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RESEARCH PAPER

Exploring the Role of E-Governance in the Economic Performance of Pakistan under Covid-19

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ABSTRACT

This study aims to investigate the role of e-governance during the catastrophe COVID-19 in the context of economic performance. The study is based on descriptive trend analysis and data is collected from the reports, statistics and ranking developed by United Nations and big data implications during Covid-19. It focuses on the comparisons and effects of e-governance on pandemic control and on economic performance. The study highlights the role of e-governance during the catastrophe and draw attention to the existing situations. It is found that the country's ranking of e-government development indicators (EGDI) has declined gradually from score of 137 to 148 score. While, e-governance implications including the internet performance, 4G and big data technology played well to control the pandemic. The study concludes that e-governance plays positive role in combating pandemics as well as it is an important factor to achieve sustained economic growth. It is suggested that, Pakistan should learn from the experience of developed countries who has adopted victorious e-governance tools of technological progression. These efforts can help to fight catastrophe and also guarantee country's sustainable economic performance.

KEYWORDS Covid-19 Pandemic, Economic Performance, E-Governance

Introduction

The outbreak of coronavirus disease-2019 (COVID-19) has infected more than 18 million people and around 1.7 million people have been died around the globe during the period of only one year (WHO 2021). In Pakistan nearly 0.18 million people are infected and nearly 17 thousand eight hundred people died (Iqbal et al., 2021; Sohil et al. 2021). The pandemic jolted the world's health care system and economic performance (Carlsson-Szlezak et al., 2020). This has necessitated the need of such system at every level of governance which helps to reshape the behaviors and create civic sense among citizens (Ullah et al., 2022). E-governance is considered as suitable and more appropriate tool for the timely, effective, and efficient administration of such social and economic services (Castro & Lopes, 2022; Majeed, 2020). E-Government projects are growing rapidly in the modern world. But in the developing countries, key challenge for the growth and development of e-government is the lack of infrastructure and functional literacy (Castro & Lopes, 2022; Majeed, 2020; Farouq et al., 2020). Despite recent developments in mobile phone technology, most countries in developing world are lagged behind in the digital divide (Majeed, 2020; Farouq et al., 2020; Yaseen, et. al. 2020). Currently, the common challenge of both developing and developed world is to fix the COVID-19 catastrophe. Among many other tools, it is found that e-governance play well to combat not only the disease but also help to sustain the economic progress. E-Governance or Electronic governance can be defined as, "the usage of Information and Communication Technology (ICT) by the government to provide and facilitate government services, exchange of information, communication transactions and integration of various stand-alone systems and services" (Makki & Alqahtani, 2022). Coleman (2008), explained that e-governance comprises distribution and processing of data on the basis of three main aspects of governing authorities mainly the

regulation of the citizen's behavior, the delivery of services, and finally the circulation of relevant information amongst the citizens. Through resourceful e-governance mechanism, the government enhances the quality of services and information delivered to the people by using different means of ICT in an economical, simple and productive approach (Castro & Lopes, 2022). It is a tool to modernize the government functioning in the 21st century. Information technology enhances the capacity of the government functioning and run the government on fast track. The amalgamation of information technology and governance means the right information with the right time and to disseminate to everyone (Castro & Lopes, 2022; Majeed, 2020).

Furthermore, it brings the government closer to the citizens, getting feedback from citizens. E-governance is introduced in 2001 in Pakistan. A directorate (Electronic Government Directorate) was established under the ministry of science and technology to implement e-governance. With the passage of time new technology has introduced such as next generation mobile services (NGMS) and 4G long term services (LTS) which has transformed the digital sector of the country. During COVID-19 pandemic, e-health card and e-vaccination projects are started in most part of the country. Government developed an application known as Geo-Tracking Application to aid the telecommunication organizations. This application identifies infected person, send information to the nearby authorities for safety and awareness purposes. Furthermore, the government has launched helpline on whatsapp for the COVID-19 epidemic (Haque and Nayyab, 2020). Basu (2004) suggested that the key role of e-government is to offer better services to the citizens by resourceful use of management to avoid red tapes.

