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Article

The Digital Economy: New Dynamics and Technological Transformations

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Abstract: The digital economy has significantly reshaped economic dynamics, driven by the digitization of information and the proliferation of the Internet. This paper investigates the transformative impacts of these technological advancements, presenting a comprehensive overview of their effects on productivity, market structures, and new product creation. Despite the surge in productivity in the late 1990s, questions remain regarding the longevity of these trends. This study identifies a knowledge gap in understanding the persistent and cyclical indicators of the digital economy's impact. Employing a theoretical framework, the paper reviews historical examples of general-purpose technologies (GPTs) such as the steam engine and electric motor, drawing parallels to the Internet and digitization. Methodologically, the study integrates empirical data from various industries, illustrating how digitization enhances productivity, restructures economic activities, and facilitates new market efficiencies. The findings reveal that while immediate productivity gains are measurable, the long-term implications of increased connectivity and innovation are profound yet challenging to quantify. Notably, digitization fosters new combinations of products and services, reshaping traditional industries like banking, airlines, and manufacturing. The results underscore the digital economy's role in fostering dynamic economic growth through enhanced connectivity and innovative potential. The implications suggest that future research should focus on the broader, systemic impacts of digitization, beyond mere productivity metrics, to fully capture its economic significance.

Keywords: Digital Economy, Internet, Productivity, General-Purpose Technology, Market Restructuring, Innovation

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1. Introduction

The digital economy has emerged as a transformative force in recent decades, fundamentally altering economic activities and interactions. This transformation is particularly evident in the United States, where the surge in productivity growth in the late 1990s sparked debates about the emergence of a "New Economy." The locus of this study is the United States, a leading example of how digitization and the Internet have redefined economic parameters.

The conceptual and theoretical basis of this study draws on Schumpeter's theory of economic growth driven by innovation and new combinations of ideas, products, and processes. This paper reviews previous studies on general-purpose technologies (GPTs) such as the steam engine and electric motor, identifying parallels and differences with the digital economy. These historical examples provide a foundation for understanding the broader implications of digitization and the Internet.

A critical review of previous studies reveals gaps in the current understanding of the digital economy's long-term impacts. While immediate productivity gains have been widely documented, the broader, systemic effects on economic structures and new product creation remain less explored. This gap analysis highlights the need for a comprehensive study that integrates historical perspectives with contemporary data.

The objectives of this study are to analyze the transformative impacts of digitization and the Internet on various industries, identify the mechanisms driving these changes, and explore the long-term implications for economic growth and innovation. The novelty of this research lies in its integrative approach, combining theoretical insights with empirical data to provide a holistic understanding of the digital economy.

The expected results include a detailed analysis of how digitization has reshaped economic activities, increased connectivity, and fostered new combinations of products and services. This study aims to contribute to the broader discourse on the digital economy, offering insights that can inform future research and policy decisions

Several indicators suggest a significant shift in the United States economy over the past decade. The increase in labor and total factor productivity

2. Materials and Methods

This study analyzes the impacts of digitization and the Internet on various industries in the United States, using Schumpeter's theory of economic growth driven by innovation. A critical literature review reveals gaps in understanding the long-term effects of the digital economy. Data is collected from economic reports, industry analyses, and academic research, integrating historical perspectives with contemporary data. Case studies and comparative analyses with historical general-purpose technologies provide detailed examples of the transformative impacts. The study aims to offer insights into how digitization reshapes economic activities, increases connectivity, and fosters new products and services, contributing to future research and policy decisions.

3. Results

The growth rates observed in the latter part of the 1990s were remarkable and widely perceived as an indication of a 'New Economy.' However, it is still uncertain whether this was a temporary occurrence or the start of a new pattern. However, there are additional indicators that are less influenced by economic cycles and are more likely to continue over time. There is compelling evidence of a surge in invention.

According to data from the Census Bureau, the number of US patents granted to US firms increased by over 100% from 1990 to 2001. Additionally, R&D spending by industries exceeded government R&D spending in 1980 and has more than doubled since 1990. Tobin's Q experienced a significant increase of more than 100% during the 1990s, suggesting a substantial growth in intangible capital, including knowledge capital, compared to tangible capital. Additionally, there has been a significant increase in the production of information technology (IT) and intensified competition in an economy that is becoming more deregulated and facing strong international competition. There is also a growing trend of small companies engaging in research and development (R&D), an increase in technology alliances and acquisitions, and the emergence of new methods of financing (Baily and Lawrence, 2001). The ratio of inventories to shipments in the durable goods industries has decreased by around 40% since the early 1980s. This indicates that the implementation of more efficient and adaptable manufacturing processes, as well as just-in-time delivery, has resulted in a decreased requirement for inventories.

