https://doi.org/10.31674/book.2023srdsi009

Adoption and Implementation of E-governance to Achieve Sustainable Development Goals in Education and Health in State Sectors in West Bengal

Chandrajyoti Sen Majumder
Department of Business Management, JIS University, Kolkata, West Bengal, India

Corresponding Author's Email: chandrajyoti.s@gmail.com

ABSTRACT

With the nation-wide goals to achieve various sustainable development goals, it has become equally important for West Bengal to adopt and implement such sustainability development goals. This research investigates different aspects of e-governance in education and health in the state sectors in West Bengal to achieve the specific SDGs regarding education of high quality, that is, SDG-4 and health of good standard, that is, SDG-3. In the research, personal interviews were done to collect various views and perspectives of specific stakeholders who have adopted E-governance and implemented E-governance-based projects for both internal administration and external service delivery in multiple fields within the state sector of the government of West Bengal. The research analysed the responses on 14 parameters to conclude, on a least squares estimation basis, about the adoption principles and implementation strategies of those stakeholders and to conclude certain generalised adoption and implementation principles for the state sectors in West Bengal.

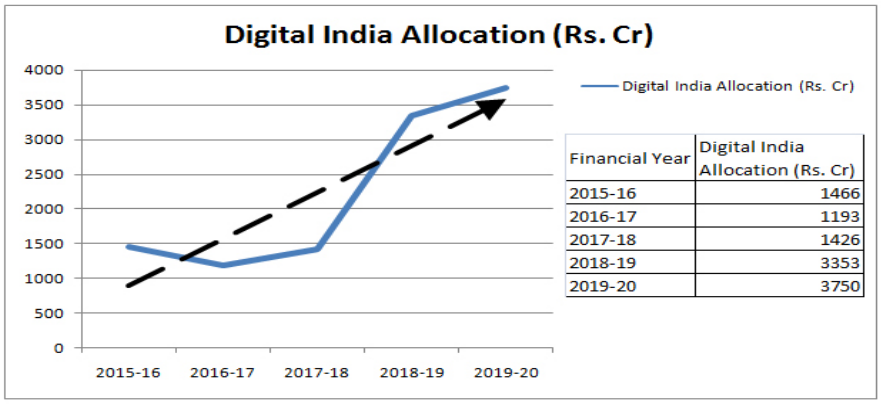
The research has studied to what degree a certain E-governance project has been accepted, new technologies related to that have been adopted, and, in terms of implementation, how far the technology-based service has been delivered to beneficiaries in multiple fields. Through a personal interview with government employees of two departments selected by convenience sampling, the researcher made an effort to assess how E-governance was welcomed by implementing agencies, departmental staff, stakeholders etc. in such different fields for the purpose of exercising administration. The outcomes depict that the maximum parameters measuring good governance and state sector employees' knowledge positively contribute towards sustainable development.

Keywords: *E-governance; Sustainable Development Goals; COVID-19*

Introduction

A general movement towards the use of Information Technology is being observed globally. E-governance is used as an effective mechanism to transform the way government delivers services. Interestingly, for a longer period of time in India, when it comes to globalization of technologies targeting superiority in innovation, as well as doubling the pace of upgrading

technology and tools of modern ICT (Information and Communication Technologies) the trend was more admissible in the private sector for a long time; but then, with the changing face of initiatives by the government of India, modernisations such as the designing of the National E-governance Plan NeGP 2006, Digital India 2015, the National Health Policy NHP 2017 and the National Education Policy NEP 2020, etc., there is a gradual shift in trend being observed also in the state sectors. At present, besides the private telecommunication industry, the state sectors in India are also seen as the largest investors in the Digital India campaign (NITI Aayog, 2022). The healthcare industry has been plummeting since 2015 at a Compound Annual Growth Rate of about 22% in India (KPMG, 2015), with nearly 50 lakh jobs since 2016 (Sarwal *et al*., 2021). India's online education market has grown at an almost 19% Compound Annual Growth Rate until 2021. (IBEF Report, 2021). Between 2015 and 2020, the Government of India has continuously raised budget allocations in information technology towards centrally sponsored schemes under the prestigious Digital India initiative, which describes the government's interest in the adoption and implementation of information technology-based digital services for all kinds of stakeholders.



