2nd International Conference on Social Sciences and Humanities Research
https://mijournals.com/index.php/Human_Studies/index

THE IMPACT OF THE DIGITAL ECONOMY ON ECONOMIC GROWTH: THEORETICAL FOUNDATIONS, TRANSMISSION MECHANISMS AND EMPIRICAL EVIDENCE

https://doi.org/10.57033/mijournals-2026-2-0291

Abdufattoh Qurbonaliyev
"International Cooperation Center" JSC, Lead Specialist
E-mail: akurbonaliev29@gmail.com

Abstract. *The rapid diffusion of the Internet, mobile communications, digital platforms and data-driven technologies has made the digital economy one of the central drivers of contemporary economic development. This article examines the impact of the digital economy on economic growth by synthesising growth theory, the economics of general purpose technologies and recent empirical research. The analysis shows that digital technologies influence growth through several mechanisms: reducing search, replication, transportation, tracking and verification costs; raising labour productivity and total factor productivity; stimulating innovation and new business models; expanding market access; and transforming labour markets. Cross-country and micro-level studies generally confirm a positive relationship between digital development and growth, although its magnitude depends on complementary investments in skills, institutions and organisational change. The article also discusses the productivity paradox, the digital divide and the concentration of platform markets, and proposes policy recommendations for developing and transition economies.*

Keywords: *digital economy; economic growth; ICT; broadband; productivity; general purpose technology; digital divide; digital transformation.*

INTRODUCTION

Explaining the sources of long-run economic growth has been a central task of economics since the emergence of modern growth theory. In Solow's neoclassical model, sustained growth in output per worker cannot be achieved by capital accumulation alone and ultimately depends on technical progress, which the model treats as exogenous (Solow, 1956:85–86). Endogenous growth theory later placed technology at the heart of the growth process. Romer showed that technological change results largely from intentional investment in knowledge and that ideas, unlike ordinary goods, are nonrival, which allows them to generate increasing returns and persistent growth (Romer, 1990:72–74).

Digital technologies are the most recent and arguably the most pervasive embodiment of this knowledge-driven growth. The Internet, mobile broadband, cloud computing, digital platforms and artificial intelligence have changed how goods and services are produced, traded and consumed. According to the International Telecommunication Union, 5.5 billion people, or 68 percent of the world population, used the Internet in 2024; usage, however, reached 93 percent in high-income countries and only 27 percent in low-income countries (International Telecommunication Union, 2024:1). The World Bank has emphasised that although digital technologies have spread rapidly, their broader development benefits, or "digital dividends", have lagged behind, because they depend on complementary factors such as regulation, skills and accountable institutions (World Bank, 2016:2–3).

This combination of rapid diffusion and uneven outcomes raises a fundamental question for economic science and policy: how, and under what conditions, does the development of the digital economy contribute to economic growth? The aim of this article is to analyse this relationship by clarifying the concept of the digital economy, identifying the mechanisms through which it affects growth, reviewing the empirical evidence and discussing the constraints and risks involved. The research is based on the methods of theoretical analysis, systematisation, comparison and generalisation of peer-reviewed studies and of the reports of international organisations.

MAIN PART

1. The concept and structure of the digital economy

There is no single universally accepted definition of the digital economy. Bukht and Heeks proposed an influential conceptualisation that distinguishes three layers: a core digital sector producing hardware, software and telecommunications services; a narrow-scope digital economy that includes digital services and the platform economy; and a broad-scope digitalised economy that covers the use of digital technologies across all sectors, including e-business, e-commerce, Industry 4.0 and precision agriculture (Bukht & Heeks, 2017:11–13). This layered structure, shown in Figure 1, is important for growth analysis, because the direct contribution of the ICT sector to GDP is relatively small, whereas the indirect effects of digitalisation on the rest of the economy can be much larger.

From an economic perspective, the distinctive feature of digital technologies is their effect on costs. Goldfarb and Tucker argue that digital technology is best understood as a

reduction in five types of economic costs: search costs, replication costs, transportation costs, tracking costs and verification costs (Goldfarb & Tucker, 2019: 3–4). Because digital goods can be reproduced at almost zero marginal cost and transmitted instantly, many traditional constraints on the scale and the geographical reach of economic activity are weakened. At the same time, falling tracking and verification costs enable new forms of data-based business, reputation systems and personalised services.