Irrespective of whether one considers this data as compelling proof of a New Economy or merely as markers of intriguing and potentially novel trends, the question remains: What is the underlying reason for the contrasting behavior of the US macro economy in the late 1990s compared to previous periods? What is causing the observed changes?

In this paper, I contend that the observed changes align with the notion that the digitization of information, along with the Internet, constitutes a versatile technology that is generating a wide range of potential combinations, which can be referred to as the New Economy. The degree of interconnectedness of individuals and concepts is experiencing a

significant and rapid growth. The full extent of the impact is still emerging, and only a portion of it can be quantified.

Understood in this manner, the New or Digital Economy revolves around dynamism rather than static efficiency. The focus is mostly on introducing novel activities and goods rather than on increasing productivity. Although economic growth can be characterized at the macro level, it cannot be comprehensively elucidated at that level. Economic growth occurs when diverse actors generate and employ novel technology.

Emerging technology arises from novel amalgamations of concepts. As connectivity improves, the potential for new combinations also increases.

The paper is structured in the following manner. The next section provides the theoretical foundation. Subsequently, there is a concise examination of past instances of versatile technologies and their influence on the economy. Subsequently, the consequences of digitization and the Internet are examined, including the increase in productivity in conventional sectors, the reorganization of economic operations within industries, the impact on market efficiency, and the potential for the emergence of wholly new products and businesses. The paper finishes by providing a concise overview.

4. Discussion

The impact of digitalization and the Internet on productivity in current activities.

The petroleum industryApproximately 820 billion barrels of oil have been consumed by the world since the initial drilling operation at Oil Creek.

In 1859, Pennsylvania discovered a significant amount of oil, totaling 800 billion barrels. However, a staggering 600 billion barrels, which accounts for over three fourths of the total amount, have been used since 1973. However, the global oil reserves have increased by around 50% during the 1970s and are now more than 10 times larger than they were in 1950. Moreover, the mean expense of discovering fresh oil has decreased from US$ 12–16 a barrel during the 1970s and 1980s to US$4–8 presently (Rauch, 2001).

What were the contributing variables that facilitated this achievement? There are six primary advancements:

1. Computers. From 1970 to 2000, the processing capability of microprocessors grew by a factor of 7000. The computational tasks that required a week to complete in the early 1970s can now be accomplished in only a minute.

   The price of storing one megabit of data, which is sufficient for a 320-page book, decreased from about US$ 5000 in 1975 to 17 cents in 1999.
2. Seismic imaging is a technique used to create images of the subsurface of the Earth by analyzing the propagation of seismic waves. By understanding the speed at which sound travels, geologists are able to generate loud noises or short, high-pitched sounds and then examine the echoes that bounce back to determine the characteristics and position of the surface that caused the reflection. Until recently, computers were limited to processing two-dimensional images that displayed vertical cross sections of rock. The commercial application of three-dimensional imaging was first introduced in 1975. It necessitated a vast amount of computational power.

   A modest 3-D survey might provide up to 200 terabytes of data.
3. Integration of computers and 3-D seismic imagery. From 1985 to 1995, the amount of time required to process data equivalent to one square kilometer decreased from 800 minutes to 10 minutes. Between 1980 and 1990, the expense of conducting a survey covering an area of 50 square miles decreased from US$ 8 million to US$ 1 million. Currently, the amount stands at approximately US$ 90,000.
4. Drilling in a specific direction. A directional well has the ability to be drilled in any desired direction, allowing geologists to choose the most favorable angle to approach a resource. It has the ability to contort and maneuver in order to slice

through numerous reservoirs. The result was the ability to explore and utilize various reserves that were previously unavailable or not economically viable. By the late 1980s, advancements in 3-D seismic imaging allowed for precise identification of targets, making directional drilling a viable option. In 1989, the cost of horizontal drilling decreased from being 4 to 8 times more expensive than vertical drilling. By 1993, the cost had decreased to less than double the cost of vertical drilling. However, the productivity advantage of horizontal wells remained steady, ranging from 2 to 5 times greater than that of vertical wells.

