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Quantitative approaches to forecasting the economic impact of technological disruptions in making informed decisions for sustainable economic growth in the U.S.

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ABSTRACT

The study is focused on forecasting economic impact of technological disruption using mathematical model to predict the consequences of disruptive technologies. Therefore, the study is aimed at analyzing quantitative data to show how disruptive technologies can be managed for the purpose of achieving sustainable economic growth in the United States. Several literatures were reviewed, especially those related to disruptive technologies. The study findings revealed that Information Technology (IT) expenditure and individual using internet have positive and significant effect on economic growth of United States. It was also revealed that there is significant difference in IT expenditure before and after 2010, indicating a decrease in total amount spent on IT. The findings also revealed that there is significant difference in US Gross Domestic Products (GDP) before and after 2010. Also, it was found that there is significant difference in number of individuals using internet before and after 2010. Therefore, the study concludes technological disruption is a significant determinant of economic growth in the US. The study recommended that initiatives aimed at enhancing broadband infrastructure and fostering digital literacy can play a pivotal role in sustaining and amplifying the positive impact of technological advancements on economic growth. By understanding and leveraging these findings, policymakers, industry leaders, and stakeholders can make informed decisions, fostering a conducive environment for sustainable economic growth in the United States. This study serves as a timely and significant contribution to the field, providing actionable insights for shaping economic policies and strategies amid the evolving landscape of technological disruptions.

Keywords: *Quantitative Model, Forecasting, Technology Disruption, Economic Growth*

I. INTRODUCTION

The rapid progress and breadth of technological advancements have prompted the characterization of the current era as the 'fourth industrial revolution' (4IR). As per a United Nations (UN) report, the driving forces behind the 4IR include swift developments in digital technologies such as artificial intelligence (AI), machine learning, robotics, additive manufacturing (3D printing), the Internet of Things (IoT), distributed ledger technology (blockchain), and quantum computers. These technologies are intricately connected with biotechnology, nanotechnology, as well as cognitive, social, and humanitarian sciences [1].

The rise of this latest wave of technologies has already influenced global peace and security. In the conflict in Ukraine, remotely operated aerial platforms have proven pivotal for the military forces on both sides. Additionally, Russian forces assert their utilization of advanced high-precision hypersonic missiles [2]. Technological advancement has often been viewed as a disruptive influence, stimulating change across various levels, from the everyday activities of individuals to the intense rivalry among global superpowers [3].

Despite their external appearance, technologies are deeply ingrained in society, reliant on human actions for their very existence. Given that technological disruptions can only occur through human activities, they are more like revolutions than seismic events such as earthquakes. Undoubtedly, technological advancements are often characterized as revolutionary [4]. From delicate yet profitable porcelain to rudimentary yet lethal gunpowder, from the invention of public opinion through the printing press to the television, which some argue encouraged solitary activities, new technologies have consistently altered the trajectory of lives, communities, and civilizations. In the current era of data-driven internet technology, its disruptive influence serves as a central element of the business model. This is notably illustrated by the 'move fast and break things' mantra, initially embraced by Facebook but now symbolizing the willingness—and even determination—of Silicon Valley companies to disrupt what they perceive as outdated social norms, political concepts, and economic models, often with a 'better to ask forgiveness than permission' approach to legal compliance [5].

Disruption is characterized by swift and often dramatic change, and has been historically associated with technology, serving as a catalyst for upheaval in our personal lives, communities, and even entire civilizations. This disruptive influence spans across various levels, from the everyday routines of individuals to the intense rivalries among global superpowers [6]. The advancement of technology disrupts the economic system by shaping and dismantling certain business models, supply chains, and employment patterns. In the realm of defense, technological innovation significantly impacts all facets of military operations, from logistics and training to strategic decision-making and physical combat [3].

Democratic discussions have encountered disruption due to technological advancements, particularly with the rise of social media(1). Many of these online platforms thrive on emotive, polarizing content and occasionally endorse misinformation, amplifying societal divisions and undermining democratic processes, while verifiable facts and information struggle to gain similar traction. Similarly, social norms, values, and identities have experienced disruption from technology, reshaping our fundamental perception of ourselves, our activities, and our relationships with others [2].

