Growth of Digitization and its Impact on Big Data Analytics

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Abstract. The world is changing in every aspect with innovations and technologies. In the current era, everyone needs to use technology smartly. The Internet, web and smartphones have become a necessity of today's life. The developed countries have already migrated their work from manual mode to digital mode. The developing countries are also striving for the overall national development using digitisation. In the last few years, India, as a developing country, also focused its efforts and took concrete steps in this regard, e.g., the Jan-Dhan Yojna, demonetisation, Digital India, etc. In the last five years, the usage of digital transaction increased in every sector. During the COVID-19 pandemic, the digitisation proved to be the optimal solution. During the lockdown period, only those sectors could survive, which had deployed digital services. Everyone needs to move to digitisation for the overall development of one society and country.

Keywords: digitization, digitalization, COVID-19, demonetization, Big data, E-commerce.

1. Introduction
The advent of the Internet has revolutionised changing the world drastically. The smartphone and the Internet have transformed almost every sector viz., education, medicine, business, banking, economics, agriculture, etc.
Online information sharing is an important feature to attract people of all areas. This is the better way to establish better connections between users, industry or companies. In any business and development of the company customers satisfaction is most important. The developed countries are using new technologies, and developing countries are moving towards digitalisation. While the big industries, organisations, banking sectors, etc. have already moved to digitalisation, the small-scale businesses are also striving for digitalisation despite many geographical/economic constraints. After, independence, India progressed in education, businesses, medical, banking, shopping and other sectors. However the pace gathered phenomenal momentum due to digitalisation. The authors [1], discusses how the web and digitalisation affected the education sector in the last few years. However, digitalising in developing countries like India has to overcome many obstacles. In the history of digitisation, the customers and businesses faced many security problems. With continuous innovation in technology, the digitalisation needs to be implemented with better supervision and monitoring with respect to the security constraints.
for safeguarding the interests of its investors and customers. In India, the government is also providing many facilities to small-scale businesses to develop their business according to the need of era [2].

Digital technologies are enabling transforming all aspects of the industry, market and organisations; businesses and employees have lots of opportunities with different obstacles. While the learners/students have better options and job opportunities as per their acquired skills, many old employees are facing problems while adapting to the new system.

2. Internet and Digitization

Since the inception of the web, the users of the Internet and web are increasing day-by-day. Further, the easy availability of smartphones and increasing affordability have propelled the density of internet subscribers. The growth of Internet users in the last five years and expected in the current year in India is shown in Figure 1 [3].

![Figure 1: Growth of Internet users in India](image)

It can be seen from Figure 1 that the number of Internet user more than doubled during the last five years. Moreover, from the literature [1 - 6] it has been studied that as the number of Internet or Web users are increasing, in its results the number of digital users are also increasing for online transactions, shopping, education, etc. Managing this vast data due to the increasing digitalisation in various sectors became a considerable challenge [7]. The Big Data analytics is playing a vital role in various government/private sectors to analyse and mine the required information. It is helping the manager or firms to take the right decision on time. However, as the data is increasing the challenges of Big Data analytics are also increasing.

3. Effects of Digitization in Businesses

In the current era, due to the Internet, the businesses are no more to a city or state or country. The increasing numbers of Internet users have facilitated increasing the e-commerce market in India. Digitising any department or organisation can provide an indirect or direct advantage by allowing managing things better, faster with least cost [8]. Indian businesses have been using Information Technology for approximately 35 years. Implementing IT have enabled businesses to gain better visibility, transparency, functionality and also provided better interaction methods with their distributors, dealers and customers.
Government incentive(s) for the Digital India program encouraged many businesses to adopt digitisation. Multiple government organisations migrated their workflow and services online, which brought in the desired transparency, to provide better service and quality work on time. The architecture of business became smarter and more attractive than traditional businesses. On the other side, customers are also happily harnessing technologies. In the history, the population and bank customers were very less and for money transfer they use simple methods. As the society and the world is developing the transactions methods are also developing for better security, transparency, easiness and fast services.

