect of explanatory variables and explained variable. For performing statistical analysis, STATA programming environment was used to this study. Telecommunication infrastructure index and online service index were used as explanatory variables. GDP growth rate used as explained variable.

Findings: The regression result showed the significant and positive impact of telecommunication infrastructure index and online service index on GDP growth rate. The variable explained was 86.6%, which was higher and indicate that these variable effect mostly on the GDP growth rate. Due to data insufficiency, the researcher cannot compare network readiness index and GDP growth rate. However, the study has found that there is significant level growth of the network readiness index and GDP growth rate. Further, the study should be conducted with more data and other variables.

Practical Implications: A developing country like Bangladesh, an appropriate infrastructure policy will helpful for all stage of development, that will drive the process of economic development. Policymakers should give sufficient support to establish the digital infrastructure.

Originality: The study found that in Bangladesh digitalization indicators have been more effective effect on economic growth.

Research Limitations: The limitation of the research is the generalization of the findings. Further researchers should conduct studies to find other variables that increase the impact digitalization.

1. Introduction

The term “digitization” has become ubiquitous across all areas of the manufacturing industry. The Gartner (2018) CIO Agenda Industry Insights Study states that digital business, often

¹Corresponding Author
¹ Assistant Professor, Department of Business Administration, Pabna University of Science and Technology, Pabna, Bangladesh. masud7648@gmail.com.
² Assistant Professor, Department of Business Administration, Pabna University of Science and Technology, Pabna, Bangladesh. rsrfb7638@gmail.com
³Lecturer, Department of Business Administration, NPI University of Bangladesh, Manikganj, Bangladesh. hasibulisamshanto143@gmail.com

Copyright © 2022 Faculty of Business Studies, Pabna University of Science and Technology, Pabna, Bangladesh.
known as digital transformation, is recognized as one of the top three business goals. While traditional methods of conducting business are losing ground, an increasing number of goods and services are being made available to consumers through various digital channels for the purpose of making their lives easier. Manufacturing, inventory management, and sales management can all be managed more effectively due to automation. The collection, storage, and processing of data helps firms provide analytical insights for decision making, which in turn helps companies steer themselves in the right path for the company’s growth and profitability. Any organization, regardless of size or industry, has a plethora of compelling reasons to give serious consideration to digitalization on every conceivable level. In addition, a number of players of digital technology have developed in the digital business in order to address the digitalization needs of end-users as well as the requirements of industries.

Studying the effects of digitalization on growth in the economy, employment, productivity, living standards, and economic inequality is important from both a scientific and policy standpoint. It is vital to learn how the first digitalization impacted these specific features. Because of the many technological developments that occur simultaneously digitalization, as well as alterations in institutions, economic system, international economic links, industrial structure, etc., it is difficult to disentangle the consequences of digitalization from those of other factors. It is critical to stress that the effect of digitalization is expected to be larger than the contribution of other reasons. Determining whether or not digitalization will speed up economic development and productivity or whether or not it could lead to a rise in economic inequality is just as important as discovering how digitalization will affect the economy and communities in the future. Other important problems include how the digital environment, and the environment of technological progress more broadly, should shape economic and social policies to accomplish particular societal objectives like employment, social (in)equality, and economic development. The study’s goal is to evaluate the impact of digitalization on Bangladesh’s economic development by looking at indicators including network readiness, telecommunications infrastructure, and online services.

1.1 Objectives of the Study: The study’s main goal is to evaluate the impact of digitalization on economic development in Bangladesh. The specific objectives are as follows:

- To determine the impact of telecommunication infrastructure index on GDP growth of Bangladesh.
- To examine the relation between online service index and GDP growth of Bangladesh.
- To analyze the recent trend of network readiness index and GDP per capita of Bangladesh.