Moreover, technology-driven disruptions have influenced international relations, reshaped the global power dynamics and even restructured the international system itself. In response to these disturbances, laws and regulations are evolving towards a more adaptable approach to policy-making, facilitated by the emergence of intelligent regulatory tools [7].

The impact of technological advancement has traditionally been viewed as a catalyst for significant change, influencing various aspects of life, from the day-to-day routines of individuals to the intense competition among global powers [5]. This examination delves into the disturbances caused by technology across several critical domains, including politics, economics, and society. It specifically highlights seven areas: the economic structure, military and defense, democratic discourse and the digital sphere, social conventions, values and cultural identities, international diplomacy, and the legal and regulatory framework. Additionally, it illustrates the concept of surveillance as an instance showcasing how technological disruption in these realms can converge to propel other phenomena. Notably, the primary disruptive force of 2020 is non-technological, specifically the coronavirus. This pandemic serves as a lens through which to explore the intersection of technological disruption with other forms of upheaval [1].

II. LITERATURE REVIEW

Twelve Potentially Economically Disruptive Technologies

Mobile Internet

Mobile computing devices and internet connectivity are becoming more affordable and efficient. Within a short span of time, internet-enabled portable devices have shifted from being a luxury for a select few to a fundamental aspect of everyday life for over one billion individuals who possess smartphones and tablets [8].

Automation of knowledge work

Intelligent software systems capable of executing knowledge-based tasks that entail unstructured instructions and nuanced judgments [7]. Advancement in artificial intelligence, machine learning, and natural user interfaces, such as voice recognition, is enabling the automation of many tasks traditionally deemed impractical or impossible for machines. For instance, computers can now respond to "unstructured" questions, allowing employees or customers without specialized training to obtain information autonomously. This development has the potential to revolutionize the organization and execution of knowledge work. Advanced analytics tools can enhance the capabilities of skilled workers, and as more tasks can be performed by machines, certain job roles may become entirely automated [5].

The Internet of Things

Interconnected systems comprising affordable sensors and actuators for data gathering, monitoring, decision-making, and streamlining of processes [9]. The rapid proliferation of the Internet of Things, which involves incorporating sensors and actuators into machines and physical objects, is increasingly prevalent. From overseeing product movement in factories to gauging moisture levels in agricultural fields and monitoring water flow in utility pipelines, the Internet of Things facilitates asset management, performance optimization, and the development of novel business models for both commercial enterprises and public institutions. Additionally, through remote monitoring, the Internet of Things holds significant promise in enhancing the health of patients with chronic illnesses and addressing a significant contributor to the escalation of healthcare expenses [10].

Cloud technology

Use of computer hardware and software resources accessed via a network or the Internet, frequently in the form of a service. Cloud technology facilitates the delivery of computer applications or services over a network without the need for local software or processing power. IT resources are made available on demand, allowing seamless addition of extra capacity without upfront investments in hardware or programming [8]. The cloud drives the proliferation of Internet-based services, from search engines to media streaming, as well as the storage of personal data, while enhancing the processing capabilities of mobile Internet devices. Additionally, it improves the economics of IT for organizations and governments, offering increased flexibility and responsiveness. Furthermore, the cloud enables novel business models, including various pay-as-you-go service structures [1].

Advanced robotics

Robots with growing capabilities, improved senses, dexterity, and intelligence, employed for task automation or to enhance human capabilities. Industrial robots, historically restricted to physically demanding tasks, are now evolving with heightened senses, flexibility, and intelligence due to progress in machine vision, AI, communication, sensors, and actuators [9]. These advancements facilitate safer human-robot collaboration, making robot substitution in manufacturing and service jobs more feasible. Additionally, the technology could lead to innovative applications in healthcare, including surgical robots, robotic prosthetics, and supportive exoskeletons enhancing mobility and quality of life [10].