Financial Year	Digital India Allocation (Rs. Cr)
2015-16	1466
2016-17	1193
2017-18	1426
2018-19	3353
2019-20	3750

Source: www.indiabudget.gov.in/ & www.meity.gov.in/integrated-finances

Figure 1: Year-wise Digital India Allocation between 2015 and 2020

Government-run or state-funded E-governance service deliveries actually started speaking on the opportunity of taking all stakeholders towards the government's modern administrative service deliveries, and as a result, regardless of the political inclination of the central government, stakeholders benefit from such technology driven deliveries that help in the exchange with the government. Adoption of e-government has increased in India, and at the same time, readiness for this adoption varies among states. There is a mighty increase in integrated services provided online by states in India, where West Bengal remains a leading state alongside Telangana, Andhra Pradesh, Gujarat, and Madhya Pradesh in the top five performing governments (UN E- Government Knowledgebase, 2020).

E-governance has many positive characteristics of its own, similar to what ideal and good governance should have. The success of the launch of E-governance depends on the successful delegation of those characteristics. The factors behind the potential success of E-governance have been analysed in the light of different characteristic factors of Governance

viz. Accountability, Transparency, Efficiency, Integrity etc, within the limited scopes of this Research paper and consequently, effort was made to establish how in India technological modernization can gain success fighting all odds like ignorance, lack of transparency, unreliability and irresponsibility. With an eye on the list of all the initiatives of the Government of India, analysis was made on the effects that those initiatives produced when implemented by the government of the State of West Bengal in different sectors.

India's recent years' economic agenda recognised the huge importance of ICT and E-governance for the twin objectives of economic restoration and comprehensive growth in achieving the Sustainable Development Goals in regard to Education and Health. In support, the government’s initiatives in flagship projects such as DBT (Direct Benefit Transfer), PM's Bima Yojana, PM Jan Arogya Yojana, as well as Digital Infrastructure for Knowledge Sharing (or DIKSHA) alongside the much-highlighted PM eVidya etc., all got noteworthy upliftment.

In March 2020, the Ministry of Health and Family Welfare under the Government of India released the newly formed Telemedicine Practice Guidelines. The guidelines allow all registered medical practitioners in India to make use of telemedicine tools to provide healthcare services in the country. Therefore, now it is possible to use telemedicine for medical treatment of the common people, all legally in the country, and thus march towards achieving universal standards of healthcare. Private hospitals in India are already using telemedicine technology for consultation purposes. For example, Medanta Hospital uses one all-inclusive telemedicine platform called 'Medanta eCLINIC' to provide virtual consultations. Also, Apollo Hospitals has successfully extended its e-consultation facility to treat patients who pursue medical care sitting at home. The Ministry of Health and Family Welfare has also started providing online medical sessions for non-COVID patients at AIIMS, New Delhi.

The worldwide pandemic-induced lockdown caused by COVID-19 has actually influenced the so-called education sector in a huge way. Therefore, to address the many challenges of spreading education, the Ministry of Human Resources Development (MHRD) has taken up many initiatives like remote or tele-learning systems for students, educators, and enduring learners at the same time in their quest for education. According to a UNICEF (2021) report on India, "school closures have obstructed 247 million children already registered in primary and secondary education and 28 million children registered in pre-schools and Anganwadi centers. This is in addition to the more than 6 million hapless children who had already dropped out of school for personal reasons before the Covid-19 crisis" (United Nations, 2020). In order to address this problem, the MHRD therefore initiated the Alternative Academic Calendar (AAC) in April 2020, designed by the National Council for Teacher Education (NCERT) for the benefit of primary and upper primary schools, as well as secondary and higher secondary schools. In those, teachers were given the privilege to teach using NISHTHA, DIKSHA, and ePathshala, which are national as well as state-level online platforms for education. Also, Massive Open Online Courses (MOOCs) were designed to encourage increasing numbers of study incumbents.

Literature Review

Sinha (2006) wrote in his book that in the last few years of the 20th century, there was a very fast growth of information and communication technologies with the discovery and spread of computing, which is user friendly and networking, which is robust. The use of electronics in government and business started only forty years ago in India. The advent of PC has brought a revolution to the work of both public and private offices.

