

# The Concept of Digitalization and Its Impact on the Modern Economy

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**Abstract.** Imagining living in the past without the facilities that are available to people today seems a bit too hard to survive. We live in an era where our dependency upon technology in our routine tasks has driven us to a point where we take most of gifts of technology for granted. Technology has transformed our way of living, including but not limited to food, education, communication, transportation, entertainment, and medical care. Our favorite grocery stores and restaurants are available to provide us food of our choice at all times. Virtual classrooms and huge amount of content available online has made attainment of education convenient. Our friends and family may be distant apart from us, but are only once click away. We book a cab sitting at home for commuting, instead of walking down the street to catch one. We carry around complete entertainment package with us in our pockets and bags. Wearable gadgets are facilitating us in medical attention and care. While the list goes on and on, there is one common factor – digitalization. This paper will reveal the concept of digitalization and its impact on the modern economy.

## 1. Introduction

Digitalization is the new buzzword for every industrial sector. According to the Gartner 2018 CIO Agenda Industry Insights report, digital business or digital transformation is ranked among the top three business priorities [1]. More and more products and services are being offered to the customers over digital channels for their convenience, while the conventional modes of sales are dying down. Automation allows efficient manufacturing, inventory and sales management. Data gathering, storage and processing assists companies in generating analytical insights for decision making and driving the company in the correct direction for its prosperity. There are countless reasons for any company to seriously consider digitalization at all possible levels. Further, to meet the digitalization needs of the

end-users as well as industries, a number of players of digital technology have emerged in the digital business.

The digital activity of businesses throughout the world is increasing with every passing day, leaving a significant impact on the economy, including Gross Domestic Product (GDP) per capital, employment, labor productivity etc. Therefore, it is extremely essential to measure the impact of digital technologies and industries on the economy for the government to track investments, quantify success, and draft policies and regulations therefor. However, measurement of the impact of digital technologies on the economy is more challenging than it may appear to be [2].

Even though we are surrounded by digital technologies, the impact of digital technologies on the economy is difficult to measure. Since physical goods dominate the majority of the industrial sectors, such as food, agriculture and automobile etc., it is easier to track their impact on the economy. On the other hand, a considerably large portion of the digital sector is not physical. Rather it supports other industrial sectors by improving their efficiencies, and is based on information, intangibles and services. Many institutions, agencies, organizations and experts are attempting to devise mechanism for measuring economic impact of digital technologies [2].

## 2. The digital economy

To be able to measure the impact of digital technologies on the economy, it is important to develop an understanding of digital economy. Don Tapscott first introduced the concept of 'Digital Economy' as creating and using digital technologies using an economic impact [3]. With the advancement of digital technologies and increase in the hemisphere of its influence, the concept of digital economy evolved. During this process, researchers suggested to use e-commerce, business processes, data size, information technology (IT) infrastructure, and price behavior as indicators of digital economy [4]. In 1990s, there existed a direct relation between emergence of the Internet and the growth of the economy. The situation took a shift in 2000s and 2010s, where a direct relation between economic growth and utilization of the information and communication technologies (ICTs) was identified [5]. A key challenge imposed in measuring the economic impact of digital technologies was identified to be the quantification of digital services [6].

In 2014, Organization for Economic Co-operation and Development (OECD) issued a set of indicators of digital economic growth, which broadly include the digital infrastructure, societal adoption of digital technologies, investments in ICTs. The German Federal Ministry for Economic Affairs and Energy 2014 defines the general economy to consist of a combination of ICT sector and the Internet economy [7]. Since ICTs stand in the center of the digitalization process, creating and increasing opportunities for growth of businesses, utilization thereof is considered to be the basic factor of economic growth. However, it may vary from one country to another – in some countries, there is a strong correlation between ICT update and economic growth (for example; United States of America (USA), China), while the relation is weaker in others (for example; Philippines, Senegal) [8].

Digitalization adds to economic growth through promotion of inclusion, by interconnection of various businesses, allowing international trade and overcoming information barriers [9]. The digital technologies provide extraordinary expansion to business, which could not be made possible using the conventional means of marketing and sales. A company manufacturing its products in one part of the world can advertise products through their websites and mobile applications, and / or by using online platforms of other e-commerce companies. Traditional flow of goods, services and finance has declines, while approximately 12% of the global goods are traded through e-commerce now [10]. A buyer residing in another distant part of the world can review these products and place orders. The e-commerce industries have set up their retail network worldwide for facilitation the delivery of goods between the sellers and the buyers. This forms a chain connecting various companies belonging to different industries together, with inter-dependability of expansion of their businesses [11].

### 2.1. *The impact of digitalization on the businesses*

Digital technologies increase the efficiency of a business, by augmenting existing factor, and efficient utilization of capital and labor [12]. The manufacturing process of goods can be improved through automation. Real time ordering data helps companies plan the manufacturing process and manage the inventory better. Internet of things utilized to receiving real time data supports the businesses to deploy the workforce in the correct domain and take business decisions in timely fashion. Big data and modern data analysis tools provide the correct and updated business insight to the decision makers of a company to divide strategy for their company and implement it efficiently. Further, innovation of using digital technologies to complement the business processes boosts completion in an industrial sector. [11][13].