Autonomous and near-autonomous vehicles

Automobiles capable of functioning and navigating with minimal or zero human intervention. Advancements in machine vision, AI, sensors, and actuators enable the development of autonomous vehicles, including drones and self-driving cars [9]. These technologies hold promise for revolutionizing ground transportation, enhancing safety, reducing emissions, and increasing productivity in the trucking industry, subject to regulatory and public acceptance.

Next-generation genomics

Automobiles capable of functioning and navigating with minimal or zero human intervention. The latest genomics combines sequencing advancements with robust big data analytics, significantly enhancing genetic research [10]. Rapid sequencing allows systematic testing for specific traits and diseases, paving the way for personalized treatments and improved drug discovery.

Energy storage

Devices or systems designed to store energy for future use, encompassing various types of batteries. Energy storage technology, including lithium-ion batteries and fuel cells, powers electric vehicles and portable electronics, witnessing enhanced performance and reduced costs [11]. Further advancements could render electric vehicles cost-competitive, improve power grid integration, and extend reliable energy access to underserved areas.

3D printing

Additive manufacturing processes involve the creation of objects through the printing of successive layers of material according to digital designs [1].

Advanced materials

Materials engineered to exhibit exceptional traits, such as enhanced strength, reduced weight, conductivity, or specific functionalities.

Advanced oil and gas exploration and recovery

Methods for exploring and extracting unconventional oil and gas in a cost-effective manner. The revolutionary extraction of unconventional oil and gas reserves from shale formations, made feasible by horizontal drilling and hydraulic fracturing, holds immense potential for energy access [8]. With ongoing advancements, this technology could significantly expand fossil fuel availability and benefit energy-intensive industries, possibly leading to a broader energy revolution.

Renewable energy

Producing electricity using sustainable sources to minimize adverse effects on the climate. Renewable energy sources, including solar, wind, hydroelectric, and ocean wave power, offer an inexhaustible energy supply without resource depletion or environmental harm. Solar cell technology has witnessed remarkable cost reductions, while wind power continues to expand as a major renewable energy contributor globally. Emerging economies, notably China and India, are aggressively pursuing the adoption of solar and wind energy, anticipating significant economic growth and pollution reduction. [11].

5G

5G's real-time data transfer capabilities promise to enhance remote use applications by eliminating information lag. Its high bandwidth and low latency can improve data capture and access, potentially informing decision-making during the design phase and reducing the need for future renovations [9]. Moreover, 5G aids cost-effective technology deployment for efficient video information analysis, reducing the necessity for onsite presence and offering project owners immediate visual transparency.

Blockchain

Blockchain finds diverse applications, facilitating activities from power project crowdfunding to the operation of flexible grid systems and interoperable transportation mobility. Its distributed ledger technology holds potential for simplifying the intricate, resource-intensive processes involved in selecting, evaluating, and managing relationships within complex global supply chains [8].

Impact of Technology Disruptions on the Economy

Technology frequently plays a role in swift alterations to the economy, impacting existing models, value chains, and employment markets. These shifts are expected to become even more dynamic in the future as workers and organizations across all economic sectors are faced with numerous new technologies that bring both opportunities and challenges. In fact, many contend that digital transformation represents a contemporary manifestation of creative destruction, fundamentally reshaping economies and employment opportunities in an irreversible manner [5].

In many instances, disruptive technologies are perceived as facilitators of simpler, more convenient, and cost-effective products and services, alongside the emergence of fresh value propositions, reduced costs and profit margins, and the establishment of novel business structures. These attributes become evident when contrasting platform enterprises with their conventional counterparts (e.g., Amazon compared to high-street shops, Airbnb compared to hotels, or Uber compared to taxis). Disruptive technologies can also give rise to new markets (e.g., cryptocurrencies), contribute to the demise of dominant companies (e.g., Blockbuster), and yield significant competitive advantages (e.g., Google search engine). While traditional models were rooted in controlling tangible or fixed assets along a vertical value chain, platforms utilize artificial intelligence (AI) and big data to coordinate knowledge gathered from third parties (users) and capture its value. [7]