Chaudhuri (2012) described that in India, E-governance and new technological adoption go side by side in a negotiation with no limit, and there is a conscious effort to hybridize technology with politics and people's culture. Since the establishment of the Ministry of Information Technology in 1999, and afterwards in 2002, E-governance was announced by the then Prime Minister of India to be one of the 15 most important enterprises of the nation. It was acknowledged that adoption and implementation of E-governance will bring efficiency, transparency, and liability to government-citizen interfacing and effective service delivery.

Shareef *et al.* (2011) pointed out correctly in their book that E-governance is something of highest interest to the common people of this nation, and therefore the most popular E-governance service is evidently the 'Government-to-Citizens' type.

Bwalya and Mutula (2014) acknowledged in their book that the use of information and Communication Technology is slowly taking centre-stage based on the drive by state sectors in developing countries to provide efficient and effective public service delivery that is responsive.

Muthuprasad *et al.* (2021) in their research paper have also discussed that since many educational establishments have stopped functioning during the COVID-19 pandemic, all over the world, thus endangering the academic planning of the government bodies, hence most of them now have shifted to online mode of providing education to keep with the academic activities. As a result, keeping pace with the change, most of the recipient end users (70%) opted to take the online classes in order to manage the curriculum during the lockdown period. As a result, the majority of the students, quickly adapting to the new environment, are now preferring to use their smart phones at home for tele-learning.

Sharma (2021) in her book has discussed that the number of TV channels for school education has massively increased from once 5 to now 12, thus transforming into 'one class, one channel' habitat, where now a dedicated channel for each of the grades is being served from 1 to 12. Some states like Chhattisgarh (Padhai Tuhar Duar portal), Kerala (KITE launched an education TV channel, Facebook page, and YouTube channel), Madhya Pradesh (mobile WhatsApp program called DigiLEP), and Maharashtra (The Learning from Home package over SMS and WhatsApp) also started initiatives locally.

Raman *et al*. (2021) in their report, acknowledged that online health care services and telemedicine have mixed outcomes, which are sometimes unexpected while other times useful due to varied human behaviour and diverse system responses. For example, telemedicine care was beneficial due to the continuity of care it could provide based on

technological advancements, which actually proved to be very effective in areas of lockdown during the COVID-19 pandemic period.

Narayanan (2021), in his book, has explained that a number of e-governance-based initiatives with the help of ICT were undertaken by Indian investigators to conduct research on the disease during the recent pandemic. Researchers from ISI Kolkata built a Deep Learning tool to screen COVID-19 virus. An AI-based-COVID detection application software was designed by DRDO's Centre for Artificial Intelligence & Robotics (CAIR) which they named ATMAN AI, and which uses chest X-rays (CXRs) that can classify the images into different types such as normal, COVID-19, pneumonia etc. The AarogyaSetu, a contact tracing app, was created by the government to create a database of people with the COVID-19 illness and with whom they came into contact. In just over a month after its release, 114 million users downloaded the app. In April 2020, the Health Ministry launched the platform called e-Sanjeevani, which made more than 3,00,000 consultations within just six months. On the parameter of the Universal Health Coverage (UHC) measuring index, which measures whether all people are receiving the health services as per need or not, whether quality is good, whether financial hardship is experienced in the process, etc., the index value of India has steadily increased from 27 (1990) to 42 (2010) to 47 (2019).

Objective of the Study

The research study has explored the perspectives of the different E-governance projects implemented in state sectors to identify, in the context of West Bengal, if the state is performing satisfactorily over time in regard to sustainable development in quality education and good health. Also, this paper analyses whether adoption and implementation of e-governance lead to the achievement of the required UN standardised sustainable development goals for quality of education and goodness of health for stakeholders.

Methodology

This study evaluates factors that affect the use of IT in the state government sector as well as the use of ICT to achieve specific goals such as the practice of online learning in the educational sector and telemedicine in the health sector, respectively, within the education and health sectors by the government. The research study has been carried out using both qualitative and quantitative methods with the help of primary and secondary data collected by the researcher. To validate such collected research data, the sampling survey method has been followed in this study. Primary data collection has been done by administering a comprehensive questionnaire to employees of the State Education Department and the Health & Family Welfare Department of the Government of West Bengal. Employees of both the School Education and Higher Education Departments in the education sector and those of the Department of Health and Family Welfare have been surveyed. The information was collected from different E-governance projects already running in the state sectors within a given time period. Only those projects that have been running for at least ten years have been taken as considerable projects that are running in the two departments. From among those projects, a group of projects are successful in terms of physical and financial status, and a