Now, in the digital world, customers have more options for online searching & evaluating the products and do online shopping. As the population and economy of India are increasing, the numbers of customers are also increasing, and consequently, almost all sectors faced management issues in the traditional methods and thus started converting their manual system to a computerised system [9]. For encouraging cash-less transactions, banks offer online traction modes, e.g., credit and debit cards, net banking, mobile banking, NEFT, RTGS, etc. Customers are offered attractive options from time-to-time to adopt cash-less/digital payment while transacting business or shopping [4 & 5]. Digital economy in the business means more profit with less work and cost. No doubt the digitization improved the problem of unemployment in India. A computer machine can work hours without any tiredness with one time investment. The main factors which are affecting the businesses are:

a) **Flexibility in Work:** Digitisation accords flexibility to employees when, how and from where to work. Customers spread all over the globe have different time zones. The customers need prompt service demanding service providers to be on their heels practically for 24 hours. Digitisation and the Internet have enabled service providers to cater to worldwide service demands by working online or offline from close or remote places. Digitisation turned out into a blessing during the current COVID-19.

b) **Innovation:** Digitisation has effected changes in the lifestyles of people all over the globe. As innovative products fascinate end users, there is a demand for state of the art technologies. Hence, it motivated the researcher fraternity for developing innovative products and services which can enhance the daily life activities of mankind.

c) **Communication:** Correct and timely communication with customers is the key necessity for any service provider to know the exact customer’s requirements, so as to fulfil it to their satisfaction/delight. Similar is the requirement for developing the required/new products/services. Digitisation, along with rapid communication techniques has enriched communication efficiently.

d) **Infrastructure:** Internet and advancements in smartphones has facilitated developing new businesses and changed the mode and requirement of infrastructure to conduct the business. Many business setups no more require extensive infrastructure. Business activities can be performed in a small office using electronic devices hooked up with the Internet.

Social media is also playing a vital role in the businesses. The methods of advertisement, billing, sales, supply chain, collaboration with other organization and business have become convenient and faster than the earlier times [4, 7 & 10].

### 4. Effects of Demonetization and Covid-19 on Digitalization

While the world economy improved, India continues to face the perils of population explosion, demographic challenges, castes and illiteracy. The cashless transactions growing at a slow pace did play an important role in the overall development of the country. The digitalisation enabled to reduce corruption and the risk of cash theft while carrying cash [11]. A huge amount of black money and fake currency notes had also seeped in the country and had created a parallel economy in the country. So, on 8th November, 2016, the Government of India took the historic step to demonetise the higher denomination currency [6].

Demonetisation was an essential and a positive step in the direction to build Digital India as described in [12-20]. In their study, the authors analysed that this initiative would necessitate and push the people to transact businesses and exchange money in digital form. Further, such strict actions can also remove
the traditional barriers and can motivate people to adopt and maximise the use digital payment in their daily lives. It can be seen that the initiative of demonetisation immediately affected the Indian market. All cash transaction got blocked throughout the country. Digital transactions still continue to pose a challenge in India. According to [21], demonetisation raised many questions e.g.
  
a) Effect on managing the design and execution of the initiative.
  
b) Its impact on small businesses.
  
c) Its impact on future economic policies.
  
d) Effect on illiterate and impoverished people.

After the demonetisation, improvements in Indian business started getting noticed. People became more aware of online transactions and shopping. According to authors in [22], despite difficulties in developing countries like India for adopting E-commerce, the E-commerce market improved in the last 5 years. While E-commerce companies were already prepared for online transactions many organisations created the necessary infrastructure to encourage digital transactions. For extending their reach to the customers, companies kept Point of Sale (POS) machine, generated distinct QR codes for different payment gateways. The use of POS machines increased drastically in the quarter January 2017 to March 2017. Table 1 depicts the growth of e-commerce and smartphone users in India in the last 6 year. The numbers of E-commerce and smartphone users witnessed phenomenal growth in last few years as shown in Figure 2 [23-25].

| Years | Smartphone Users | E-commerce Users |
|-------|------------------|------------------|
| 2015  | 250.66           | 302.36           |
| 2016  | 304.51           | 342.65           |
| 2017  | 394.82           | 422.2            |
| 2018  | 479.34           | 493.96           |
| 2019  | 559.94           | 636.73           |
| 2020  | 642.38           | 696.77           |

Figure 2 depicts that the growth of smartphone and e-commerce users increased more than twice after the demonetisation in November 2016. Further, the pandemic COVID-19 has shaken up the world. The people locked down in their houses. On the other hand, it was a challenge for government, organisations, education sector and different business to continue their work. The IT industries, Educational Institutions, customer care, insurance industries assign work from home to their employees. Digitisation is the only solution which could help humans to perform their work smoothly and safely. The COVID-19 crisis and compulsions, forced Indians to adopt digitalisation of business transactions, thus filling up the gaps that demonetisation had failed to cover up. With lots of new opportunities arising, and the people becoming gaining experience of using available and upcoming technologies, different sectors are going the digital way for survival and growth [24-26].
5. **Challenges in Big Data**

The previous sections of this study showed how the Internet/smartphones/digitisation/demonetisation and COVID-19 influenced our routine and lifestyles. Figure 3 shows various application areas of big-data in different sectors.