In addition to establishing new value chains, technology is reshaping numerous traditional ones. Industrial value chains are experiencing a shift towards greater decentralization and globalization [10]. Primarily, digital technologies facilitate key stages of production, such as product design, engineering, and manufacturing, to occur in diverse locations. They enable supply chains to extend across continents and permit oversight of the international flow of production components, goods, workers, and investments. Moreover, the integration of digital technology, the internet, and production is progressively forming a cyber-physical system that encompasses manufacturing, servicing, customization, and even energy management [9]. Although this trend is still in its initial phase, it is anticipated to gain more momentum in the future.

Impact on Job Market

The automation stemming from technological progress can manifest in two ways: either by substituting humans with machines or by enabling the execution of tasks that were previously unattainable, thereby significantly impacting job markets. From 2013 to 2018, the implementation of industrial robots witnessed an annual growth rate of 19% [5]. The impact of automation on unemployment can be dynamic and intricate. While job displacements may occur, the workforce can adapt, and new employment opportunities can emerge. Increased productivity and reduced prices can potentially lead to higher salaries and consumer demand, thereby fostering employment growth in other sectors. Ongoing disruptive technologies such as AI, big data, or the Internet of Things (IoT) also contribute to the creation of entirely new jobs, implying that this wave of automation will likely exhibit similar 'rebound' effects as previous ones.

Nevertheless, there is a risk that insufficient employment opportunities may arise for workers displaced due to inadequate skills. Education and training, which can positively or negatively influence the level of technical and digital readiness in society, along with the overall composition of sectors (receiving both positive and negative spill-over effects from automation), will be pivotal in shaping the future outcomes [9].

The future workforce is expected to rely more on non-traditional employment arrangements and will likely require constant retraining and upskilling to keep pace with rapid technological advancements. However, this process might prove challenging and costly for many, especially those most vulnerable to job displacement. Disruptions caused by technology can disproportionately impact workers depending on their skills and occupations, with variations across countries and regions [12].

The emergence of the gig economy raises concerns about worker welfare and social protection, including issues related to pensions, insurance, and maternity leave, among others. Technological disruptions may contribute to job polarization, affecting differently skilled roles in distinct ways [9]. As technological change tends to favor those with higher skills, workers employed by industries benefiting from technological disruptions often enjoy superior job quality and rewards compared to those in sectors struggling to adapt to digitalization.

Without intervention, the bias towards specific skills and the concentration of profits and resources could exacerbate existing income and wealth disparities. However, certain market forces, such as labor costs and the profitability of investments in labor-replacing technologies, might help moderate these effects. Consumer choices and social preferences regarding labor market regulations and ethical standards, along with institutional norms, regulations, and the role of trade unions, could also influence the outcomes [12].

In emerging economies, technology disruption can yield negative real growth and high inflation, leading to massive job redundancies and a significant portion of the workforce being excluded from employment. Historical instances in India, such as the industrial revolution in the 1960s and the advent of computerized accounting in the 1990s, highlight how unskilled workers faced prolonged poverty, emphasizing the need for continuous upskilling. Anticipated changes in the IT sector due to automation could render low-cost software development models obsolete, affecting employees at all levels. Proper management is crucial to avoid a potential era of heightened unemployment and subsequent economic repercussions [10].

III. METHODOLOGY

[13] stated that data analysis involves the systematic application of tools and techniques in a logical sequence to interpret information and data. This constitutes a crucial element for gauging effectiveness and ensuring accurate data interpretation in the study. There are two major types of forecasting methods: Time Series and Causal method. Time series forecasting method can be subdivided into moving average; weighted moving average; exponential smoothing method; trend projection and decomposition. Components of time series forecasting method include trends, seasonality (months), cyclic (over the years), random components. The components are used in two models; addictive models (add all components) and multiplication method (multiply all components) [14]

On the other hand, the causal method obtains a forecast of the quantity of interest of the dependent variable by relating it directly to one or more independent variables. The method is focused on using regression analysis to establish or forecast future relationship between dependent and independent variables.

