USA Economic Development with the Help of Information Technology

[1]**MD Nadil Khan**
Research scholar

Abstract
Information Technology (IT) has emerged as a pivotal catalyst for economic development in the United States. Over the past few decades, the integration of IT into various sectors of the economy has led to profound transformations, enhancing productivity, fostering innovation, and creating new opportunities. This paperanalyses a concise overview of how Information Technology has contributed to the economic development of the USA.

Keywords: USA, economic development, Information Technology, transformations

1. Introduction

The economic development of the United States has been significantly influenced and propelled by the widespread adoption and integration of Information Technology (IT) into various sectors of the economy. This transformation, often referred to as the "Digital Revolution," has played a pivotal role in shaping the country's economic landscape over the past few decades.

The United States has a long history of technological innovation and entrepreneurship, which laid the foundation for its leadership in the IT industry. Beginning with the development of the transistor in the mid-20th century and the subsequent creation of the first personal computers, the U.S. has consistently been at the forefront of IT advancements. This innovative spirit has not only fueled economic growth but has also revolutionized industries, job markets, and the way people live and work.

Several key factors have contributed to the symbiotic relationship between IT and the U.S. economy:

1. **Productivity Enhancement:** Information Technology has enabled significant increases in productivity across various industries. Automation, data analytics, and software solutions have streamlined processes, reduced operational costs, and allowed companies to do more with less.
2. **Globalization:** IT has facilitated the globalization of markets and supply chains. E-commerce, online marketplaces, and digital payment systems have expanded the reach of U.S. businesses, allowing them to tap into a global customer base and source goods and services from around the world.
3. **Job Creation:** The IT sector itself has been a major source of employment in the United States. Beyond that, the digitization of the economy has created jobs in areas such as software development, cybersecurity, data analysis, and digital marketing.
4. **Innovation and Entrepreneurship:** The U.S. IT ecosystem has fostered a culture of innovation and entrepreneurship. Tech hubs like Silicon Valley, Boston, and Austin have become epicenters of innovation, attracting talent and venture capital. Startups and tech giants alike have pushed the boundaries of what's possible with technology.
5. **Education and Research:** The United States boasts some of the world's top universities and research institutions, which have played a critical role in advancing IT knowledge. These institutions have produced talent, conducted ground-breaking research, and facilitated technology transfer to the private sector.
6. **Government Initiatives:** Government initiatives, such as investments in broadband infrastructure, research funding, and policies that encourage innovation and competition, have supported the growth of the IT sector and its positive impact on the economy.
7. **Digital Transformation:** Businesses, both large and small, have undergone digital transformations, adopting cloud computing, artificial intelligence, the Internet of Things (IoT), and big data analytics to stay competitive and meet the changing needs of consumers.

2. Literature review

The proportional contributions that various industries make to national economies are not the same; for example, some pay their employees more than others do. Some businesses increase their pricing more gradually than others do, while others occasionally lower their costs altogether.

Some export, which results in an increase in their production as well as a shift towards increased competitiveness and productivity throughout the economy as a whole. This enables typical employees to have a larger ability to buy imports. And some companies innovate more than others, leading to increased economic growth and an enhanced standard of living for their customers [1]. The United States' information technology sector possesses all of these characteristics, including high pay, minimal price inflation for consumers, robust exports, and excellent innovation. This research investigates the significant role that the information technology industry plays in the economy of the United States by using the most recent data that is made accessible by the federal government.

Computing, data storage and processing, information services, semiconductors, and software are all examples of sectors that are included in the United States' information technology sector, which is often referred to as the "tech sector" by many people. 5.9 million people were working in this industry in 2020, making up 4.4% of all occupations in the private sector in the United States [2]. These employees earned more than double the standard pay in the United States [3]. When the influence of multipliers is taken into account, we find that this sector is responsible for 19% of all jobs in the United States [4].

The information technology sector is also a major source of well-paying opportunities for Americans who do not have a college education. Workers in this category receive around a fifty % salary bump across the board in this industry [5].

Importantly, the vast majority of the industry participates in international commerce, which means that it sells its goods and services on a worldwide scale and competes with the output of other nations. [6] The information technology industry accounts for a proportion of 28.0% of establishments, 22.4% of jobs, and 30.7% of payroll expenditures among those industries in the United States that compete in the global economy. However, given the intensity of competition taking place throughout the world for leadership positions in the information technology industry, the United States should not take any of this for granted.