2. Literature Review

According to Kutsuri et al. (2019), with having a particular concept and value for digital economy to be understood clearly is a need for today’s world though the study mainly
focused on Russia’s digitalization on economy. Considering traditional economy, today’s economy which is more focused on digital economy in real world is thousands times better as there are changes in each and every aspects of lives in terms of doing shopping, getting restaurant foods or other products at home sitting at the corner of the city, getting medical services sitting at home, doing office works sitting at home etc. The one of the main blessing of digitalization or technologies’ uses is promotion. Because of digital economy, it is easier to promote products or businesses through using technologies which helps to promote locally and also worldwide according to the requirements. Without promotion, no business can experience maximum or even minimum profit levels and digital economy makes people able to promote products or businesses through using technologies. So, it is to be said that digital economy is a blessing in today’s world. The study mainly focused on how Russian federation got advantages through using technologies, which would clear the positive impact of digital economy. Zhang et al. (2021) found that the economic development of China is being increased to upcoming days as there is obvious development of digital infrastructure but if looking at digital industry that is not up to mark even relatively slow which got from the analysis of 30 selected cities of China in this study. The study also found that all these three dimensions digital infrastructure, digital industry and digital integration impact on productivity level positively if considering total factor on regional basis. The author proved that in eastern region there are higher possibilities than non-eastern region in terms of economic development considering digital economy. And higher possibilities in economic development indicate that there must be higher marginal contribution to improvement if considering total factor of productivity. The author claimed that this study would be a theoretical basis and also used by governments for making the policies of digital economy as support practically.

Both general people and business sectors are being supported by technologies as considering opportunities in the past are a little bit hard to find compared to today’s opportunities in terms of general people’s lifestyles, business sectors etc. It is seen that today’s business sectors which need supports from technologies keep growing day by day because of digitalization on economy. Adoptions of technologies which is emergency to ensure prosperity of the economy for locally or globally are being difficult day by day that is why all including leaders, employees etc. are facing challenges to cope up with new and upcoming technologies and most of the countries are trying to adopt ambitious strategies for emergence technologies. All the industries which are considered as minimum ranges developed need technologies to run their businesses locally and globally as per their requirements. Automation has been ensured because of technologies and this automation helps businesses to be efficient in terms of capitals, labors and time management. The study also agreed to decision making has been easier as businessmen can get insights of real time orders, customers feedback etc. through using technologies (Mentsie et al., 2020). Mammadli and Klivak (2020) found in their study that there is a direct connection between digitalization and economic growth. For getting a clear measurement about both economic and social
impact of digitalization, the author made a digitalization index and also created a synthetic index to be tested. The author applied panel data model or panel regression analysis through using GDP in previous prices as dependent variable. And, lagged value, synthetic index, LPR etc. were independent variables for the study. Finally, the measurement came to conclusion about digitalization and that is, technology plays a significant role for transforming the economy where innovation exists as well. Another study found that the author tried to identify the position of Romania in European context in terms of ICT development for which business sectors can be boomed in today’s world which indicate basically the impact of digital economy. IDI indices (ICT development index) and DESI indices (Digital Economy and Society Index) are the main indicators to find the results of the study. The authors concluded that Romania had slower stand in digital economy as they did not have sufficient investments in ICT industry though Romania had increased amount of IDI indices and DESI indices. Alternately, Europe had sufficient investments in ICT industry but still facing declining which was a little bit. The study also investigated that governments are not still flexible to encourage investments in ICT industry through minimizing tariffs in digital areas (Neamtu et al., 2019). If digitalization of the economy is linked with entrepreneurship intention or not. To complete the study, Kosovo which is regarded as small transition country as world perspective has been selected to be tested. From many universities of Kosovo, the authors have taken only two universities of Kosovo for selecting their samples and that is 310 students of that two universities. The study found that because of personal attitudes, intention of entrepreneurship could be changed whereas behavioral content is responsible for making a shape to become an entrepreneur in the economy with having support of higher education on digital basis. EIQ (Entrepreneurial Intention Questionnaire) scale has been used to prove the hypothesis of the study where the dependent variable is entrepreneurship intention and independent variables are personal attitudes as well as behavioral content of the selected samples. They concluded the study to agree that there is a positive relationship between digitalization of the economy and entrepreneurship intention (Youssef et al., 2021).