$Yt = f\ (Xt)$

or

$Yt = f\ (X_{1t}, \dots, X_{kt},\ Y_{2t,} \dots, Y_{1k})$

To achieve the objectives of this study, inferential statistics was employed. Inferential statistics such as ordinary least square (OLS) regression analysis is used to ascertain either the rejection or acceptance of the null hypothesis at 0.05 level of significance using SPSS Version 22.0. For the purpose of this study, the model below was formulated:

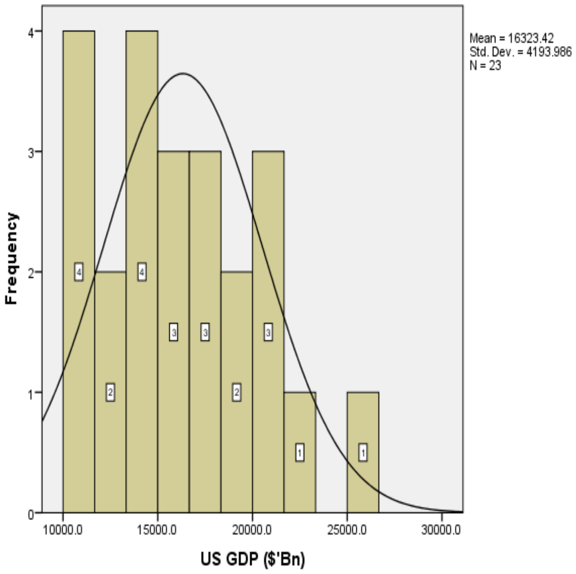
$GDP_t = \beta_0 + \beta_1 ITE_t + \beta_2 ITE_t + \beta_2 INI_t + U_t$

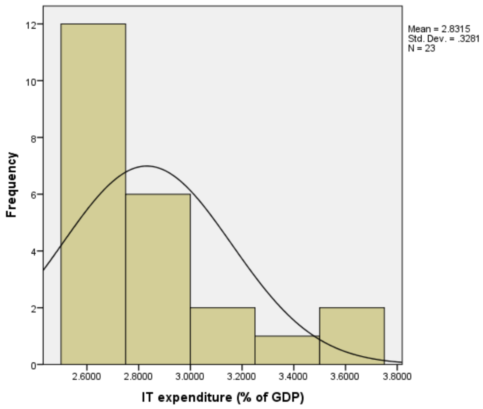
IV. EMPIRICAL RESULTS

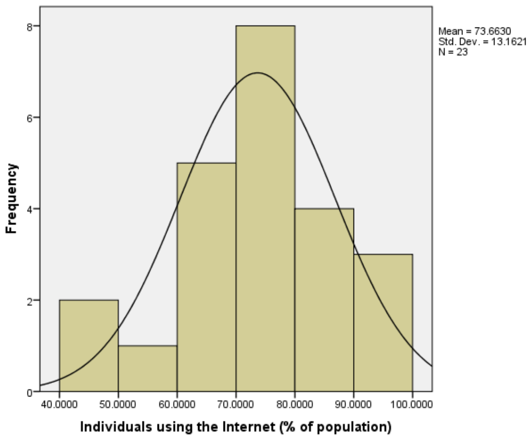
Descriptive Analysis

Table 1: Descriptive Statistics

	IT_EXPENDITUR E	INDIVIDUALS_U SING_THE_IN	US_GDP__$_BN_
Mean	2.831503	73.66300	16323.42
Median	2.725060	73.00000	15599.70
Maximum	3.703690	91.75321	25461.30
Minimum	2.501720	43.07916	10251.00
Std. Dev.	0.328061	13.16213	4193.986
Skewness	1.431805	-0.437380	0.405581
Kurtosis	4.051691	2.817008	2.350879
Jarque-Bera	8.918550	0.765414	1.034369
Probability	0.011571	0.682013	0.596197
Sum	65.12458	1694.249	375438.7
Sum Sq. Dev.	2.367724	3811.315	3.87E+08
Observations	23	23	23