In conclusion, the information technology industry is significant not just because of the direct influence it has on the economy in terms of the number of jobs it creates and the cash it generates, but also because of the indirect effect it has on organisations that utilise IT to enhance their quality and productivity, regardless of whether these organisations are for-profit businesses, non-profit organisations, or governments. Because of this, there has been a slight inverse association between an industry's usage of information technology and inflation over the course of the previous decade. In other words, sectors of the economy that make more use of information technology experience price inflation at a rate that is one-half that of the entire economy, and the savings resulting from this phenomenon are subsequently passed on to consumers in the United States.

Even among the select group of industries that meet those criteria, the information technology sector is a standout for the United States, punching 35% above its weight in the global marketplace. These are the three primary characteristics of the nation's most strategically important industries: they are driven by advanced technologies; they are globally traded sectors; and they serve the dual purpose of contributing to both economic and national security. That example, according to the most current comparable data that was made public by the OECD, the information technology (IT) sector in the United States comprised about one-third of the global IT market (32,1%), which was 35% more than the United States' share of the whole global economy [7].

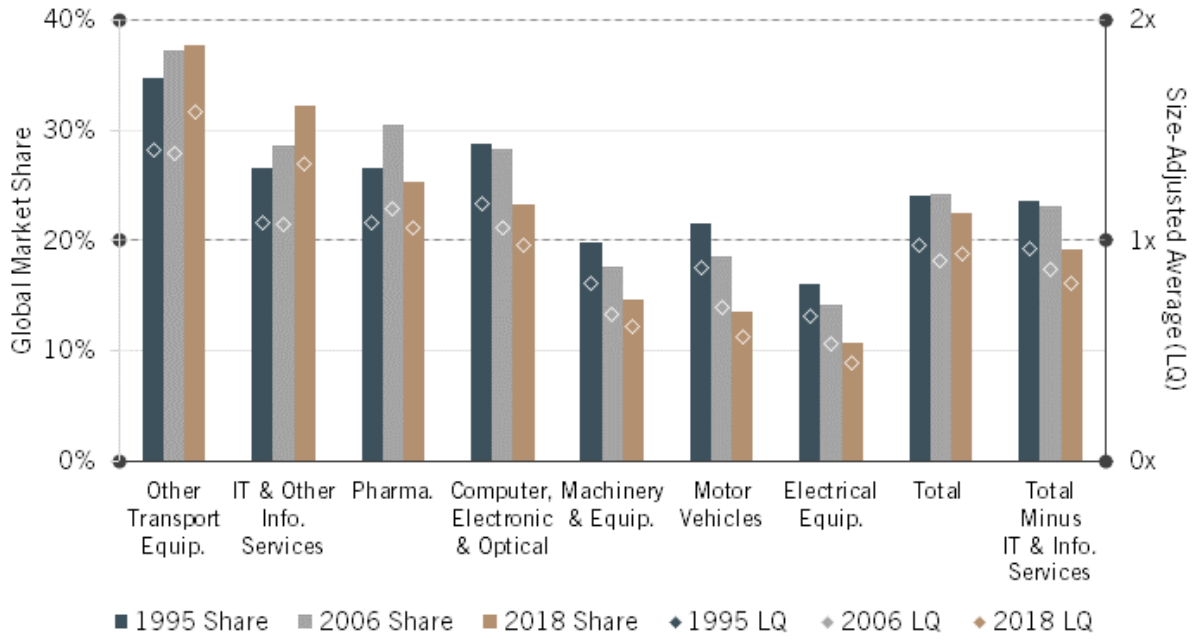

Figure 1: U.S. performance in advanced industry sectors [7]

The location quotient (LQ) is a striking metric of industry concentration, and as shown in figure 1, the trend line for the United States information technology sector has been very favourable in recent decades: Its relative worldwide market share increased from 1.08x in 1995 (meaning it was 8% higher than the size-adjusted average across 66 nations in the OECD's dataset) to 1.35x in 2018 (meaning it was 35% above the relative average). This occurred as a result of the company's expansion. In point of fact, if it weren't for the contribution made by the information technology sector, the most strategically significant advanced sectors in America as a group would have experienced a precipitous decline over that time period in the face of increasing competition, notably from China. Therefore, policymakers in the United States should not underestimate the importance of the information technology industry [9].

3. IT in the U.S. Economy

In the year 2020, the information technology sector in the United States consisted of 275,859 enterprises with a combined annual payroll of $722 billion [10].

In addition to this, the industry is responsible for the creation of well-paying jobs for American citizens. The average yearly remuneration for a worker in the information technology business was $122,270 in 2020 [11], which was 117% more than the average wage in the private sector in the United States. The recent research on the digital economy that was released by the Department of Commerce reveals that between the years of 2012 and 2020, the nominal pay for workers in the digital industry increased at an average annual rate of 6.0% [12]. Even more impressive was the 7.3% increase in the average nominal remuneration that was seen from 2019 to 2020 [13]. The scope of this report is narrower than that of the Commerce report, which covers more industries.

