**Requisition of IoT Analytics in Education Sector & Other Sectors during Covid-19 Pandemic**

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**Abstract**— The World Health Organization (WHO) has designated the most recent outbreak of a novel coronavirus COVID19, which has plunged humanity and the global economy into chaos. The governments of all the nations have mandated a national imprisonment as part of their plan to control this virus. Although the internment may have helped to slow the spread of the disease, it has severely hurt the nation and upset the entire value chains of many important companies. This study covers IoT services throughout COVID-19 and primarily assesses the difficulties in the business, service, and educational sectors. According to the study, respondents believe that time savings in the education sector have the most potential, whilst in the business and service sector, using IoT services has the greatest advantages for rigidly preserving physical distance. The IoT, on the other hand, will widen social distance and restrict interpersonal interactions, which are the most critical challenges people in both industries face. However, people from all sectors have a favourable outlook on how IoT will be used in the future.

Keywords— IoT, Covid-19, Internet of Things, Pandemic, Education, Corporate, Public sector

1. **Introduction**

A brand-new paradigm shift in IT is currently being driven by the Internet of Things (IoT). The terms "internet" and "things" are combined to generate the acronym "IoT," which stands for "Internet of Things." TCP/IP protocols may be used to connect billions of computers worldwide into a global network for providing services to users. [1]. One of the most intriguing ideas in the area of data technology is the internet of things. Because each item is uniquely identified, the Internet of Things may also be seen as a worldwide network that makes it easier for people and things to interact and communicate with one another. [2]. The Internet of Things is being embraced in a number of sectors. The application starts with home automation and moves on to wearables. Applications made possible by IoT tools are utilised to stop the spread of the corona virus throughout the pandemic by keeping track of the patients, performing initial research, and following the essential prescriptions for patient recovery. [3]. Learning at any educational level and across many fields. They classified some of the difficulties associated with implementing IoT in higher education, including cloud computing, instructional technologies, mobility applications, and privacy and security concerns [4]. The longer-term usage of IoT in education depends on students' growing analytical abilities, collaborative learning environments, and extending instructional middleware for a variety of reasons.

With the combination of economic, technological, and social factors, IoT is transforming the current aid system. The assistance system is changing from a standard to a very trendy made-to-order aid system through the collection of the Internet of things, making it easier to diagnose, treat, and observe patients [3]. In addition to health care, they are also utilised in remote banking, e-commerce, wearable technology, remote operation, drones, robots, knowledge storage, security tools, and other sectors. Being a developing nation, Utilizing IoT services in India during the pandemic situation presents both opportunities and challenges. The first is that various industries are aware of the use of IoT services.

In this case, the corporate and educational sectors are examined. The benefits and restrictions of implementing IoT services fully inside the industries are then evaluated. Following that, opinions on using IoT services by people may be discovered.

The subsequent analysis queries are addressed:

* What advantages and challenges does the education sector experience when utilising IoT services at COVID-19?
* What drawbacks and challenges are associated with the use of IoT services in the business and service sectors during COVID-19?
* How do people in COVID-19 see the use of IoT?

***Research objectives***

The goal of this analysis is to comprehend the advantages and disadvantages of the Internet of Things in Asian countries during COVID-19.

• One of the specific purposes of COVID-19 is to examine the advantages and challenges of using IoT services in the educational sector.

• To gain knowledge about the advantages and challenges of using IoT services in the business and service sectors during COVID-19.

• To find out what people's attitudes are on IoT in COVID-19

**2. LITERATURE REVIEW**

IoT will make it possible to connect all sentient items to cutting-edge technology without requiring human interactions across a network. However, IoT may be a new research topic with significant research ground in recent years, according to Mohammed [6].