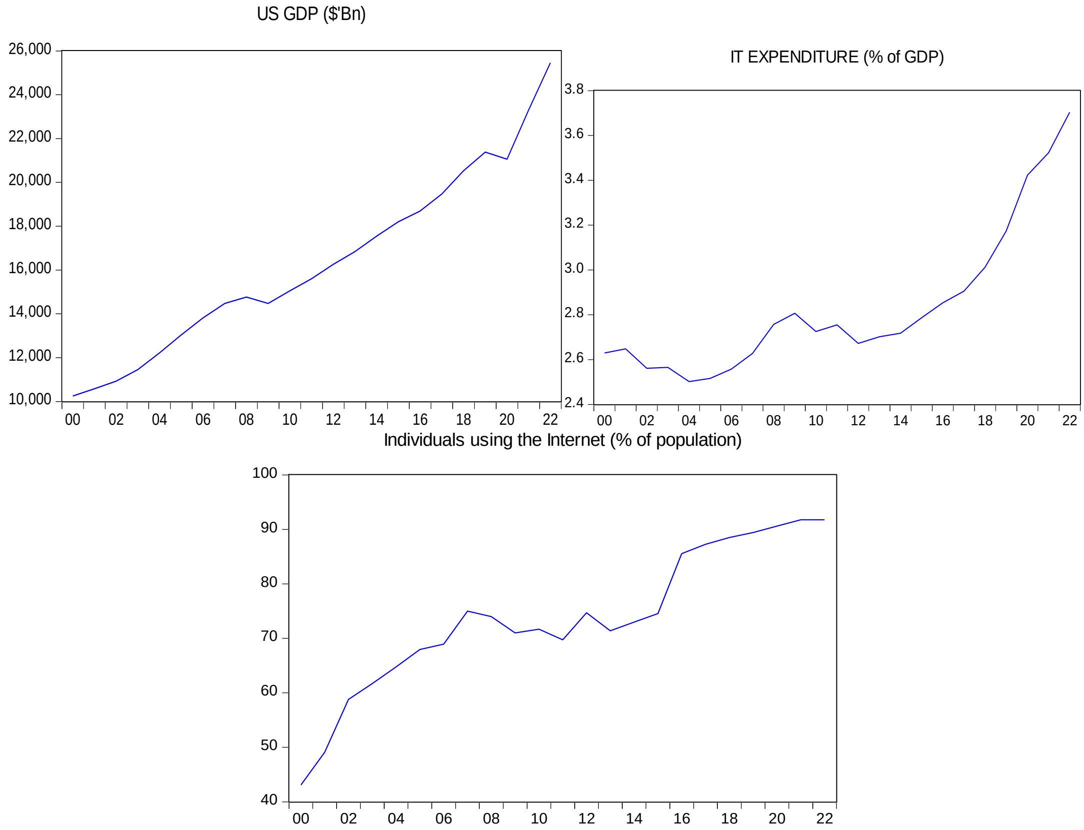




The average IT expenditure is approximately 2.83% of the value GDP with a standard deviation of 0.33. The distribution is positively skewed (1.43), indicating a longer right tail. Positive kurtosis (4.05) suggests heavy tails and a peaked distribution. The Jarque-Bera test indicates non-normality (p-value = 0.0116). The mean number of individuals using the internet is approximately 73.66% of the population with a standard deviation of 13.16. The distribution is negatively skewed (-0.44), indicating a longer left tail. Positive kurtosis (2.82) suggests heavy tails and a moderate peak. The Jarque-Bera test indicates non-normality (p-value = 0.682). The mean value of US GDP is approximately 16,323 billion dollars with a standard deviation of 4,193, the variable is slightly positively skewed (0.41), indicating a right-leaning distribution. Positive kurtosis (2.35) suggests heavy tails and a moderate peak. The Jarque-Bera test of the variable indicates non-normality (p-value = 0.596).