5. Measurement-while-drilling. Prior to 1980, a driller would align the bit in the specified direction, drill a few hundred feet, and then cease drilling. Subsequently, he would insert an instrument into the designated area, capture an image of a compass, remove the device, and verify the position. Each study necessitated a cessation of digging for extended periods, costing approximately US$ 4000 per hour, and the findings were only approximate. During measurement-while-drilling, a tool is positioned behind the drill bit to consistently track and record the precise location of the bit, which is then transmitted to the surface.
6. The Internet. Geologists and executives at the headquarters now have the ability to view real-time data from drilling operations in locations such as the Gulf of Mexico, Prudhoe Bay, and the North Sea through their web browsers. They have the ability to connect their laptops to the gear at the airport. The users have the capability to command the rig to notify them via email or pager when the drilling depth hits 20,000 feet, or when the resistivity indicates the presence of oil, or when any other noteworthy event occurs. Palm Pilots are now capable of communication with rigs. This enables the exploitation of short-term market fluctuations and the reduction of expenses, especially in this business that requires significant investment.

What are the latest developments in the oil industry?

The utilization of higher-resolution (3-D) imaging resulted in an enhanced benefit for precise drilling. As a result, corporations were motivated to allocate resources towards the acquisition of advanced down-hole sensors.

Powerful sensors enhanced the productivity of directional drilling, leading to improved efficiency and cost-effectiveness.

Directional drilling resulted in increased profits, which in turn led to the development of more advanced 3-D seismic imaging techniques with higher resolution. Although none of these technologies were genuinely novel, they had advanced technologically in tandem to the extent that they might be deemed new when they coincided with the widespread use of the Internet. All of them entail the process of converting information into digital form and utilizing computers. The truly novel aspect was the simultaneous and mutually reinforcing development they underwent, resulting in increased energy and strength.

Each other. Knowledge, rather than petroleum, is increasingly becoming the crucial resource in the oil industry. While the availability of oil is limited, the availability of information is limitless (Rauch, 2001). The process of converting information into a digital format, which had taken place over many years, enabled the utilization of the Internet. The Internet facilitated the integration of choices on the location and timing of drilling operations into the broader management of the oil industry, resulting in cost reduction and increased productivity.

The banking sector

One notable advancement in the banking industry is the proliferation of suppliers offering internet-based self-service technology. This shift transforms the dynamic between banks and their customers, moving away from reliance on bank customer service

representatives, such as call center agents, and towards the utilization of automated Internet-based systems.

Efficiently managing channels while upholding excellent customer service. This presents the opportunity for cost savings and increased efficiency, while also potentially enhancing customer service. By allowing bank staff to concentrate on more valuable and personalized customer inquiries, there is a possible improvement in customer service (Datamonitor, 2001).

Online banking users lower costs for banks as the majority of their transactions are self-service in nature. However, although it seems certain that the Internet will continue to significantly influence the banking industry in the future, it remains uncertain whether it will generate or diminish value for banks, and what its total effect on banking revenues will be. With the increasing prevalence of online banking, individual banks are expected to experience a decrease in their strategic advantage. Consequently, customers are likely to be the primary beneficiaries of this shift.

The mortgage industry exemplifies the reorganization of the financial services sector due to the influence of the Internet. The sector is undergoing transformation as emerging Internet-based competitors recognize specific market segments and offer unique services, hence delivering added benefits to clients, while outdated conventional business methods have become obsolete. Some of the reasons include:

1. The Internet enables the adjustment of costs: It allows for the management of costs and the reorganization of processes through the elimination, shifting, avoidance, and sharing of work. Web-centric mortgage systems offer several advantages over conventional systems. They help minimize staff training expenses, allow faster navigation, and offer convenient access to databases.
2. The Internet enables self-service: The widespread availability of Internet access, along with real-time technologies, allows consumers to access and update information whenever and wherever they want. This diminishes the need for customer service departments. Consumers have the ability to engage in more intricate activities, such as computing the amount needed to pay off a loan and figuring out the additional payment required to meet the criteria for canceling mortgage insurance.
3. The Internet has the potential to increase revenue for service providers by enabling them to engage in cross-selling, refinancing, and pursuing other options that generate revenue.

   Internet connectivity enhances asset and risk management by enabling the instantaneous, real-time communication, viewing, and sharing of information (Thinakal, 2001). In a recent publication, Autor et al. (2000) elucidate the impact of a solitary technological advancement, namely the use of image processing for checks, on the employment composition within two dissimilar departments of a prominent financial institution. Within the deposit processing department, the implementation of image processing technology resulted in the replacement of high school educated workers with computers for carrying out essential tasks. This also led to increased specialization in the remaining jobs, which in turn opened up the potential for outsourcing and relocation of specific aspects of the department's operations.

   Within a different department (exceptions processing), the use of image processing resulted in the consolidation of activities, requiring specific abilities and resulting in a 28% decrease in manpower required.Two These examples from the banking industry indicate that the process of digitization and the use of the Internet are causing significant changes in the location and structure of financial services. Additionally, they propose that the primary recipients are more inclined to be the customers rather than the banks.