5.9 million people would be employed by the industry in the year 2020 [14]. Between the years 2017 and 2020, the information technology industry added employment at a rate that was more than two times as fast as the whole private sector added jobs in the United States [15]. While employment in information technology hardware increased by 1.5%, mostly as a result of greater productivity development, employment in information technology services and software increased by 12.4% [136]. According to a research published by the Department of Commerce, the digital economy employed 7.8 million people in the year 2020. This was determined by using a broader definition of the term "digital economy," which covers a significant portion of the retail

sector that makes use of e-commerce, services related to telecommunications, and some entertainment services.

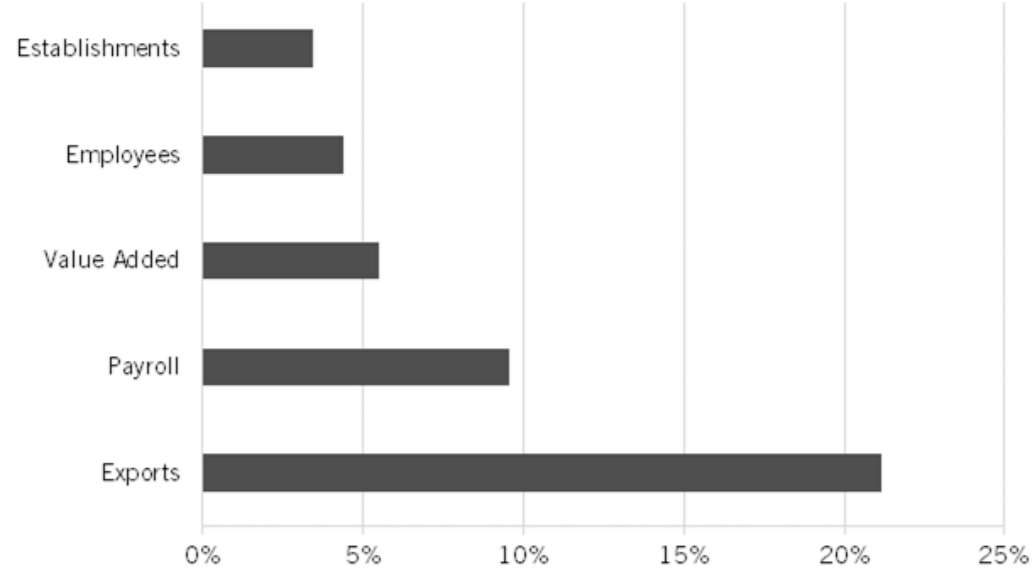

Figure 2: IT industry's share of the total U.S. economy [15]

Using the ITIF industry definition, the information technology sector accounted for 3.5% of all company establishments and 4.4% of workers in the private sector in the year 2020. This indicates that the typical information technology firm was around 27% bigger than the typical private sector firm.19 Despite this, the information technology business is one of the highest paying industries, accounting for 9.5% of all salaries earned in the private sector [16].

The value added to a product or service is the indicator that provides the most reliable data on an industry's contribution to the overall economy. This indicator is calculated by deducting the price of all inputs (such as raw materials, energy, and so on) from the total revenue of the product or service. In the year 2020, the information technology industry contributed around 5.5% of total economic output, or $1.2 trillion in domestic value added. From 2010 to 2020, the value added in the IT industry increased by $600 billion, which is an increase of 109 %. The value added in data processing, Internet publishing, and other information services increased the most quickly, at 215.1 %, the overall gross domestic product (GDP) of the United States increased by 39% during the same time period.