Parfenov et al. (2021) studied that the main focus was about how distribution of logistics management is transformed in the digital economy. The authors conducted the study at the crisis of Covid-19 for the purpose of identifying the transformation of logistics management in new business environment when there was a nightmare situation for all. The study found that there was a mixed practice of logistics management and customer services which was totally modified because of the Covid-19 situation; the businessmen had to shift to online services from offline business and also sometimes this was both online and offline business in terms of products and services so that new environment could be coped with. Not only online selling, digital selling was the main focus at that time and this could be concluded that there is a transformation of logistics management in digital economy. According to Khandii (2019), there is always a threat with an opportunity in the field of digital economy. The author wanted to identify some major social threats of digital economy through completing this study. Ukraine has been used to run the study as sample. Because of this
digital economy, people are more dependent on internet which indicates that the ability of thinking critically is being lessened day by day. Cyber-threats are being increased for which the personal and business related privacies are being hampered nationwide as well as worldwide. The study has been completed through qualitative analysis as the main focus of the study was identifying the major social threats which are basically the explanation or interpretation basis study instead of proving hypothesis based on quantitative data.

Another study made by Mishakov (2021), that there is a different scenario between developed countries and developing countries in terms of maintaining economic sustainability when considering digitalization of economy. Regression analysis method has been used to prove the hypothesis of the study which basically concluded to digitalization of economy has a positive impact on maintaining economic sustainability in the selected 10 developing countries whereas digitalization of economy is a little bit controversial issue in the selected 10 developed countries if looking at maintaining economic sustainability. The variables (digital infrastructure, digital knowledge and society) showed that developing countries need the improvement of the variables to ensure economic development but it is not the same in developed countries because global competitiveness can be hampered because of this digitalization with having some blessings such as increasing per capita GDP, augmenting economic growth quicker etc. Barlybaev et al. (2021) studied that there are both positive and negative impacts of digitalization on population’s life quality. The samples are from Russian Federation. There were a mixed of methodologies to support the hypothesis and identify the right interpretation and they are some general scientific methods which are analysis, synthesis and comparison of data; some specific methods which mainly showed generalization, interpretation, assessment in terms of socio-economic indicators and also life quality development. To reach a specific decision, GDP and disposable cash income were selected as dependent variables whereas the uses of digital technologies were regarded as independent variables. The results showed that there is a direct relationship between digitalization on the economy and life quality of population in Russia Federation.

**Hypotheses:** The following hypotheses are developed for the study.

**Telecommunication Infrastructure Index and GDP Growth**

Null hypothesis (H₀): There is no significant association between the telecommunication infrastructure index (TII) and the GDP growth rate (GDPG).

Alternative hypothesis (H₁): There is a significant association between the telecommunication infrastructure index (TII) and the GDP growth rate (GDPG).

**Online Service Index and GDP Growth**

Null hypothesis (H₀): There is no significant association between the online service index (OSI) and the GDP growth rate (GDPG).

Alternative hypothesis (H₁): There is a significant association between the online service index (OSI) and the GDP growth rate (GDPG).
Conceptual Model:

![Conceptual Model Diagram]

3. Methodology: Secondary data was the vital source to conduct this study. The researcher used network readiness index, telecommunication infrastructure index, online service index and GDP growth. The researcher used telecommunication infrastructure index, online service index as independent variables and GDP growth rate as dependent variable. The research used STATA programming to analyze the data. Regression model was used to determine the association between variables. The researcher also showed the recent impact of NRI index on GDP growth rate.

Regression Models:

Multicollinearity was tested by calculating the variance inflated for (VIF). VIF was 1.583 for Online Service Index and 1.583 for Telecommunication Infrastructure Index. For extremely higher value of VIF of e-government index, the researcher excluded the variable. To test the impact of each independent variable on the dependent variable, the following model was proposed

\[ Y = \beta_0 + \beta_1 \text{TII} + \beta_2 \text{OSI} + \beta_3 \text{CRP} + \varepsilon \]

Where:

- \( Y \) = GDP Growth Rate (GDPG)
- \( \text{TII} \) = Telecommunication Infrastructure Index (TII)
- \( \text{OSI} \) = Online Service Index (OSI)
- \( \varepsilon \) = Error term
- \( \beta \) = Beta
4. Analysis and Findings of the Study:

Performance of Bangladesh against its income group and region, overall and by pillar

![Network Readiness Index 2021 Bangladesh](source)

Within the Asia and Pacific region, Bangladesh holds the 17th spot with the score of 40. In each of the four pillars, it lags behind the region it is a part of. In terms of the sub-pillars, it performs worse than the average for the region in each of them. Bangladesh is ranked fifteenth among lower-middle-income nations. In three of the four pillars (nri.score, technology, governance, and impact), its score is greater than the average for its income category. In seven of the twelve sub-pillars, including Access, Content, Governments, Trust, Inclusion, Economy, and Quality of Life, it exceeds lower-middle-income countries.