Digital technologies are also widely regarded as general purpose technologies (GPTs). Bresnahan and Trajtenberg characterise GPTs by their pervasiveness across sectors, their inherent potential for continuous technical improvement and their innovational complementarities, meaning that they raise the productivity of research and development in downstream sectors (Bresnahan & Trajtenberg, 1995: 83–84). Like electricity and the steam engine in earlier eras, digital technologies generate growth mainly by enabling a wave of complementary innovations throughout the economy rather than through the output of the ICT sector itself.

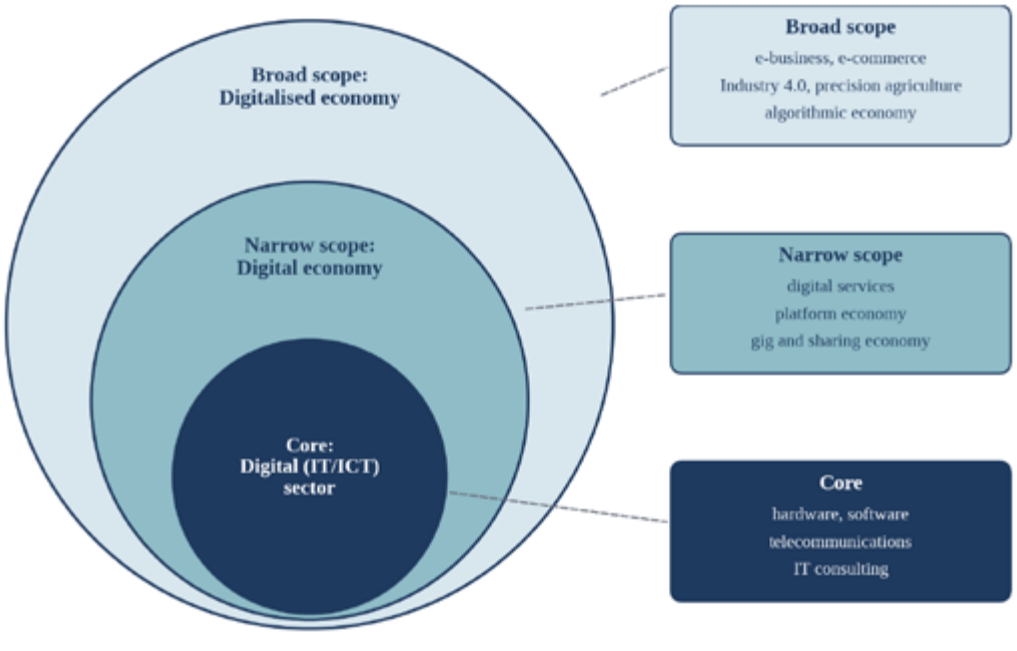

Figure 1. Scope of the digital economy (compiled by the author on the basis of Bukht & Heeks, 2017:13)

2. Mechanisms linking the digital economy and economic growth

The first mechanism is capital deepening and productivity growth in the ICT-producing and ICT-using sectors. Growth accounting studies of the United States in the late 1990s demonstrated that information technology played a major role in the

acceleration of growth. Jorgenson and Stiroh found that investment in computers, software and communications equipment, together with rapid productivity growth in their production, accounted for a substantial share of the growth resurgence (Jorgenson & Stiroh, 2000:125–127). Oliner and Sichel concluded that information technology accounted for about two-thirds of the acceleration in labour productivity between the first and the second halves of the 1990s (Oliner & Sichel, 2000: 3). By contrast, van Ark, O'Mahony and Timmer attributed the widening productivity gap between Europe and the United States after 1995 largely to Europe's slower emergence of the knowledge economy and to weaker productivity growth in market services that intensively use ICT (van Ark, O'Mahony & Timmer, 2008:25–26).

The second mechanism operates through reductions in transaction and information costs. Lower search and transportation costs expand markets, improve price discovery and allow small firms to reach distant customers, while lower verification costs support trust in online transactions (Goldfarb & Tucker, 2019: 15–24). The third mechanism is innovation and new business models. Digital platforms, cloud services and data analytics enable entrepreneurs to launch products with little physical capital, while incumbent firms reorganise production processes around data. Brynjolfsson and Hitt showed that the returns to IT investment are much larger when firms simultaneously invest in complementary organisational changes, such as decentralised decision-making, new work practices and worker training (Brynjolfsson & Hitt, 2000:24–25).