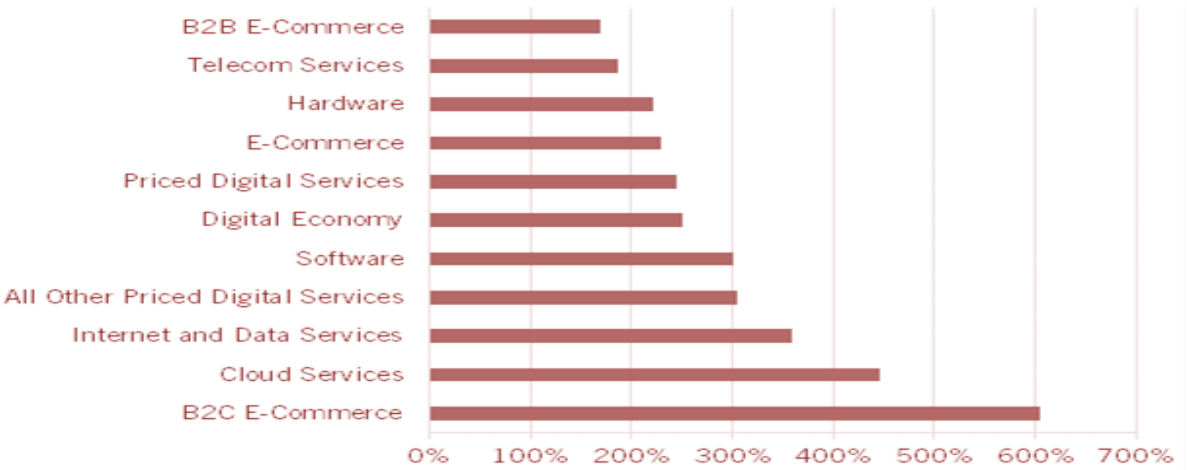

Figure 3: Digital economy, 2005–2020[17]

According to the findings of the Department of Commerce, the digital economy contributed 10.2% ($2.14 trillion of value added) to the GDP of the United States in the year 2020.[24] The Department estimates that the value generated by the digital economy will increase by 6.3% on an annual basis in real terms (after adjusting for inflation) between the years of 2012 and 2020.[18] According to the data provided by the Department, the actual value generated by the digital economy increased by 151.4% between the years 2005 and 2020.[19]

Information technology may be thought of as a broad technology that serves as the basis for economic progress. The significance of the contribution that information technology made to the expansion of the economy was seen as a significant element in the expansion of the economies of a number of nations and regions[20]. According to the findings of Weber and Bussell [21], the development of information technology contributed to drastically divergent results in the balance of economic power around the globe. Yousefi [22] examined the effect of information technology on economic growth using data collected from both established and developing nations. His findings supported the hypothesis that IT had a positive impact on economic growth. Jonathan and his colleagues [23] saw the significance of information technology (IT) in facilitating global planning, improving coordination, and cutting costs. According to the findings of Haseeb et al. [24], the information and communication technologies have the potential to enhance the quality of our surroundings in this age of globalisation. Qureshi [25] provided an analysis, from the point of view of development, on the significance of information technology to the process of economic growth. [26] Narcyz et al. presented a multi-dimensional framework in order to demonstrate the function that information and communication technologies play in the process of socioeconomic growth.

The level of sophistication of a nation's information technology can serve as a useful indication of its level of economic growth [27]. In order to highlight the significance that information technology plays in economic growth, the researchers chose many industrialised and developing nations to use as the research object. According to the findings of Jorgenson et al. [28], the development of information technology contributed to the postwar expansion of the US economy. The application of information technology in the Netherlands results in more cost-effective manufacturing. In addition, the use of information technology results in more flexibility as well as improvements in the planning, organisation, and management of work. [29]. Both Ramlan and Ahmed [30] had the belief that information technology (IT) is essential to the expansion of Malaysia's economy. In Africa, the development of information technology has an effect on the growth of urban infrastructure, which in turn contributes to the continued expansion of the African economy [31,32]. In Malaquias [33], the author discusses the function of information technology in Brazilian economic development. According to Khuntia et al. [34], information technology has the potential to play an essential part in the management of activities that promote ecologically sustainable growth.

4. Economic development with the help of Information Technology

The United States has experienced significant economic development and growth with the help of Information Technology (IT) over the past few decades. Information technology encompasses various aspects, including hardware, software, telecommunications, and the internet, and it has played a crucial role in shaping the country's economy. Here are some ways in which IT has contributed to economic development in the USA:

1. **Increased Productivity:** IT tools and software have improved efficiency and productivity across various industries. Automation, data analysis, and streamlined processes have allowed companies to produce more with fewer resources, leading to increased economic output.
2. **Job Creation:** While some jobs have been automated or outsourced due to IT advancements, the technology sector itself has been a major source of job creation. IT-related fields, such as software development, cybersecurity, and data analysis, have seen substantial growth, offering high-paying employment opportunities.
3. **E-commerce and Online Retail:** The rise of e-commerce, led by companies like Amazon, has

transformed the retail industry. Online shopping has not only created jobs but also allowed businesses to reach a global customer base, boosting sales and economic growth.