The data for IT expenditure and US GDP exhibit positive skewness, indicating a right-leaning distribution, while INDIVIDUALS_USING_THE_IN shows negative skewness. All variables have positive kurtosis, suggesting heavy tails and a peaked distribution. The Jarque-Bera tests indicate that the variables do not follow a normal distribution.

Unit Root Test



The graphical representation of the variables used in the study showed that US GDP moved in upward trend over the years as the value continue to increase at an increasing rate. For IT expenditure, values of the variable also increase over the years, the variable experienced fluctuation in early 2000s before continuous increase from 2012 till date. In recent years, the percentage of individuals using the internet has been steady at almost 90%. Over the years, the variable also experienced an upward trend.

Table 4.3: Phillip Perron Fuller Unit Root Test

Variables	1st Diff	Order of Integration	Remark
ITE	0.0460	I(1)	Stationary at 1st Diff
INI	0.0053	I(1)	Stationary at 1st Diff
GDP	0.000	I(1)	Stationary at 1st Diff

Source*: Author's Computation Using E-Views 11.0*

The unit root test summarized in Table 4.3 above shows that all variables (IT expenditure, individuals using internet and gross domestic product) in the study are stationary after first difference as the probability values of their unit root test were less than 5% significance level after first difference. It is therefore concluded that all variables are I(1) variables.

Cointegration Test

H_0: Series are not Cointegrated.

Table 4.4: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.706572	36.23630	29.79707	0.0079
At most 1	0.266009	10.48773	15.49471	0.2451
At most 2 *	0.173171	3.993297	3.841466	0.0457

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

The Trace statistics of the Johansen cointegration regression test summarized in the Table above shows that there is 1 cointegrating regression at 5% significance level as the probability value at most 2 (0.0457) is less than 5% significance level.

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.706572	25.74857	21.13162	0.0104
At most 1	0.266009	6.494437	14.26460	0.5506
At most 2 *	0.173171	3.993297	3.841466	0.0457

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

The summary table of the Johansen cointegration regression test indicates that, based on the Maximum Eigenvalue statistics, there is one cointegrating regression at a 5% significance level. This conclusion is drawn from the probability value associated with the hypothesis of at most two cointegrating equations, which is 0.0457, falling below the 5% significance threshold.

The cointegration test conducted showed that there is cointegration among the variables in the test, the null hypothesis is rejected. Fully Modified OLS regression method is therefore estimated to analyze the long run impact of technology on economic growth in US.

Interpretation of Coefficients

The regression results above revealed that the two independent variables, IT expenditure and number of individuals using internet have positive impact on economic growth. The coefficient of IT expenditure (4860.57) implies that a percentage increase in overall IT expenditure (ITE) in the economy will result in a $4.8 trillion increase in value of US GDP. The coefficient of the second independent variable (227.78) also revealed that percentage increase in numbers of individuals that use internet (INI) will result in $227 billion increase in value of GDP of the United States. The probability values of the two independent variables (0.0096 and 0.0002 respectively) show that the two variables (ITE and INI) have significant impact on economic growth as the values are less than 5% significance level.

Table 4.5: Fully Modified Least Square Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IT_EXPENDITURE	4860.570	1689.319	2.877236	0.0096
INDIVIDUALS_USING_THE_IN	227.7815	48.39041	4.707161	0.0002
C	-14210.04	2857.661	-4.972615	0.0001
R-squared	0.935946	Mean dependent var		16599.44
Adjusted R-squared	0.929203	S.D. dependent var		4073.252
S.E. of regression	1083.796	Sum squared resid		22317652
Long-run variance	2305322.			