It also ensures to the citizen that they have ease of doing business and have key role in decision making process. The aim of the e-governance is to promote complete information, ease of doing activities, transparency, reduce corruption and promote accountability (World Bank, 2011). There is ample of literature on ICT in governance and these studies have highlighted that how e-governance is changing the life and bringing improvement in socio-economic development in society. Many studies have been done in context of e-governance for developing countries such as Arjan de Jager (2008); Backus,(2001); Basu,(2004); Onyancha (2010) and Onuigbo and Eme (2015) just to mention a few. These studies have covered all the dimension of e-governance like Palvia and Sharma (2007) address the conceptual issues related to e-governance while Onuigbo and Eme (2015) and de-Miguel-Molina, M. (2009) have highlighted and investigated the challenges of e-governance. Coleman, S. (2008) argued that, epidemics extend capital and liquidity issues in the economy and does so at exceptional rate. As Fan et al. (2018) concluded that, major pandemics of the world will attack again and again and some argued that the world adequately prepared and, since the Ebola outbreak, there is a need for greater preparation and investment, against epidemics and pandemics. Ata-Agboni JU, Olufemi IO (2001) argued that if the governments would really want to make considerable developments to control the spread of COVID-19, they must have to establish a digitalized system in line with its public by following the standard global practices. It is fact that due to this catastrophe, economic dynamics are totally changed and economic conditions can be most severe in coming years. Consequently, there is foreseeable trade-off between the severity of the economic slump and the health challenges of COVID-19 (Gourinchas 2020). In this entire scenario, technology played well to fix the issue. For example, advanced tools of technology in China are deployed which has made an excellent contribution to the development of sustainable e-governance that further support the government in handling this critical situation much successfully compared to other countries (Ullah et al., 2021). Despite the crucial role of the e-governance in pandemic control and economic performance, there is no study that explore the role e-governance in pandemic control and economic performance in Pakistan. Hence, this study is designed to explore the role of e-governance in pandemic control and economic performance of Pakistan.

Material and Methods

Keeping in view the uncertain nature of pandemic, data limitations and small sample size, carrying out a descriptive and exploratory analysis is a feasible way to comprehend this research exercise. The study makes use of line charts and correlations by using basic statistical tools for the purpose of descriptive analysis. The key objective of the study is to investigate a nexus among three key factors, explicitly COVID-19, economic performance and e-governance in Pakistan. For the analysis, data is collected from different relevant sources. To construct the patterns and trends of the COVID-19 pandemic, data is collected from the country's official data sources from March 2020 when the first case of corona virus was reported in the country up to July 2021and from the WHO which is also publically available. This data comprised of the COVID-19 indicators such as total death, total recoveries and number of total cases reported. To analyze the economic and e-governance performance indicators, data is collected from 2003 to 2021. One measure of the quality of e-governance is the availability and performance of internet in the country and the data of this indicator is taken from the country's official data sources. The other standard e-governance indicators, includes; E-Government Development Index (EDGI), E-Participation Index (EPI), Human Capital Index (HCI), and Telecommunication Infrastructure Index (TII), are taken from a database of UN e-government indicators. The standard metrics of e-governance indicators are developed to evaluate the e-governance policies, information on national websites, and operation of certain sectors that deliver basic services.

Results and Discussion

Tables 1 show the monthly statistics of COVID-19 since the start of the pandemic till July, 2021 updated by WHO. **Table 2** presents some descriptive statistics on COVID-19 cases in the country to 22 may, 2021. **Figure 1** present the total cases of COVID-19 in the country. The first case was reported and confirmed on February 27, 2020, but during the month of April of the same year, there was a peak in the cases. **Figure 2** present the trends in total deaths of COVID-19 and **Figure 3** present the monthly recoveries.

Table 1
Covid-19 Monthly Statistics

Month	Total Confirmed Cases	Total Deceases Cases	Total Cases (per million)	Deceased Cases (per million)	Reproduction Rate	Positivity Rate	Stringency Index
Mar-20	2118	27	9.588	0.122	1.64	0.107	96.3
Apr-20	18114	417	82.004	1.888	1.41	0.124	89.81
May-20	72460	1543	328.033	6.985	1.37	0.219	82.41
Jun-20	213470	4395	966.398	19.897	0.87	0.157	60.19
Jul-20	278305	5951	1259.912	26.941	0.68	0.038	66.67
Aug-20	295849	6294	1339.336	28.494	0.89	0.016	47.69
Sep-20	312806	6484	1416.102	29.354	1.02	0.018	39.35
Oct-20	333970	6823	1511.913	30.888	1.26	0.031	53.24
Nov-20	400482	8091	1813.019	36.629	1.11	0.071	64.35
Dec-20	482178	10176	2182.864	46.068	0.96	0.056	64.35
Jan-21	546428	11683	2473.73	52.89	0.87	0.043	57.87
Feb-21	581365	12896	2631.893	58.381	1.09	0.034	50.46
Mar-21	672931	14530	3046.421	65.779	1.18	0.106	56.02
Apr-21	825519	17957	3737.201	81.293	0.92	0.099	78.24
May-21	922824	20850	4177.71	94.390	0.79	0.044	63.43
Jun-21	958408	22321	4338.802	101.049	1.06	0.021	56.48
Jul-21	1034837	23422	4684.803	106.034	1.29	0.083	56.48