4. **Innovation and Entrepreneurship:** IT has paved the way for innovation and entrepreneurship. The USA has a thriving startup ecosystem, with tech hubs like Silicon Valley serving as global centers for innovation. New technologies, products, and services continually emerge, fostering economic growth and competitiveness.
5. **Remote Work and Telecommuting:** IT infrastructure and tools have enabled remote work and telecommuting, which have become increasingly popular, especially in light of the COVID-19 pandemic. This flexibility has allowed businesses to tap into a broader talent pool and reduce overhead costs.
6. **Healthcare and Biotechnology:** Information technology has revolutionized healthcare through electronic health records (EHRs), telemedicine, and data-driven medical research. These advancements have improved patient care and boosted the healthcare sector's economic contributions.
7. **Financial Services:** The financial industry relies heavily on IT for trading, risk management, and customer service. The development of fintech (financial technology) companies has also disrupted traditional banking, leading to increased competition and innovation.
8. **Government Efficiency:** Governments at all levels have adopted IT solutions to improve efficiency and transparency. Online services, digital payment systems, and data analytics help government agencies deliver services more effectively.
9. **Education and Skill Development:** IT has transformed education and skill development. Online learning platforms, educational software, and Massive Open Online Courses (MOOCs) have expanded access to education and training, enhancing workforce skills.
10. **Big Data and Analytics:** The ability to collect, analyze, and leverage vast amounts of data has led to more informed decision-making in business and government. This has resulted in improved resource allocation, strategy development, and economic growth.
11. **Infrastructure Development:** IT infrastructure, including broadband internet and 5G networks, is critical for economic development. Investments in such infrastructure enhance connectivity, support new technologies, and enable businesses to thrive.
12. **National Security:** IT plays a crucial role in national security through cybersecurity measures, intelligence gathering, and defense technologies. These efforts safeguard the country and contribute to its overall stability and prosperity.
13. **Internet Connectivity**: Access to the internet is fundamental for economic development. It enables businesses to reach global markets, facilitates e-commerce, and provides information and education to individuals. Expanding broadband access is a common strategy to promote economic development.
14. **Cloud Computing**: Cloud services provide cost-effective access to computing resources, making it easier for businesses to scale and innovate. This technology also supports remote work and data storage.
15. **Mobile Applications**: Mobile apps are used for various purposes, including mobile banking, health services, and education. They can enhance productivity and access to critical services.
16. **Blockchain Technology**: Blockchain is used for secure and transparent transactions. It can boost trust in financial systems and supply chains, thus attracting investment and fostering economic growth.
17. **Artificial Intelligence (AI)**: AI technologies, including machine learning, can optimize processes, automate tasks, and improve decision-making. Industries like healthcare, manufacturing, and finance can benefit from AI.
18. **IoT (Internet of Things)**: IoT devices can collect and transmit data from physical objects. This data can be used to optimize operations in agriculture, manufacturing, and logistics.
19. **E-commerce Platforms**: E-commerce platforms enable businesses to sell products and services online, expanding their reach. This is particularly relevant for small and medium-sized enterprises (SMEs).
20. **Cybersecurity Solutions**: Secure IT systems are crucial for economic development. Protecting sensitive data and critical infrastructure is essential to foster trust and facilitate digital transactions.

21. **Online Education**: Online learning platforms provide access to education and skills development, increasing human capital and employability.
22. **Smart Cities Technologies**: Technologies such as smart grids, intelligent transportation systems, and environmental monitoring can improve urban infrastructure and quality of life, attracting investment and talent.
23. **Fintech**: Financial technology innovations can enhance access to financial services, promote financial inclusion, and enable new business models.
24. **Digital Health Solutions**: Telemedicine and digital health records can improve healthcare access and efficiency, ultimately contributing to healthier and more productive populations.
25. **Social Media and Digital Marketing**: These tools enable businesses to reach a broader audience, engage with customers, and build brand awareness.
26. **Open Data Initiatives**: Governments can release public data for free, which can be used by businesses and researchers to create new products and services, stimulate innovation, and improve decision-making.
27. **Economic Forecasting Tools**: Advanced data analytics and modeling tools can help governments and businesses predict economic trends and make informed decisions.

These IT tools and technologies are not only essential for economic development but also interdependent. A holistic approach that integrates various tools and strategies can have a more significant impact on fostering economic growth and development.

Conclusion

Information Technology has been a driving force behind economic development in the United States by enhancing productivity, fostering innovation, creating jobs, improving access to education and healthcare, and facilitating the growth of various industries. It will likely continue to be a key driver of economic growth in the years to come.While Information Technology has been a powerful driver of economic development in the United States, it has also raised important questions related to privacy, cyber security, and the digital divide. Addressing these challenges while harnessing the full potential of IT will be crucial in ensuring continued economic growth and prosperity in the years to come. Overall, the United States' economic development with the help of Information Technology underscores the importance of adaptability, innovation, and the ability to harness technology for the benefit of society and the economy.

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