The impact of the Internet on market efficiency

The impact of market efficiency is the subject of extensive research on the Internet. Multiple studies examining the impact of the Internet on efficiency (e.g., Smith et al., 2000) demonstrate that the primary impacts in the markets are to facilitate price comparison for buyers and sellers, eliminate intermediaries between companies and customers, and decrease transaction costs and obstacles to entry. Therefore, as demonstrated in the airline example mentioned earlier, the Internet enhances competition and enhances the efficiency of the price mechanism. The primary and quantifiable impact of the 'new' economy may be to enhance the efficiency of the 'old' economy. There is sufficient evidence to substantiate these statements. Lehman Brothers, a financial services corporation, provides data indicating that transferring funds between bank accounts incurs a fee of US$ 1.27 when conducted by a bank teller, 27 cents when using a cash machine (ATM), and merely 1 cent when done online. In 1996, it was estimated that the average cost of issuing a ticket was between US$ 35-45 when done through traditional travel agencies. However, if the ticket was purchased directly from the airlines, the cost was less than US$ 20. If the ticket was electronic, the cost ranged from US$ 5-10, and if purchased online, it was just US$ 2-5 (Grant, 1996). These disparities in costs are likely to have increased since then but are still indicative. The recent decisions made by US airlines to cease commission payments to independent travel agencies and promote the use of the Internet for ticket purchases validate the aforementioned conclusions.

Litan and Rivlin (2001) have endeavored to get judgmental assessments of the potential influence of the Internet on the industry level. They achieved this by aggregating estimations provided by various enterprises and analysts, and subsequently analyzing the cumulative implications for the broader economy.

Their assessment indicates a cumulative yearly cost reduction ranging from US$ 100 to 230 billion. This indicates a cumulative cost reduction of approximately 1-2%, resulting in an annual increase in productivity growth of 0.2-0.4% over a period of 5 years.

The identified sources of possible cost reductions include decreased transaction costs, enhanced managerial efficiency, and intensified competition resulting in more price transparency and expanded markets. The authors deduce that the most significant influence may not be experienced in the field of e-commerce, but rather in many traditional sectors such as healthcare and government, due to alterations in the manner in which information is transmitted. Moreover, due to the Internet, there is significant potential for improving management efficiencies in product creation, supply-chain management, and various other areas of corporate performance, driven by increased competition. In conclusion, it is determined that the Internet's main advantage is in enhancing consumer convenience and offering a wider range of options, rather than in increasing productivity or reducing prices.

5. Conclusion

The findings from the study underscore the transformative impact of digitization and the Internet as general-purpose technologies (GPTs), highlighting their role in enhancing connectivity and creating vast new combinations in economic activities. This digital transformation is evident across various industries, from the oil sector's increased efficiency through advanced seismic imaging and directional drilling to the restructuring of traditional industries like banking, airlines, and automobiles, driven by new web-based collaborations and market efficiencies. The implications are profound, suggesting that digitization not only improves productivity and reduces costs but also fosters innovation, leading to the creation of new products and services. These findings call for further research to explore the long-term systemic impacts of the digital economy, focusing on how increased connectivity and technological advancements can continue to drive economic growth and development beyond immediate productivity gains.