Source: WHO data base

Table 2
Descriptive Statistics of Covid-19 situation in Pakistan (March 2020 to July 2021)

No. of Patients	Confirmed	Deaths	Recoveries
Region	Pakistan	Pakistan	Pakistan

Patients total sum	7952064	173860	883291
Mean	60239.930	1353.867	58886.077
Standard Deviation	44920.760	1039.229	43923.998
Skewness	.659	.457	.457
Kurtosis	2.642	2.186	2.649
Minimum	1938	26	1912
Maximum	152866	3377	149489
No. of Observations	15	15	15
Unit	Person	Person	Person
First Obs. Date	3/31/2020	3/31/2020	3/31/2020
Last Obs. Date	7/31/2021	7/31/2021	7/31/2021

This section of the study highlights the trends of the CIVID-19 positive cases, reproduction rate, total cases per million and total deaths per million in Pakistan based on the monthly data presented in **Table 1**. **Figure 1** to **4** are self-explanatory express dissimilar situations in different months.

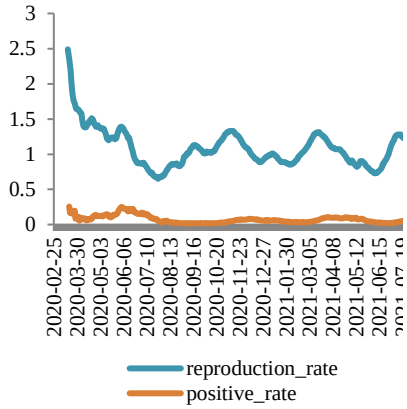


Figure 1: General Trend in COVID-19 Spread

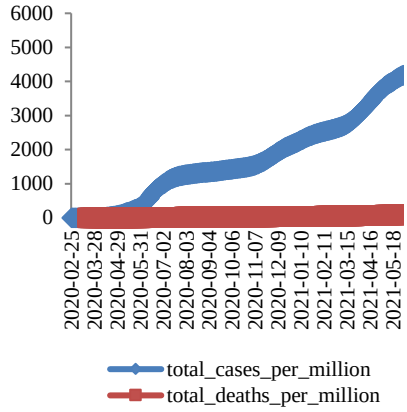