group of projects are not much of a success in terms of implementation due to lack of skills, lack of planning, irregular funding, irregular responses of citizen beneficiaries, etc. This study has carried out confirmatory factor analysis on the primary data collected in order to construe to what degree the respondents within a specific sample set approve any of the proposed objectives of the research study and also in what way the challenges for implementing an E-governance project can be overcome successfully, that is, by following proper planning, and thus subsequently how and what steps can be taken up for future projects by different State sectors in West Bengal towards successful E-governance project implementation. The research has reviewed the personal views of respondents implementing such projects and, as a result, made an effort to draw inferences on the availability of a proper planning algorithm behind strategizing and implementing such projects in terms of service delivery as well as funding for long-term running to call the projects successful ones.

In order to collect data from the respondents, personal interviews with a questionnaire have been conducted. This research has remained a cross-sectional research study, firstly considering the fact, that data is collected only from West Bengal, secondly, from selected departments of the state government, and thirdly, data is acquired only out of a specific time period, that is, between 2006 and 2016. Now, the logic of selecting a single state from the whole country rather than considering multiple states of India lies actually with the goal of eliminating the macro-environmental diversity that exists among states because of social, geographical, and cultural differences. Moreover, the collection of data from a fairly homogeneous environment is expected to further facilitate the control of probable effects cropping out from overpowering external variables. This research studies the contemporary situational impact that is caused as a result of different E-governance projects being implemented in the education sector. Again, the education department is selected by the researcher as a result of convenience sampling. 74 respondents, meaning those employees of the government department who are responsible for implementing smart education and administering necessary ICT tools for e-learning, have been selected from the teaching and administrative officials of the Education department. Another 73 sample populations of the Health and Family Welfare Department were selected who are responsible for the adoption of telemedicine technology to implement online health care, specially during the COVID-19 pandemic situation. Personal interviews with the officials through questionnaires and surveys of implemented e-governance projects at this level have been the primary source of data collected by the researcher from the mentioned departments.

There were 14 specific questions framed to measure parameters on planning, objectives, processing, strategizing, implementation, delivering, overall impacts, results, acceptability, effect on end users, scope of further development, evolution, impact on funding, and impact of future regulations. There are 7 hypotheses framed also on acceptance of e-governance, use of technology for service delivery, awareness of technology, difference in demand for technology, challenges, testing and development, and government funding.

Results and Discussion

Linear least squares regression was chosen for modelling and the output concluded that the model fit is good. Based upon rigorous statistical analysis of the 14 parameters, namely, X1 to X14 which are directly related to the 7 nos. Hypotheses, namely, H1 to H7 through least square regression of the two-sided distribution of obtained values, the following tabulated coefficient values were obtained –

Table 1: All 14 Parameters and their Values of Linear Equations

Parameters	Coeff. Least Sq. Estimation		Parameters	Coeff. Least Sq. Estimation
X1	0.271		X8	0.439
X2	0.148		X9	0.693
X3	0.731		X10	0.504
X4	0.874		X11	0.743
X5	0.918		X12	0.589
X6	0.796		X13	0.778
X7	0.836		X14	0.821

Source: Author's Estimation

The above table suggests the value of the linear equations made out of least square estimation and by that it was found that x1 = 0.271, x2 = 0.148, x3 = 0.731, x4 = 0.874, x5 = 0.918, x6 = 0.796, x7 = 0.836, x8 = 0.439, x9 = 0.693, x10 = 0.504, x11 = 0.743, x12 = 0.589, x13 = 0.778, and x14 = 0.821.

The required data filtration was done by performing normalization of the data. The data, which understandably is regarding the quality and preferences of life of a stakeholder of an implementing agency and is all about personal experiences and awareness, thus the data is not multi-variate normal and therefore the common test to examine univariate normalization, the Shapiro-Wilk test, has been performed on the dataset obtained against the 14 questions of the research survey. The univariate type of data considers only one variable at a time, and in a univariate analysis, several hypotheses are possible, and also tests of any partial subset of one or more predictor variables are possible with the considered complex Hypotheses in the research study.