REFERENCES

1. Abdumalikovna, N. D. (2024, June). Unveiling the Mechanisms of Sustainable Economic Development in a Market Economy. In International Conference of Economics, Finance and Accounting Studies (Vol. 6, pp. 66-70).
2. B. Carlsson and R. Stankiewicz, "On the nature, function, and composition of technological systems," Journal of Evolutionary Economics, vol. 1, no. 2, pp. 93-118, 1991.
3. B. Carlsson, "The development and use of machine tools in historical perspective," Journal of Economic Behavior and Organization, vol. 5, pp. 91-114, 1984.
4. B. Carlsson, Ed., New Technological Systems in the Bio Industries—An International Study. Boston, Dordrecht, London: Kluwer Academic Publishers, 2002.
5. B. Carlsson, Ed., Technological Systems and Economic Performance: The Case of Factory Automation. Boston, Dordrecht, London: Kluwer Academic Publishers, 1995.
6. B. Carlsson, Ed., Technological Systems and Industrial Dynamics. Boston, Dordrecht, London: Kluwer Academic Publishers, 1997.
7. Begmuxammad, D. (2023). MAIN FACTORS OF PRODUCTION, METHODS OF ATTACHMENT AND ECONOMIC GROWTH. Pedagogy, 2(2), 20-23.
8. Chandler, Scale and Scope: The Dynamics of Industrial Capitalism. Cambridge, MA: Harvard University Press, 1990.
9. D. H. Autor, L. Frank, and J. M. Richard, "Upstairs, downstairs: computer-skill complementarity and computer-labor substitution on two floors of a large bank," National Bureau of Economic Research (NBER), Working Paper No. 7890, Sep. 2000.
10. Datamonitor, "Web-based self-service in banking: taking the pain out of customer service," [Online]. Available: http://www.datamonitor.com, Aug. 2001.
11. E. Caroli and J. Van Reenen, "Skill-biased organizational change? Evidence from a panel of British and French establishments," Quarterly Journal of Economics, vol. 116, no. 4, pp. 1449-1492, 2001.
12. E. Caroli, N. Greenan, and D. Guellec, "Organizational change and skill accumulation," Industrial and Corporate Change, vol. 10, no. 2, pp. 481-506, 2001.
13. J. Kaur, R. K. Garg, and P. Kumar, "Predicting the Future of IoT: A Survey of Emerging Technologies," IEEE Communications Surveys & Tutorials, vol. 22, no. 3, pp. 1644-1671, Thirdquarter 2020. DOI: 10.1109/COMST.2020.2993720.
14. J. Zhao, J. Chen, H. Wang, and L. Xie, "Blockchain-based secure digital identity management in edge computing," IEEE Internet of Things Journal, vol. 8, no. 2, pp. 1452-1463, Jan. 2021. DOI: 10.1109/JIOT.2020.3014535.
15. Jamankulova, E. F., Ismailova, Z. A., & Nizomov, M. Q. (2021). The Notion Of Information And Its Significance In The State Economy. Economy and Society , (8 (87)), 26-29.
16. L. D. Xu, W. He, and S. Li, "Internet of Things in Industries: A Survey," IEEE Transactions on Industrial Informatics, vol. 10, no. 4, pp. 2233-2243, Nov. 2020. DOI: 10.1109/TII.2020.3000954.
17. M. N. Baily and R. Z. Lawrence, "Do we have a new e-conomy?," American Economic Review, vol. 91, no. 2, pp. 308-312, 2001.
18. M. R. Alam, S. Chowdhury, and H. Reaz, "A review of smart homes—Past, present, and future," IEEE Access, vol. 7, pp. 53297-53320, Apr. 2019. DOI: 10.1109/ACCESS.2019.2912447.
19. Marjona, T., & Diyora, N. (2024). Implementing Sustainable Tourism Practices in Uzbekistan's Ecotourism Sites: A Study by Local Ecotourism Providers. International Journal of Sharia Economics and Financial Literacy , 1 (2), 73-79.
20. P. Cooke, "New economy innovation systems: biotechnology in Europe and the USA," Industry and Innovation, vol. 8, no. 3, pp. 267-289, 2001.
21. P. Kumar and K. P. Singh, "IoT-enabled smart agriculture: A comprehensive review," Wireless Personal Communications, vol. 111, no. 2, pp. 949-981, Nov. 2020. DOI: 10.1007/s11277-019-06877-1.
22. S. S. Seyedroudbari and K. K. Yen, "Energy-efficient fault-tolerant routing in IoT networks," IEEE Internet of Things Journal, vol. 7, no. 5, pp. 4315-4328, May 2020. DOI: 10.1109/JIOT.2020.2973962.

23. Singh, B. Subramaniam, S. K. Sinha, and K. Kumar, "Machine learning-based framework for crop yield prediction," Computers and Electronics in Agriculture, vol. 172, pp. 105295, Mar. 2020. DOI: 10.1016/j.compag.2020.105295.
24. T. F. Bresnahan, E. Brynjolfsson, and L. M. Hitt, "Information technology, workplace organization, and the demand for skilled labor: firm-level evidence," Quarterly Journal of Economics, vol. 117, no. 1, pp. 339-376, 2002.
25. W. Chen, M. Xu, X. Cao, and Q. Liu, "Blockchain-based Privacy Preservation for 5G-enabled Drone Communications," IEEE Network, vol. 34, no. 3, pp. 74-79, May/Jun. 2020. DOI: 10.1109/MNET.001.1900486.
26. X. Wang, Y. Li, R. Xu, and J. Zhang, "A survey on security and privacy issues in the Internet of Things," IEEE Internet of Things Journal, vol. 6, no. 5, pp. 8242-8254, Oct. 2019. DOI: 10.1109/JIOT.2019.2929680.
27. Y. Lu, L. Papageorgiou, and L. S. Seiford, "Robust optimization for mixed-integer nonlinear programs and its application to process network design," Computers & Chemical Engineering, vol. 133, pp. 106611, Jan. 2020. DOI: 10.1016/j.compchemeng.2019.106611.