There is no industry, at least in the developed countries, which run without ICTs today. However, the level of dependence upon the digital technologies may vary across the countries based on a number of reasons. It is observed that the developed and the developing countries are adopting digital technologies faster, which is also reflected in their economic growth. In 2016, Japan and Brazil had the highest proportion of cloud computing tools i.e. 45%. Similarly, German enterprises showed highest adoption of Electronic Resource Planning (ERP) tools i.e. 57% and the highest acceptance of Customer Relationship Management (CRM) tools i.e. 45%. The same year and following years, there was observed a considerable growth in economy of these countries [14].

The aforementioned factors pertain to the growth of economy by effectively utilizing digital technologies in various industrial sectors. It should be noted that the digitalization of industries all around the world has also proliferated the ICT sector itself. With the increased dependency of ordinary people and business on data, there is a direct increase in demand of ICT platforms. Thus, creating more employment opportunities for people within an ICT sector. ICT platforms are specially designed to meet the customers' business needs, which are volatile, making it an ever green industry, which is most likely to grow more in future. In addition, the Internet, software and other ICT companies are associated with higher earning jobs in comparison with other industrial sectors.

For the 36 member countries of OECD, representing 80% of world trade and investment, ICT producing industries accounted for one-quarter of total research and development (R&D) expenses in 2011. In 2014, ICT related technologies accounted for one-third of total major patent applications. From 2004 to 2014, within a decade, the share of patents pursuant to digital technologies (mostly data mining, machine-to-machine (M2M), and data storage) has grown 6 times. Resultantly, between 2009 and 2012, the ICT sector performed better in the economies of OECD member countries as compared to the other business domains. ICT exports for these countries grew by 4.4% [15].

### 2.2. *The impact of digitalization on the global economy*

The share of ICTs and ICT-enables services in emerging and developing countries has been found to be on the rise. To elaborate, these countries have been able to increase their GDP by offering ICTs and ICT-enables services to the other countries. Where, United Nations Conference on Trade and Development (UNCTAD) defines ICT-enabled services to comprise of digital services delivered remotely. The 2014 economic analysis of USA revealed an export of 54% of the ICT and ICT-enabled services and 48% of import thereof. The emerging and developing economies, led by China and India, accounted for 33% of ICT and ICT-enabled services exports and 27% imports thereof [16].

As identified by the Bureau of Economic Analysis (BEA), USA Department of Commerce, the USA economy, comprising of more advanced technological industry and hence progressive digital market, reflects significant growth based on digital industrial sector. For this study, BEA considered the digital economy to comprise of the three components – digital-enabled infrastructure (including computer hardware, software, telecommunication equipment and services, Internet of Things (IoT), and supporting services), E-commerce (including Business-to-Business (B2B) e-commerce, Business-to-Consumer (B2C) e-commerce, Peer-to-Peer (P2P) e-commerce, and supporting services) and digital media (including direct sale digital media, free digital media, big data, and supporting services). In the USA, the GDP share of digital products and services exhibited growth of digital economy by an

average of over 6%. The gross output for digital economy of USA grew annually by 4.4% for a decade from 2006 to 2016. In 2016, the digital economy of the USA employed 5.9 million workers, which corresponded to 2.9% of the total employed people living in the USA. This employment rate of the ICT sector grew annually at a rate of 3.7% from 2011 to 2016 [17].

Since 2000, the digital economy is continually rising. In 2000, the Internet business spiked up, while the global digital economy boosted from 2007. Between 2008 and 2013, Singapore observed the highest digital evolution and strongest momentum thereof. USA itself has the latest technologies available to support the digitalization process. On the other hand, China and India have had a lower digital evolution but stronger momentum thereof. Resultantly, China and India are attracting private equity investments due to cheaper labor availability and rising levels of digital readiness [18].

Every passing day imposes new challenges to the leaders, followers and late adopters of the global digital market. Since the market dynamics is changing with digitalization, companies, industries and countries are working hard to keep up and catch up with the pace of emergency of digitalization for their prosperity. The digital market is currently being led by USA (MGI, March 2016), while other countries are devising aggressive strategies to promote digitalization therein. The Russian digital economy amounted to USD 61 billion in 2018, corresponding to an increase of 11% from 2017. The relevant share of Russia's GRP was about 3.8% in 2018. Russian government has devised a 5 years' digital economy development national program, and plan to invest about USD 1.8 billion annually on development of the digital industrial sector of the country from until 2025 [19, 20].

### 3. Conclusion

The digital technology is taking over lives of ordinary men as well as businesses. The digital industry is not only supporting other industrial sectors, but itself is a whole world therein. With the increasing digitalization, the ICT and ICT-enables services sector is expected to keep growing. The economy of countries investing and promoting the digital products and services within their territory is bound to grow – directly through ICTs, and indirectly when ICTs support other industries.

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