NRI score and GDP per capita:

![NRI score and GDP per capita of Bangladesh](source)
Bangladesh’s ranking in respect including both NRI score as well as GDP per capita is shown in the graph above (PPP). The trend line shows the predicted NRI score given the income level of an economy. This can be seen, Bangladesh is notably above the line graph, showing that it does have a greater degree of network availability than one would anticipate given its economic level.

**Descriptive Statistics:**

According to Table 1, the mean values for EGI, OSI, TII, and GDPG were respectively 0.377, 0.528, 0.147, and 0.769. The standard deviation demonstrates the value's variability. The standard deviation for the EGI was 0.104, whereas the OSI had a greater standard deviation of 0.174. The GPDG was variable 0.125, followed by another variability of 0.124 that belonged to TII. EGI had a minimum value of 0.276, OSI had a minimum value of 0.346, TII had a minimum value of 0.033, and GDPG had a minimum value of 0.544. Last but not least, the greatest EGI value was 0.519, the highest OSI value was 0.785, the maximum TII value was 0.372, and the maximum GDPG value was 0.898.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGI</td>
<td>6</td>
<td>.377</td>
<td>.104</td>
<td>.276</td>
<td>.519</td>
</tr>
<tr>
<td>OSI</td>
<td>6</td>
<td>.528</td>
<td>.174</td>
<td>.346</td>
<td>.785</td>
</tr>
<tr>
<td>TII</td>
<td>6</td>
<td>.147</td>
<td>.124</td>
<td>.033</td>
<td>.372</td>
</tr>
<tr>
<td>GDPG</td>
<td>6</td>
<td>.769</td>
<td>.125</td>
<td>.544</td>
<td>.898</td>
</tr>
</tbody>
</table>

**Sources:** Output Derived from Applying Stata (Version-15)

**Regression Analysis:**

Table 2 indicates that model was significant with a value of 0.049 (less than 0.05) The F value was 9.712, and the $R^2$ value was 0.866, indicating that the regression model was fit for this study. There was a significant association between the dependent variable (GDP growth rate) and the independent variables (Online Service Index, Telecommunication Infrastructure Index). There was significant association between the Telecommunication Infrastructure Index and the GDP growth rate with the value of 0.023 which was lower than 0.05. The standard error was 0.269. The coefficient value was -1.152 which showed that an increase of one unit of the Telecommunication Infrastructure Index decreased the GDP growth rate by -1.152 of. There was a significant association between the online service index and GDP growth with the value of 0.042, which was also, lowers than 0.05. The standard error was 0.191. The coefficient value was 0.649 which showed that an increase of one unit of Telecommunication Infrastructure Index increased the growth rate of GDP by 0.649.
Table 2: Regression Analysis

<table>
<thead>
<tr>
<th></th>
<th>Coef.</th>
<th>St.Err.</th>
<th>t-value</th>
<th>p-value</th>
<th>[95% Conf Interval]</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>TII</td>
<td>-1.152</td>
<td>.269</td>
<td>-4.29</td>
<td>.023</td>
<td>-2.007 -.298</td>
<td>**</td>
</tr>
<tr>
<td>OSI</td>
<td>.649</td>
<td>.191</td>
<td>3.40</td>
<td>.042</td>
<td>.042 1.256</td>
<td>**</td>
</tr>
<tr>
<td>Constant</td>
<td>.596</td>
<td>.086</td>
<td>6.91</td>
<td>.006</td>
<td>.321 .87</td>
<td>***</td>
</tr>
</tbody>
</table>

Mean dependent var: 0.769, SD dependent var: 0.125
R-squared: 0.866, Number of obs: 6
F-test: 9.712, Prob > F: 0.049