The replies in the questionnaire are taken on a Likert scale in seven levels, that is, from the lowest level to the highest level. Here, from among the sample size, the set of respondents has been distributed into two separate groups on the basis of the order in which they have been surveyed serially. Those interviewees who have been interviewed as first, third, fifth, and such in the odd order have been grouped in the odd section. Similarly, those interviewees surveyed in even order of second, fourth, sixth, eighth, and so on serially have been grouped in the even section. The section consisting of the first, third, fifth, seventh, and so on respondents has been named the "odd answers' group" and the section consisting of the second, fourth, sixth, eighth, and so on respondents has been named the "even answers' group". These two sections of respondents, thus divided, have had their replies statistically

analysed to obtain distinct mean values and distinct standard deviation values. Those are then compared with one another, and the values of Cronbach's alpha and Pearson's Correlation are obtained. Considering, as per the thumb rule, that Cronbach's Alpha's max value is 1, in the research, a value above 0.7 reliability has been achieved. This apart, the Pearson value of 'r' credibly displayed that either there is a positive relation, such as when one variable increases, the other increases along with it, or else it depicts a negative relation, that is, when one variable increases, the other actually decreases, when it comes to the linear relationship between two research questions at any point in time. The two groups of replies collected from odd group answers (viz. the first, the third, the fifth, the seventh person and so on) and even group answers (viz. the second, the fourth, the sixth and so on) and the correlation between them have been calculated with the CORREL function of MS Excel, and the gotten Correlation coefficient is 0.836215. As per the Spearman-Brown reliability predictor, if the result of correlation is between 0.8 and 1.0, it designates higher internal consistency, and since the Spearman-Brown correlation value obtained is 0.9108, that indicates high consistency of the dataset. Apart from this, Guttman's reliability test, agreed to be another good way to test reliability, has been applied. The Guttman reliability, G-R coeff., is obtained as 0.888. Also, the weighted least squares method (WLSMV) for the confirmatory factor analysis (CFA) model of the ordinal dataset has been used by the researcher for data found to be non-normal and continuous. The odd and even replies of respondents are separately obtained to get the mean and standard deviation values. Then an unpaired t-test was carried out on the two samples for each of the questions to get the p-value. The p-value thus obtained for each of X1 to X14 is found to be less than the significance level. The Shapiro-Wilk W test value for each of X1 to X14 is approximately 0.8 and the p-value is never more than 0.001. So, all the null hypotheses have been safely rejected.

Secondary data related to several running E-governance projects in the state sector is obtained from various materials published, such as books, articles, and reports etc. by various academicians and internet surfing has been meted out regularly with the goal of getting current data. Those data are analysed in terms of funding, source of finance, political effect on the running of projects, the nature of adoption by the stakeholders at different levels of implementation, and the experience of such adoption in the long run.

As obtained from the statistical analysis of the data and responses, the least positive relationships can be observed in factors related to planning, objectives, and results. All these factors gave values less than 0.5 (a thumb rule says 0.5 or higher coefficients in least squares regression are always good). In real life too, when it comes to factors like planning and the objectives behind a project, there is always less clarity. Similarly, in regard to the result, there's always scope for debate. The respondent, while answering the questionnaire, quite humanly hesitated or faltered in marking those answers, and as a result, there remain marked differences in responses and wide variations in conceptualizing those factors. Even with a steady increase in funds, technology, basic infrastructure, and knowledge availability, there still remains a clear difference between demand and supply for running a project successfully

in both departments. For example, even though there are digital healthcare facilities run by the government in seven of the remotest districts of the state and even a floating healthcare system, it still fails to address the shortfall of one healthcare staff for five families. Similarly, although digital literacy under Bangla Siksha (Bengal's Education) has till date digitally transferred money for girl child's education for 68 lakh girls in West Bengal under its flagship initiative of Kanyashree Prakalpa, there are still high dropout rates of girls in the state at 49.9%.

Findings

The confirmation factor analysis process always assumes that the identified underlying factors of research are actually correlated to each other. It thus measures the degree of association existing between two hypotheses and thus across the related variables. Ideally, factor correlation must be <0.85 and that should be in the range between 0 and 1. By looking into the correlations between the factors, it can be concluded that, hypothesis related to the use of technology is found to be highly correlated with awareness of technology, and their Factor Correlation came out to be 0.642. And, hypothesis on awareness of technology is found to be strongly associated with the hypothesis on difference in demand for technology, where the factor correlation came out to be 0.731. On the other hand, government funding unfortunately has a negative association with awareness of technology as well as with differences in demand for technology. This concludes that awareness of technology makes use of technology popular in the state sector. Also, it is an accepted fact that not all divisions in a department have equal needs for technology, and accordingly, awareness of technology has been found to vary.