The fourth mechanism relates to labour markets. Hjort and Poulsen studied the gradual arrival of submarine Internet cables in Africa and found that the availability of fast Internet increased employment rates, with little evidence of job displacement for less-educated workers, while firm-level data from some of the countries studied pointed to higher firm entry, productivity and exporting (Hjort & Poulsen, 2019: 1032–1034). Digital technologies also automate tasks, however. Acemoglu and Restrepo describe this process as a combination of a displacement effect, in which machines replace labour in existing tasks, and a reinstatement effect, in which new tasks are created in which labour has a comparative advantage (Acemoglu & Restrepo, 2019:3–4). Autor similarly stresses that automation often complements workers by raising the value of tasks requiring problem-solving, adaptability and creativity (Autor, 2015:5–6). The net effect on growth and employment therefore depends on how quickly economies generate new tasks and skills.

3. Empirical evidence

A large body of empirical research has quantified the growth effects of digital infrastructure. Using a panel of OECD countries, Czernich and colleagues estimated that a 10 percentage point increase in broadband penetration raised annual per capita GDP growth by 0.9–1.5 percentage points (Czernich et al., 2011: 505). In a World Bank study covering 120 developing and 66 high-income countries, Qiang and Rossotto found that a 10 percentage point increase in broadband penetration was associated with an increase in GDP growth of 1.21 percentage points in high-income economies and 1.38 percentage points in low- and middle-income economies (Qiang & Rossotto, 2009: 45). Choi and Yi, using cross-country panel data, likewise found that Internet usage has a positive and significant effect on economic growth (Choi & Yi, 2009: 39–41).

Broader studies of ICT generally confirm these findings. Vu analysed a large cross-country panel for 1996–2005 and found that ICT penetration, measured through personal computers, mobile phones and Internet users, had a positive effect on economic growth (Vu, 2011: 357–358). Niebel, however, found that although ICT contributes to growth in developing, emerging and developed countries, there is no evidence that developing and emerging economies obtain larger growth effects from ICT investment than developed economies (Niebel, 2018: 197–198). This result warns against the assumption that digital technologies automatically allow poorer countries to leapfrog. The contrast between access to digital technologies and the estimated growth effects is presented in Figure 2.

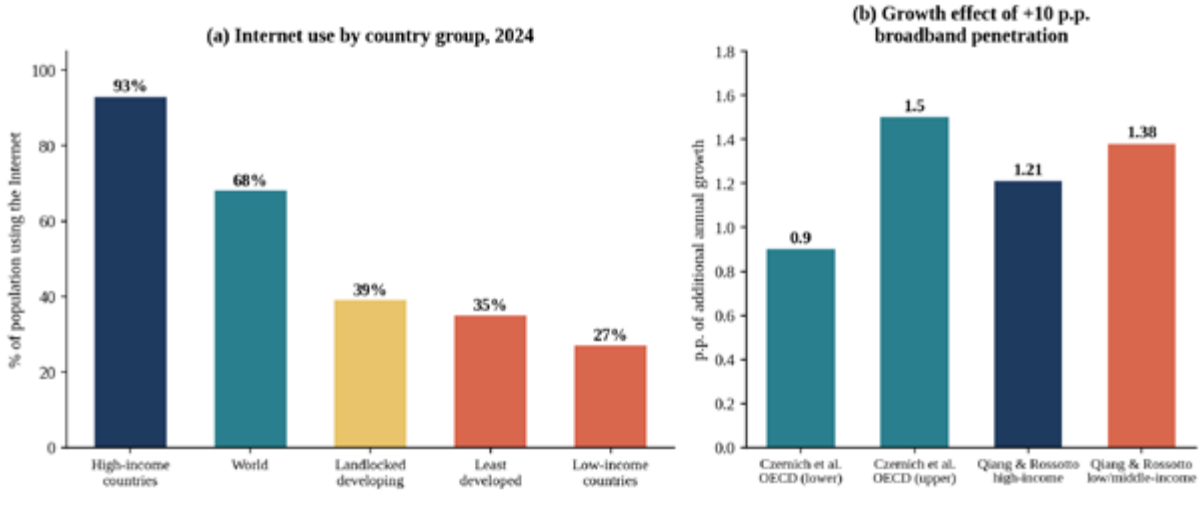

Figure 2. Digital access gaps and estimated growth effects of broadband (compiled by the author on the basis of International Telecommunication Union, 2024:1; Czernich et al., 2011:505; Qiang & Rossotto, 2009:45)

Taken together, the evidence suggests that the effect of the digital economy on growth is positive but heterogeneous. The largest benefits are obtained where digital infrastructure is combined with human capital, competitive markets and organisational adaptation. The countries with the lowest levels of Internet use, as Figure 2 shows, are precisely those that have the most to gain from digital development but also face the greatest barriers to realising these gains.