*** p<.01, ** p<.05, * p<.1

Sources: Output Derived from Applying Stata (Version-15)

Correlation Analysis:

In this research, Pearson product-moment correlation was used to examine the connection between the variables shown in table 3. The OSI and GDPG have a positive and slight association, according to the r-value of 0.212. With a score of -0.591, the correlation between TII and GDPG was moderately negative. The relationship between EGI and GDPG had an r-value of -0.299, indicating that it was weak and adverse. The link between OSI and TII was moderately positive and associated with a value of 0.607, while the correlation between OSI and EGI was strongly positive and associated with a value of 0.862. Last but not least, the r value of the TII and EGI was 0.897, indicating a positive and significant connection between the variables.

Table 3: Matrix of correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>GDPG</th>
<th>OSI</th>
<th>TII</th>
<th>EGI</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDPG</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSI</td>
<td>0.212</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TII</td>
<td>-0.591</td>
<td>0.607</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>EGI</td>
<td>-0.299</td>
<td>0.862</td>
<td>0.897</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Sources: Output Derived from Applying Stata (Version-15)

5. Conclusions

The study’s objective is to ascertain how Bangladesh’s economy would be impacted by digitization. The researcher used network readiness index, telecommunication infrastructure index, online service index as digitalization and the GDP growth rate used as economic growth. Based on the literature the researcher create hypotheses. The regression model was
used to test the hypothesis. The p value of telecommunication infrastructure index was lower than 0.05 (p= 0.012 < 0.23), so there was a significant impact of telecommunication infrastructure index on GDP growth. The null hypothesis (H₀) has been rejected, which stated that there has no significant association between telecommunication infrastructure index and GDP growth. On the other hand, the alternative hypothesis (H₁) has accepted which stated that there has been significant association between telecommunication infrastructure index and GDP growth. So, in the first hypothesis H₁ is accepted.

The p value of online service index was lower than 0.05 (p= 0.012 < 0.42), so there was a significant impact of online service index on GDP growth rate. The null hypothesis (H₀) has been rejected, which stated that there has no significant association between the online service index and GDP growth. On the other hand, the alternative hypothesis (H₁) has accepted which stated that there has been significant association between online service index and GDP growth. So, in the first hypothesis H₁ is accepted.

<table>
<thead>
<tr>
<th>Hypotheses Testing</th>
<th>Accept</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Telecommunication Infrastructure Index And GDP Growth Rate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H₀</td>
<td>The Telecommunication Infrastructure Index (TII) has no significant association with GDP growth rate (GDPG).</td>
<td>×</td>
</tr>
<tr>
<td>H₁</td>
<td>The Telecommunication Infrastructure Index (TII) has a significant association with GDP growth rate (GDPG).</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Online Service Index And GDP Growth Rate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H₀</td>
<td>The Online Service Index (OSI) has no significant association with GDP growth rate (GDPG).</td>
<td>×</td>
</tr>
<tr>
<td>H₁</td>
<td>The Online Service Index (OSI) has a significant association with GDP growth rate (GDPG).</td>
<td>✓</td>
</tr>
</tbody>
</table>

In addition to this theory, there is evidence that the GDP is affected by the network readiness index. Figure 2 makes it quite evident that NRI had a large impact on GDP. As can be seen, Bangladesh is notably above the trend line, showing that it has a greater degree of network readiness than one would anticipate given its economic level. As a result, the study discovered that digitization had a favorable effect on Bangladesh's economic development. Since Adam Smith articulated the idea that a nation has an absolute advantage in producing an item or service, policymakers have fought to build and maintain absolute advantage in significant sectors of their economy (Darwiche, 2011). A core competency that underpins all other national economic undertakings, digitization is gaining popularity as a new tool for creating and sustaining absolute advantages, and in certain cases even claiming the “right to win” and surpass the competition in particular sectors. Besides this there are some limitations of the study. The first limitation of the study is the generalization of the findings. This study analyzed factors to find to what extent they were related to the impact of Digitalization. The regression result found a positive and significant impact on dependent and independent
variables. Collecting more data from more different variables may increase the variance explained and could provide a better understanding of the factors related to the impact of Digitalization. Further research with more variables and sophisticated tests could produce better results for this study.

References