Findings of the research show that, though there are some limitations, information and Communication Technologies (ICTs) are helping in providing education of high quality and thus helping humans develop skills in order to make them suitable for the competitive global market, which serves smart education through e-Learning. The Education Department of West Bengal operates through different institutions such as, the Mass Education Extension and Library Services, School Education, Technical Education and Training, etc. West Bengal also envisions a plan to leverage EDUSAT to provide tele-education as a supplement to the schools. The State Wide Area Network (SWAN) has been built to provide state-wide intranet linkage that can leverage support in different administrative divisions in government departments. The State Data Centre (SDC) built to store and process all the data from all over the state and support the applications running to support services. In 2007-08, the state government started using the centrally sponsored ICT @Schools scheme and immediately applied computer education in 543 government-aided higher secondary schools with a budget of Rs. 0.4 billion. The yearly expense under the planned budget of the said department rose to Rs. 514.18 crore in 2017-18 from earlier Rs.108.7 crore of 2010-11(The Finance Minister, 2019, 2020, 2021). That was a 373% increase in budget for the Department of Education in the state of West Bengal. However, there is still a demand for higher funding, which is still unmet.

Similarly, it was found that in spite of the limitations in physical reachability, online health advice and telemedicine support actually proved a strong base of support to thousands of patients during the period of pandemic-related crisis, when lockdown and physical distancing had actually become a necessary regulation to avoid disaster. The State Government has augmented its planned Budget for the Health and Family Welfare Department to Rs. 5,530 crores in FY 2017-18 from earlier Rs. 899.3 crores, which was in FY 2010-11. That was more than 6 times increase. However, this still fell short of meeting the huge demand. However, to meet the gap, the government has given cover to more than 63 lakh families under the Rashtriya Swasthya Bima Yojona (RSBY). The number of hospitals empaneled under RSBY has also increased to 1,308 till 2017-18 (Open Budget India, 2018, 2019, 2020, 2021, 2022). This apart, the state government sponsored Swasthya Sathi scheme for more than 45 lakh families, which belong to different Self-Help Groups, ICDS Workers, ASHA Workers, Civic Volunteers Force, Civil defense Volunteers etc. apart from being selected contractual employees, cable TV operators etc. The Health department has developed the Stores Management Information System (SMIS) in order to digitalize the whole process of drug indenting, procurement, and related issues of medicines with the goal of eliminating the physical maintenance of ledgers and registers. There are 54 nos. of Mobile Medical Units functioning to provide curative services in remote and inaccessible areas of the state. Almost 20 lakh patients are annually benefited, from the hills area in Darjeeling to the forests of the Sunderban areas of the North 24 Parganas and even the now closed Tea gardens in the Dooars of Jalpaiguri, Alipurdaur and Darjeeling, as per reports on the portals of the respective departments.

Conclusion

The objective of this study being how the state is standing out in performance over a period of time in the context of sustainable development in quality education and good health, it was observed that awareness and knowledge base among the government officials who are delivering their duties in the said departments of health and education who are increasingly using ICT tools for delivering services. The adoption and implementation of E-governance in education and health have been accepted with much enthusiasm. But there are challenges, such as the availability of funds, which are often not proportionate to meet this enthusiasm and the increasing knowledge base of government officials.

It is, however, understood that in a developing country like India, where the literacy rate, as per the last done census, is 74.04% and 21.09% of the population is still living below the poverty level, when the Telecom Regulatory Authority confirms that almost 56% of the population uses the internet, it is surely an encouraging picture. But funding has always remained poor because the recent Rs. 3750 crore Digital India investment in the Indian IT industry, which already has a market valuation of more than USD 190 billion as estimated by the NASSCOM authority, depicts poor strategizing and a lack of planning to support and encourage the growth of revenues for the benefit of the Indian economy.

Acknowledgment

The work has not been submitted elsewhere concurrently, to the author's knowledge, and there are no conflicts of interest as of now for publication. The research is a personal effort in all respects, and no monetary aid in any form has been taken for the purpose. It is indebted to all the government officials of all the institutions under the two departments—the Department of Health and Family Welfare and the twin Departments of Secondary and Higher Secondary Education—who have allowed long appointments, relentlessly provided with patient answers in interviews, supplied many informational booklets, guidebooks for collecting secondary information from, and helped with valuable references. Starting from the higher authorities of Secretary and Director ranks to those related to administration and engineering, they all encouraged me selflessly. Not to name any of the officers in particular, but the technical and financial heads of different hierarchies have arranged a lot of reported documents and pointed out online sources of published data of considerable relevance that contain all the secondary information.