4. The productivity paradox, the digital divide and market concentration

Despite the evidence of positive effects, the relationship between digitalisation and measured growth has not always been visible. In 1987 Solow famously remarked that the computer age could be seen everywhere except in the productivity statistics (Solow, 1987: 36). A similar puzzle has reappeared in recent years, as rapid progress in digital technologies has coincided with slow productivity growth in many advanced economies. Brynjolfsson, Rock and Syverson explain this through the "productivity J-curve": when firms adopt a general purpose technology, they must invest heavily in intangible capital, such as new business processes, software and skills, which is poorly captured in official statistics, so that measured productivity is initially underestimated and rises only later, when the benefits of these investments are harvested (Brynjolfsson, Rock & Syverson, 2021: 333–335). This dynamic is illustrated in Figure 3.

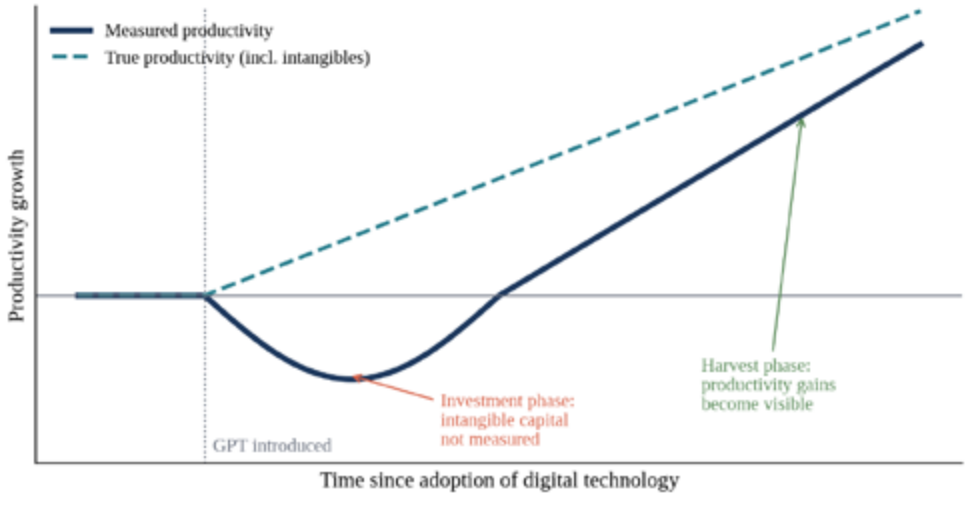

Figure 3. Schematic representation of the productivity J-curve (compiled by the author on the basis of Brynjolfsson, Rock & Syverson, 2021:334)

A second constraint is the digital divide. Large differences in connectivity between high- and low-income countries, as well as within countries between urban and rural areas, men and women, and different income groups, limit the spread of digital dividends

(International Telecommunication Union, 2024: 1–2). The World Bank warns that without strong analogue complements, digital technologies may reinforce existing inequalities and concentrate benefits among already advantaged groups (World Bank, 2016: 3).

A third concern is the concentration of the platform economy. UNCTAD reported that the United States and China together accounted for about 90 percent of the market capitalisation value of the world's 70 largest digital platforms, which indicates that the value created by data and platforms is captured unevenly across countries (UNCTAD, 2019: 2). For developing and transition economies this means that digital development policy must address not only access to technology but also the capacity to create and capture value domestically through local digital firms, data governance and fair competition.

Policy frameworks increasingly reflect these challenges. The OECD Going Digital Integrated Policy Framework identifies seven interrelated dimensions of digital transformation: access, use, innovation, jobs, society, trust and market openness (OECD, 2019: 16–17). This comprehensive approach recognises that infrastructure investments must be accompanied by policies on skills, competition, cybersecurity, data protection and social inclusion if the digital economy is to become a sustainable source of growth.

CONCLUSION

The analysis presented in this article shows that the digital economy is an important driver of economic growth, and that this relationship is firmly grounded in growth theory. Digital technologies function as general purpose technologies whose main contribution to growth arises not from the ICT sector alone but from their diffusion throughout the economy. They reduce search, replication, transportation, tracking and verification costs, stimulate capital deepening and productivity growth, enable innovation and new business models, expand market access and transform the structure of employment.