Figure 2: Country Spread COVID-19

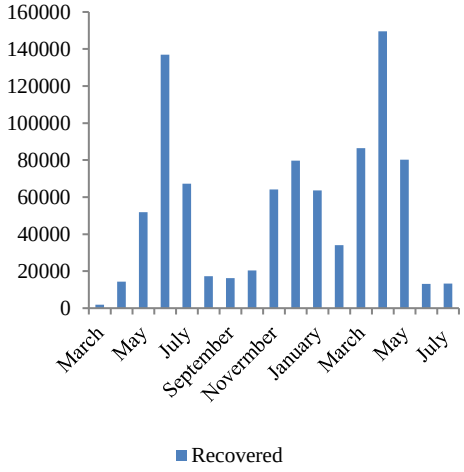


Figure 3: COVID-19 Recoveries per month

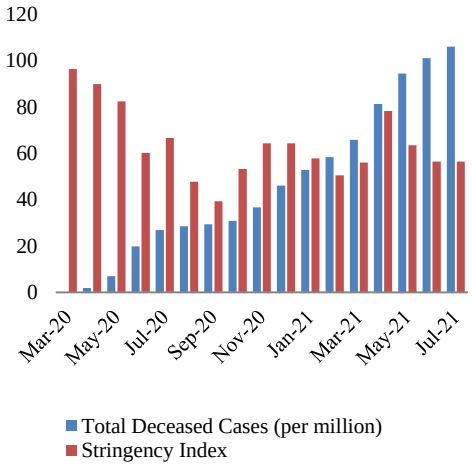
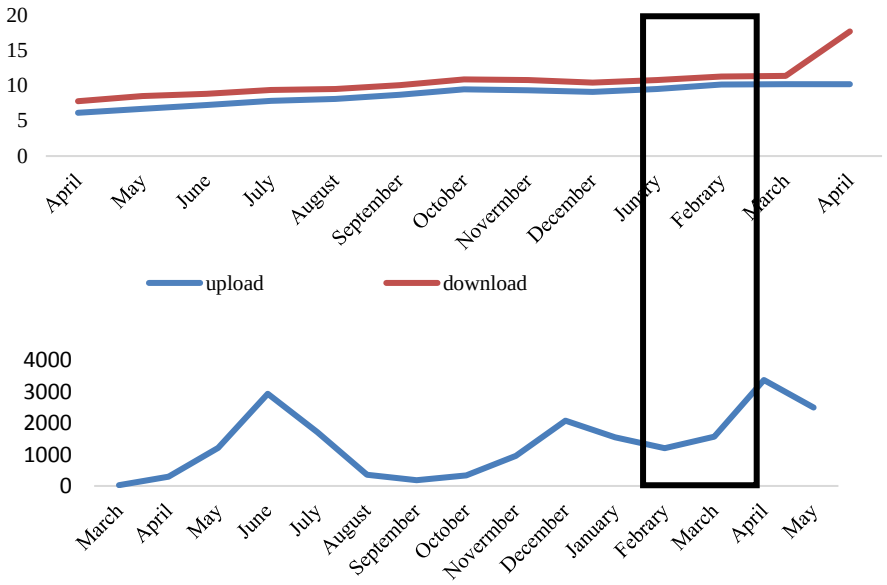


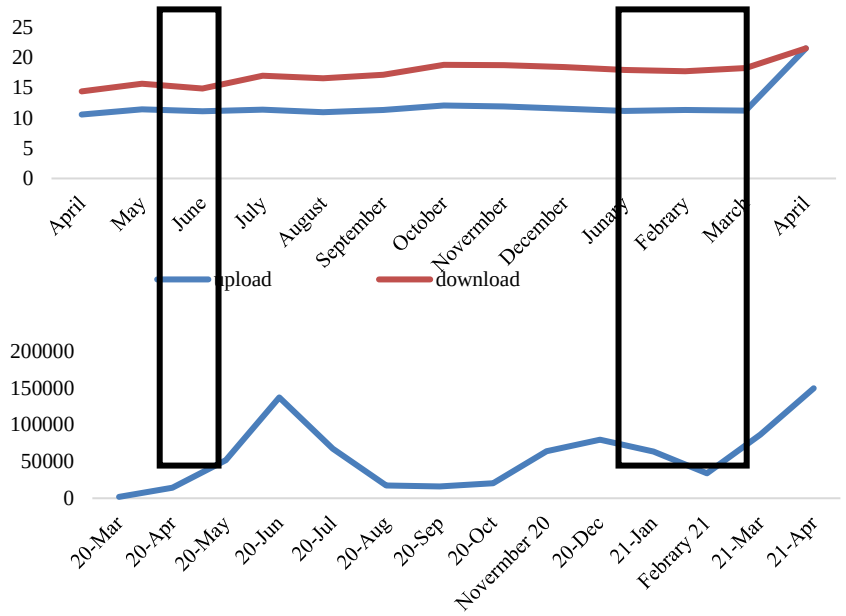
Figure 4: Relationship between Government regulations and COVID-19 spread

Relationship between e-governance and COVID-19 pandemic

Internet performance can be a proxy measure of e-governance which indicates that if internet performance is increasing, e-governance is increasing and ultimately, COVID-19 awareness is reaching to everyone (Ullah et. al., 2021). So, Internet performance indicators (Upload, download, mobile data and fixed broad band) is taken to express the association between e-governance and COVID-19 spread in **Figures 5**. The mean fixed broadband download and upload (**Panel a**) is increasing from April onwards, remained flatter during October till the start of January and then sharply increased from March 2021 onwards which is the third wave of COVID-19.