References

Bwalya, K., & Mutula, S. (2014). E-Government: Implementation, Adoption and Synthesis In Developing Countries. -Berlin.

Chaudhuri, B. (2012). *Hybridising (E)-Governance in India: The Interplay of Politics, Technology and Culture* (Doctoral dissertation).

IBEF Report. (2021). Education & Training Sector in India. https://www.ibef.org /industry/education-sector-india

KPMG. (2015). *Investing in India 2015*. https://assets.kpmg.com/content/dam/kpmg/pdf/2016/03/investing-in-india-2015.pdf

Muthuprasad, T., Aiswarya, S., Aditya, K. S., & Jha, G. K. (2021). Students' Perception and Preference for Online Education in India During COVID-19 Pandemic. *Social sciences & humanities open*, *3*(1), 100101.

Narayanan, K. (2021). Digital Health in India. https://itihaasa.com/public/pdf/Digital_Health_in_India.pdf

NITI Aayog. (June 2022). *India's Booming Gig and Platform Economy*. https://www.niti.gov.in/sites/default/files/2022-06/25th_June_Final_Report_27062022.pdf

Open Budget India. (2018). *West Bengal Budget 2018-19.* https://openbudgetsindia.org/organization/west-bengal-budget-2018-19

Open Budget India. (2019). *West Bengal Budget 2019-20.* https://openbudgetsindia.org/organization/west-bengal-budget-2019-20

Open Budget India. (2020). *West Bengal Budget 2020-2021.* https://openbudgetsindia.org/organization/west-bengal-budget-2020-21

Open Budget India. (2021). *West Bengal Budget 2021-2022.* https://openbudgetsindia.org/organization/west-bengal-budget-2021-22

Open Budget India. (2022). *West Bengal Budget 2022-2023.* https://openbudgetsindia.org/organization/west-bengal-budget-2022-23

Raman, R., Rajalakshmi, R., Surya, J., Ramakrishnan, R., Sivaprasad, S., Conroy, D., ... & Netuveli, G. (2021). Impact on Health and Provision of Healthcare Services During The COVID-19 Lockdown in India: A Multicentre Cross-Sectional Study. *BMJ open*, *11*(1), e043590.

Sarwal, R., Prasad, U., Gopal, K. M., Kalal, S., Kaur, D., Kumar, A., ... & Sharma, J. (2021). Investment opportunities in India's healthcare sector. https://www.niti.gov.in/sites/default/files/2021-03/InvestmentOpportunities_HealthcareSector_0.pdf

Shareef, M. A., Kumar, V., Uma, K., & Dwivedi, Y. K. (Eds.). (2011). *Stakeholder Adoption of E-Government Services: Driving and Resisting Factors*. Information Science Reference.

Sharma, A. (2021). *Guide For DIKSHA Implementation in Schools* (No. 50). ICT India Working Paper.

Sinha, R. P. (2006). *E-Governance in India: Initiatives & Issues*. Concept Publishing Company.

The Finance Minister. (10th February 2020). West Bengal Budget Analysis 2020-21. https://prsindia.org/budgets/states/west-bengal-budget-analysis-2020-21

The Finance Minister. (4th February 2019). West Bengal Budget Analysis 2019-20. https://prsindia.org/budgets/states/west-bengal-budget-analysis-2019-20

The Finance Minister. (7th July 2021). West Bengal Budget Analysis 2021-22. https://prsindia.org/budgets/states/west-bengal-budget-analysis-2021-22

UN E- Government Knowledgebase. (2020). *UN E-Government Survey 2020,* ISBN: 978921123210-3 https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2020

UNICEF. (10th March 2021). COVID-19: Schools for more than 168 million children globally have been completely closed for almost a full year, says UNICEF. https://www.unicef.org/india/press-releases/covid-19-schools-more-168-million-children-globally-have-been-completely-closed

United Nations. (2020). *Policy Brief: Education during COVID-19 and Beyond* https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_august_2020.pdf