In response to COVID-19 effects, digital tools are being utilised to promote public health, including population observation, event detection, bit tracking, and action assessment on interactions with the quality of information and subsequently the public. [7]. To overcome the economic limitations revealed by COVID-19, emerging technology must be developed and prepared. In the fight against COVID-19, numerous modern defence and governmental tactics utilising digitalization are being deployed. Innovations and digital technology have been the pillars of humanity up until this point. The potential of the IoT would have a significant impact on achieving SDGs (sustain- able and medical care goals) in the developed countries. Islam [8] claims that the IoT's cutting-edge features and integrated structure can aid in containing the pandemic's spread. IoT-enabled devices and applications are utilised for police investigation of the patient, declared protocol observation, and first detection approach to reduce the possible spread of the coronavirus. IoT, according to Javaid [9], permits the internet-based transmission and receipt of information and physical objects. The utilisation of numerous medical devices, state-of-the-art imaging technology, medical specialisations, and artificial intelligence in the medical field has resulted from this. Connecting healthy cities, homes, cars, and entertainment systems is made simpler by IoT. Good healthcare equipment is controlled by wire and wireless networks. Information can be collected by intelligent devices and shared globally. These cutting-edge tools and technologies enhanced productivity and quality of life in both old and new towns and industries (Farr, 2020). For the purpose of monitoring the COVID-19 pandemic, this technology is thriving. Without using any people, the Internet of Things (IoT) connects mechanical and all-digital computing technologies to transmit data via the internet. According to Nasajpour [3], all patient-related COVID-19 data was given the proper care and storage in the cloud for additional assistance. In this crucial situation, a lot of us lost our lives as a result of inaccurate and tardy health information. IoT uses sensors to communicate health-related issues to the healthcare system; it records daily activities and addresses health issues [10].

To prove efficient operations in the medical industry, the appropriate instrumentation is a requirement. IoT applications help patients receive better care throughout the COVID-19 pandemic. Intelligent medical gadgets and connecting devices are utilised to provide crucial health information to the doctor. With the use of IoT, these devices successfully monitor time information, saving lives from a variety of health conditions and assisting in providing when services and analysis capabilities to productive operations [9].

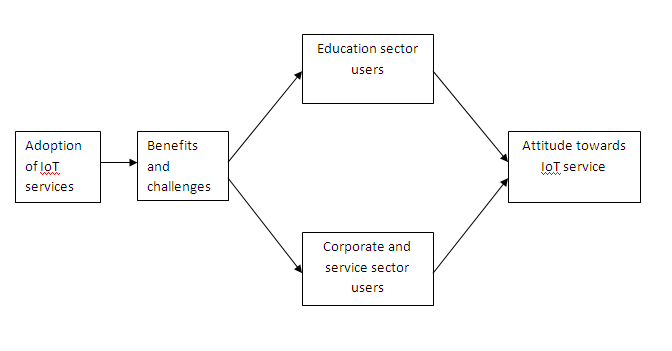
Müller [11] asserts that the Internet of Things (IoT) is a cyber-physical system in which mechanical and digital equipment exchange data without the need for human involvement. Cloud computing, time analytics, machine learning, robots, and sensors are used by IoT inclusion and client apps to totally change the operations. Several businesses have the chance to start over and reassess their business strategy during this pandemic crisis. Intelligent manufacturing facilities, for instance, connected and connected assembly lines to exchange information, decrease order times, cycle durations, and production flexibility, foresee occurrences, and decide how to address problems "without trouble" [10]. The COVID-19 has accelerated the use of intelligent gadgets. The most popular residences in the business are those that are reasonable. The IoT has a broad knowledge network that supports better waste management and traffic control. Additionally, it aids in the detection of fire and flood hazards to make dwellings safer. The software will examine video evidence to determine whether or not massive offices follow the social-distancing norms.

Airports and railroad stations both used infrared cameras [12]. Many small and major retailers operate virtually in this epidemic environment. IoT also promoted growth in the online retail sector Amazon and Wal-mart, for instance, automate their supermarkets and distribution centres using radio frequency identification (RFID) and AI to minimize their reliance on human labour and support contact-free payment. It is typical practise in the retail sector to track inventories and gather data on consumer purchases to enhance in-store knowledge for customers. expanding contactless and cashless payment options There are some app options from Samsung, Apple, and Google [7].

**3. RESEARCH METHODOLOGY**

**3.1 Method of Analysis**

83.2 percent of all 12 to 17-year-olds, according to an marketer estimate, own a Smartphone. In addition, 31.0 percent of parents said their children had smart phones between the ages of 6 and 10 and 73.0 percent said their children had smart phones between the ages of 11 and 13.



**Fig.1 Research Framework**

With that foundation of being digitally native, it's clear how the Internet of Things is positioned to fundamentally alter education as we currently know it. Students who utilise these mobile IoT devices in the classroom will change the way they take notes, check their schedules, and do analyses.