Panel (a) Relationship between Fixed Broadband and Deaths Per Month



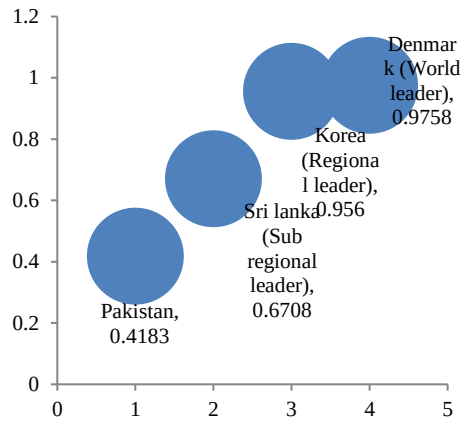
Panel (b) Relationship between Mobile data (Mbps) and Recoveries Per Month

Figure 5: Deaths and Recoveries during COVID-19 period in relations with internet performance (e-governance)

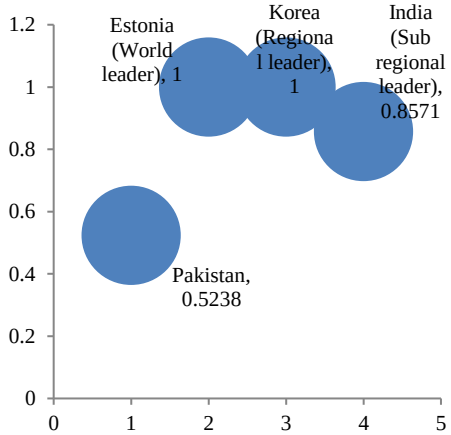
Similarly, Panel b shows the mean mobile broadband speed which shows almost the same trend as shown by the fixed broad band. It can be seen from the figure 5 (panel a) that, the trend in the Internet Performance after the month of March 2021 is followed by deceased cases per month by the same fashion. Panel b shows that as the mobile internet usage increase, patient's recovery improves by the same trend.

E-Governance ranking and performance of Pakistan in globe

The e-governance ranking survey is conducted by United Nations during critical time of pandemic. Pakistan e-governance index is 0.418 which is not very pleasing. The regional leader stands at 0.956 which is almost double than Pakistan. Similarly, Pakistan is far below from the sub regional level which is Sri-Lanka ranked as 0.670. The country is also lagged behind in the other indicators of EGDI; Online Service Delivery Index (OSDI), Telecommunication Infrastructure Index (TII), and Human Capital Index (HCI). The E-Participation index of Pakistan is 0.520 while the regional leader Estonia is standing at 1.000. The sub regional leader India ranked at 0.857 which is far above than Pakistan. The score of Online Service Delivery Index (OSDI) of Pakistan is 0.629 which is below from sub regional leader India (0.852) and regional leader Korea (1.000). The Telecommunication Infrastructure Index (TII) is very low in Pakistan which is 0.243 while the regional leader Korea stands at 0.968 and sub-regional leader Iran is ranked as 0.621 respectively. The situation of Human Capital Index (HCI) is also not very much pleasing having score of only 0.381 which is far below from regional leader Korea (0.899) and sub-regional leader Iran (0.768). Based on the EGDI components ranking and index and E-governance participation Index (EPI), Pakistan needs to work a lot to improve its EGDI indicators and to adapt improved model of e-governance in terms of participation facilities and management. The novel reforms are required to improve online services, telecommunication infrastructure and human development, to improve economic situation of the country.



Panel a: Pakistan EGDI ranking in globe



Panel b: Pakistan E-Participation in globe

Figure 6: Pakistan e-governance situation in globe

COVID-19 and Economic performance of Pakistan

Figure 7 demonstrates the country's overall economic sustainability and performance before and during the COVID-19 period. It shows that, since 2003, almost all of the indicators show fluctuations with time. The graphical comparison between the different indicators such as real GDP, saving and investments, services sector performance and exports of ICT to indicator of EGDI, shows that, Pakistan's economic performance indicates that the government has to do a lot for achieve the sustainable economic growth. It is very much obvious that the impact of pandemic on sustainable economic growth and development is immense.