![Figure 3: Application areas of Big Data](image)

**Figure 2: Growth of E-commerce and Smart Phone Users**

![Growth of Smart Phone and E-commerce Users](image)
Many businesses have adopted digitisation, which generates massive data every nanosecond. Smartphones are the main generators of Big Data. Technical obstacles in Big Data analysis include scalability, security, inconsistency and incompleteness of data and timeliness. The heterogeneous data is saved on the server. Due to the different applications and vast user-base of smartphone and the Internet, Big Data gets overused and abused. As a result, it has become quite challenging to manage a combination of structured data with unstructured data to mine the required information. Table 2 depicts the main characteristics in Big Data along key dimensions are based on 6V's [10, 17, 27 & 28].

| Table 2: Characteristics of Big Data |
|-------------------------------------|
| **Volume**                          |
| a. Terabyte                          |
| b. Petabyte                          |
| **Velocity**                         |
| a. Growth rate                       |
| b. Users growth                      |
| **Variety**                          |
| a. Unstructured                      |
| b. Structured                        |
| **Veracity**                         |
| a. Availability                      |
| b. Accountability                    |
| **Value**                            |
| a. Statistical                       |
| b. Hypothetical                      |
| c. Correlations                      |
| d. Modelling                         |
| **Validity**                         |
| a. Correct data                      |
| b. Incorrect data                    |

These 6 V's together define Big Data as "high volume, high velocity, and/or wide variety information assets. However, in the last few years, as users of the Internet and web have increased, Big Data has also increased posing new challenges [10, 27 & 28]. The main challenges in Big Data analysis are described in Figure 4.

1. **Growth of Data:** Streaming of unstructured data has increased its quantum, thus creating difficulties in managing it.

2. **Variety of Tools:** A large number of tools are being developed for the analysis of Big Data. However, prior training is essential for using these tools proficiently, which is expensive and a time-consuming task.

3. **Quality Management:** Data needs to be checked and cleaned for malware, prepared, verified and then mined for retrieving the quality patterns from it.

4. **Variety of Users:** Variety signifies knowledge of users. Every category of the user has a different way to handle the data.

5. **Heterogeneous data:** It is the combination of data of text, images, audio, video, etc. It means dealing with unstructured, structured and semi-structured data. So, there are challenges in every phase of Big Data Analytics.

6. **Frauds:** One side where digitization is improving the one life on the other hand some people are using it for frauds. Different type of offline or online frauds are increasing day by day. It is a big challenge for analysts to analysis the fraud data from the social media.

7. **Scalability:** It means the ability to change and increase hardware, software and storage capacity to manage the rapid changes in the growth of data either in the volume of traffic for the prompt processing of data to generate the output.

8. **Complexity:** Due to the high level of technical complexity, technocrats in many companies lack data science skills.
9. **Data Storage**: The organizations have to face many challenges to store unstructured data. The data need to store in database so that it can mine or analysed as per the requirement of the users.

![Figure 4: Challenges in Big Data](image)

10. **Data Integration**: In the current era, the users can input their information through various sources. Which became a challenge for organization to integrate the information in database.

11. **Security**: It is a collective term for all tools and measures necessary to protect data from hacking and malware.

12. **Privacy**: Big Data provides lots of benefits; however, it has privacy risks like data brokerage, data discrimination and data breaches.

13. **Risks**: In the digital world different new risks were also increased. Few of them are as follows:
   i. Market Risk
   ii. Credit Risk
   iii. Operational Risks

As the requirements of online users is also increasing. Table 3 depicts 3 Q's based on expectations:

| **Table 3**: Expectations |
|---------------------------|
| **Quality** | The quality is the primary concern to analyse the data. |
| **Quick** | Quick response is necessary. |
| **Quantity** | The quantity of similar contents are increasing. Users want to keep the backup of the contents. |

Analysts have witnessed that during the past few years, an increasing number of people are directly or indirectly storing significant volumes of their unstructured information online in India.
6. Conclusions
The economy, market and living standards are improving across the globe. The backbone of improvement is advanced technology. An individual's development could prove to be helpful in the overall development of the country. The Government of India is taking many initiatives for deriving benefits of digitisation. On 15th August 2020, the Prime Minister of India initiated the National Digital Health Mission for the health record of every person. It has been seen that the use of digitisation, online transactions, online booking etc. have increased in the past few years. Similarly, many e-businesses have been established. The need of the hour is that everyone needs to adopt digitisation to make the system fast, error-free and transparent. Increasing data poses new challenges, which needs to be promptly resolved for creating reliable systems.

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