The main benefits for schools would be increased energy potency and decreased operating costs. By using a web-based system to manage every mechanical device inside the buildings, new state capital universities in Tipp City, Ohio save about $128,000 yearly. The savings are sustained while the institutions spend money on reusable resources like laptops, tablets, and cellphones. The average college spends about $200,000 on paper each year, which amounts to about 100% of most institutions' budgets. However, a reusable school would completely eliminate that cost.

The IoT will start to disturb the educational system in preschool and may continue to do so until the 12th grade, but pedagogy may have the most significant effects. Students are increasingly switching from paper books to tablets and laptops, particularly in the faculty. Students can now learn at their own pace and have a nearly comparable teaching experience at home and in the classroom since they have access to all the necessary information.

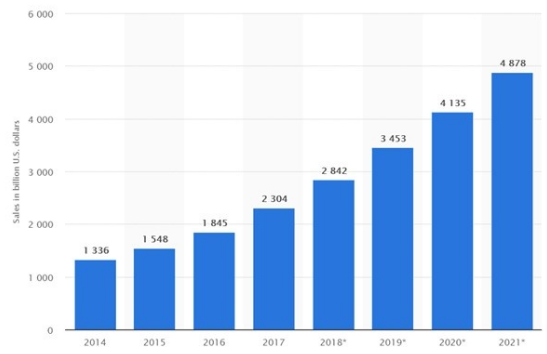
Additionally, while this trend increases student comfort, it also allows academics to use a more cost-effective teaching strategy. Because of the rise in connected technology, educators are no longer need to physically grade tests on paper or complete other rote jobs.

Professors will instead focus on the specific, personalised learning that is most valued by their pupils. Professors can gather information about their students using devices that are cloud-connected, then determine which pupils require the most individualised treatment. These statistics help academics enhance student engagement and govern their instructional plans for upcoming subject areas.

Universities will employ linked devices outside of the classroom to monitor their staff, students, resources, and instrumentation at a reduced cost, which saves money for everyone. Additionally, safer campuses should result from these trailing capabilities. For instance, students would be able to monitor connected buses and manage their schedules accordingly, which might prevent them from spending extra time in potentially hazardous locations.

The emergence of Internet of Things (IoT) devices has resulted in a commensurate change in the ecommerce sector as customer lifestyles continue to change and become more adaptable. Similarly, the increasing rate at that internet buyers have adopted the internet has seen ecommerce grow steady, and is predicted to be the long run of retail as most of the expansion is going on within the digital area.

According to Statista, global retail e-commerce sales were staggeringly high in 2016 at $1.85 trillion and are projected to reach $4.88 trillion by 2021.



**Fig.2 Global sales statistics for retail ecommerce**

In an effort to improve the shopping experiences of customers worldwide, retailers are also preparing to incorporate the Internet of Things. This just serves to highlight the fact that in order to remain lucrative and competitive, every e-commerce and retail sector needs to stay on top of trends in the digital promoting arena.

Positive viewpoint and negative perspective are the two dimensions used to assess perspectives on using IoT services. It has been confirmed in the business, corporate, and service sectors. The perspectives of these two sectors diverge greatly from one another. Compared to 52 % of respondents in the corporate and service sector, 55 % of respondents in the education sector concur that IoT will be positively utilized in the future. Each sector has a small percentage of the negative viewpoint statement, in terms of the negative perspective statement. 13 percent of the population works in the education sector, and 14 percent work in the service industry. There are opportunities and signs of hope for accelerating IoT adoption across all industries. However, as the table indicates, a fascinating range of people expressed neutrality in both the positive and negative perspective statements. To increase the optimistic outlook among people, it is necessary to appropriately handle difficulties that are known within the sectors.

**4. CONCLUSION**

In this contemporary new traditional context, the internet of things (IoT) is rapidly driving non-human interaction. The report details the advantages and challenges people encounter in a variety of situations. The findings indicate that younger people—those under the age of 35—are more inclined to use internet of things services in a range of businesses. In the field of education, time savings is the most likely result. This is because students will save time by attending class from anywhere and avoiding road congestion, while instructors will have more time for sophisticated planning and management. In numerous domains, like the corporate and maintenance sectors, it has been demonstrated that maintaining strict physical distance provides the greatest potential for use of IoT services.

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