Table 3
Production and economic loss in various sectors of the society due to COVID-19 outbreak in Pakistan

Main Sectors of Economy	Economic Losses
1. Hotels and Restaurants	10%
2. Recreation Industry	60%
3. Information and Communication Technology (ICT)	20.3%
4. Public transportation	70%
5. Retail markets	29%
6. Electronic equipments, repairing and Electricity	60.9%

Source: Author's own calculations

From the last two decades, due to inconsistent macroeconomic policies, the average growth rate of Pakistan economy is 2% approximately. Recently, COVID-19 has impacted the economy very badly and pushed it towards bankruptcy. The lockdowns contracted the economic activity and GDP growth rate further contract to 1.5% in FY20. More than 20 million people lost their jobs and more than 2 million people fall below poverty line. Government announced the stimulus package of 300 billion cash flow for the people who live below poverty line to mitigate the adverse socioeconomic effects. These policies recovered the economic activity in first half of FY21 by increasing private consumption, increase remittances inflow, machinery imports and large cement sale. Although the interest rate was reduced but still the inflation was 8.3% on average. Demand management policies and record inflow of remittances convert current account deficit into surplus. The exchange rate appreciated by 5.4% against US dollar from June 2020 to December 2020. In the same period exchange reserved reached to US$ 14.9 billion. In first six months of FY21, fiscal deficit widened due to high government expenditures and public debt reached to 87.9% of the GDP. Looking at overall scenario, the GDP growth will recover gradually. Government announced growth led policies like focusing on high export, high inflow remittances and import machinery for production. If Government couldn't counter the fourth wave by sharp policies and structural reforms, the economy may face the consequences in the form of low output, unemployment and macroeconomic imbalances.

Table 4
Summary of Economic Indicators before and during COVID-19

Economic Indicators	2019 (Pre COVID-19)	2020 (Post COVID-19)	Difference	Impact
1. GDP growth rate	0.989	0.526	-0.463	Negative
2. GDP per capita growth rate	-1.034	-1.444	-0.410	Negative
3. Gross fixed capital formation percent of GDP	14.011	13.807	-0.204	Negative
4. Exports of goods and services percent of GDP	10.119	9.578	-0.541	Negative
5. Growth in the Exports of goods and services	14.494	1.585	-12.909	Negative
6. Industry value added growth	-2.269	-2.643	-0.374	Negative
7. Manufacturing value added percent of GDP	12.457	11.549	-0.908	Negative
8. Merchandise trade percent of GDP	26.484	25.721	-0.762	Negative
9. Manufacturing value added growth	-0.657	-5.555	-4.898	Negative
10 Services, value added percent of GDP	53.855	52.790	-1.065	Negative
11 Services, value added growth	3.755	-0.591	-4.346	Negative
12 Final consumption expenditure percent of GDP	94.589	91.648	-2.941	Negative
13 Trade percent of GDP	30.438	26.211	-4.228	Negative
14 Trade in services percent of GDP	5.810	4.891	-0.920	Negative

Source: World Development Indicators

Table 4 present the overall summary of major economic indicators before and during the pandemic spread. All of the indicators show a decline in the growth during COVID-19 period. This clearly shows a negative impact of COVID-19 on Pakistan economy.

Conclusion

The significance of e-governance in modern day cannot be overlooked. It helps to promote efficient and effective service delivery. The current study has investigated the role of e-governance on economic performance under COVID-19 pandemic. The role of e-governance is evaluated in combating COVID-19 in Pakistan by analyzing several indices: E-Governance Development Indicator (EGDI), including Online Service Delivery Indicator (OSI), Telecommunication Infrastructure Indicator (TII), and Human Capital Index (HCI); the E-Participation Index; and some economic performance measures. Based on the statistics, Pakistan is ranked poorly in the region. Its ranking has steadily declined from 137 to 148, except for the year 2008. While another indicator of e-governance, the usage of Internet has increased in the country particularly during the pandemic outbreak. Therefore, we safely conclude that e-governance improvement during the pandemic has helped to combat COVID-19 spread. The total number of confirmed cases, total deceased cases per month and total number of new confirmed recoveries shows that, with the increases of internet performance and usage, recoveries increased while number of patients decreased. The economic indicators highlights that with the help of well-organized, competent, and effective implementation of e-government policies, Covid-19 pandemic has controlled effectively. Similarly, country needs significant improvements in the e-governance systems to achieve sustainable economic performance. It is further added that, the scope of the study is limited because of the low sample size. So the study findings may be restricted in nature lead to limited implications. It can be hypothesized that, more clear picture of the relationship among the variable of interest can be observed if the sample size is handsome. It is suggested for the future researchers to take a larger sample for significant outcomes.

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