Source: *Author's Computation Using E-Views 11.0*

Before and After Effect of Technological Impact on the Economy

Source: Author's Computation using SPSS 21 (2023)

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	IT expenditure (before 2010) - IT expenditure (After 2010)	-.32992	.22705	.06845	-.48246	-.17739	-4.819	10	.001
Pair 2	US GDP (before 2010) - US GDP (After 2010)	-6168.54	794.96	239.69	-6702.61	-5634.47	-25.735	10	.000
Pair 3	Individuals using the Internet (before 2010) - Individuals using the Internet (After 2010)	-17.31962	5.50446	1.65965	-21.01757	-13.62166	-10.436	10	.000

Expenditure:

Mean Difference: The average IT expenditure decreased by approximately 0.33% of GDP after 2010 compared to before 2010.

Significance: The statistical test shows a significant difference (p-value ≈ 0.001), indicating that this reduction is not likely due to random chance alone.

Implication: The negative mean difference suggests that, on average, IT expenditure as a percentage of GDP decreased after 2010 compared to the pre-2010 period. This could imply a change in investment or allocation strategies in IT spending.

US GDP:

Mean Difference: The mean difference in US GDP is approximately $6,168.54 billion (negative), indicating a substantial decrease after 2010 compared to before.

Significance: The statistical test shows a highly significant difference (p-value ≈ 0.000), suggesting this reduction is not likely by chance.

Implication: The negative mean difference signifies that, on average, the US GDP decreased significantly after 2010. This could be indicative of economic shifts, downturns, or other significant changes impacting the national economy.

Individuals Using the Internet:

Mean Difference: On average, there was a decrease of approximately 17.32 million individuals using the internet after 2010 compared to before.

Significance: The statistical test demonstrates a highly significant difference (p-value ≈ 0.000), indicating this decrease is not likely due to random variability.

Implication: The negative mean difference suggests that, on average, there were fewer individuals using the internet after 2010 compared to the period before. This might reflect changes in accessibility, technology adoption rates, or demographic shifts.

In summary, the findings suggest a significant decline in IT expenditure as a percentage of GDP, US GDP, and the number of individuals using the internet after the year 2010 compared to the period before, indicating noteworthy changes in these aspects during and after that time frame.

V. SUMMARIES OF FINDINGS AND CONCLUSION

The findings of the study indicate that increased spending on internet-related activities positively influences economic growth. This could include investments in broadband infrastructure, research and development in internet technologies, and other related expenditures. The study also highlights that a greater number of individuals using the internet is associated with increased economic growth. This could imply that the widespread adoption and use of internet technologies contribute positively to the overall economic activity in the country. The findings reinforce the idea that technological advancements, particularly those related to the internet, play a crucial role in fostering economic growth. This aligns with the broader narrative that technological disruptions can have transformative effects on economies.

Policymakers can use these findings to inform decisions related to promoting internet usage and expanding access to the internet. This may involve initiatives to improve broadband infrastructure, enhance digital literacy, and increase internet accessibility across different demographic groups. Policymakers could consider policies that encourage and incentivize businesses and organizations to invest in internet-related infrastructure and technologies. Industry leaders can align their strategies with the understanding that investments in internet-related technologies and encouraging a higher number of individuals to use the internet can positively contribute to economic growth. It can therefore be concluded that technology and technology disruptions have positive and significant impact on economic growth in United States.

It is therefore recommended that there is an increase in public and private investments in internet infrastructure to ensure widespread and high-quality access. This includes expanding broadband networks to underserved areas and improving connectivity in urban centers. It is also necessary to develop and implement educational programs to enhance digital literacy among the population. This can empower individuals to effectively use internet technologies, participate in the digital economy, and contribute to overall economic growth. Policy makers should create policies and incentives that encourage businesses to invest in research and development of internet-related technologies. This could involve tax breaks, grants, or other financial incentives to stimulate innovation and entrepreneurship in the tech sector. Government and private organizations should recognize the importance of cybersecurity in the digital age and collaborate with industry stakeholders to establish robust cybersecurity measures. A secure online environment is crucial for fostering trust, which is essential for the growth of digital transactions and services. Regulatory bodies should also assess and adapt regulatory frameworks to accommodate technological advancements. This includes addressing emerging issues such as data privacy, digital rights, and the ethical use of technology to create a supportive environment for innovation.

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