Empirical evidence from cross-country, sectoral and micro-level studies generally confirms a positive relationship between digital development and economic growth. Increases in broadband penetration are associated with significantly higher growth rates, and the arrival of fast Internet can raise employment and firm performance. The magnitude of these effects, however, depends on complementary investments in human capital, organisational change and institutions. The productivity J-curve, the persistent digital divide and the concentration of platform markets demonstrate that digital dividends are neither automatic nor evenly distributed.

For developing and transition economies, including Uzbekistan, which is implementing its "Digital Uzbekistan – 2030" strategy, several policy priorities follow: expanding affordable broadband and mobile infrastructure, especially in rural areas; investing in digital skills and education; supporting the digitalisation of small and medium-sized enterprises; ensuring fair competition and effective data governance; and improving the measurement of intangible capital and of the digital economy in national statistics. Future research should estimate the growth effects of digitalisation using regional data for the Central Asian countries and examine how complementary factors determine the size of digital dividends.

REFERENCES

1. Acemoglu, D. & Restrepo, P. (2019). Automation and new tasks: how technology displaces and reinstates labor. Journal of Economic Perspectives, 33(2), 3–30. https://doi.org/10.1257/jep.33.2.3
2. Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. Journal of Economic Perspectives, 29(3), 3–30. https://doi.org/10.1257/jep.29.3.3
3. Bresnahan, T. F. & Trajtenberg, M. (1995). General purpose technologies: "engines of growth"? Journal of Econometrics, 65(1), 83–108. https://doi.org/10.1016/0304-4076(94)01598-T
4. Brynjolfsson, E. & Hitt, L. M. (2000). Beyond computation: information technology, organizational transformation and business performance. Journal of Economic Perspectives, 14(4), 23–48. https://doi.org/10.1257/jep.14.4.23
5. Brynjolfsson, E., Rock, D. & Syverson, C. (2021). The productivity J-curve: how intangibles complement general purpose technologies. American Economic Journal: Macroeconomics, 13(1), 333–372. https://doi.org/10.1257/mac.20180386
6. Bukht, R. & Heeks, R. (2017). Defining, Conceptualising and Measuring the Digital Economy. Development Informatics Working Paper No. 68. Manchester: Centre for Development Informatics, University of Manchester.
7. Choi, C. & Yi, M. H. (2009). The effect of the Internet on economic growth: evidence from cross-country panel data. Economics Letters, 105(1), 39–41.
8. Czernich, N., Falck, O., Kretschmer, T. & Woessmann, L. (2011). Broadband infrastructure and economic growth. The Economic Journal, 121(552), 505–532. https://doi.org/10.1111/j.1468-0297.2011.02420.x
9. Goldfarb, A. & Tucker, C. (2019). Digital economics. Journal of Economic Literature, 57(1), 3–43. https://doi.org/10.1257/jel.20171452
10. Hjort, J. & Poulsen, J. (2019). The arrival of fast internet and employment in Africa. American Economic Review, 109(3), 1032–1079. https://doi.org/10.1257/aer.20161385
11. International Telecommunication Union (2024). Measuring Digital Development: Facts and Figures 2024. Geneva: ITU.
12. Jorgenson, D. W. & Stiroh, K. J. (2000). Raising the speed limit: U.S. economic growth in the information age. Brookings Papers on Economic Activity, 2000(1), 125–211.
13. Niebel, T. (2018). ICT and economic growth: comparing developing, emerging and developed countries. World Development, 104, 197–211.
14. OECD (2019). Going Digital: Shaping Policies, Improving Lives. Paris: OECD Publishing. https://doi.org/10.1787/9789264312012-en

15. Oliner, S. D. & Sichel, D. E. (2000). The resurgence of growth in the late 1990s: is information technology the story? Journal of Economic Perspectives, 14(4), 3–22. https://doi.org/10.1257/jep.14.4.3
16. Qiang, C. Z.-W. & Rossotto, C. M. (2009). Economic impacts of broadband. In: World Bank, Information and Communications for Development 2009: Extending Reach and Increasing Impact, pp. 35–50. Washington, DC: World Bank.
17. Romer, P. M. (1990). Endogenous technological change. Journal of Political Economy, 98(5, Part 2), S71–S102. https://doi.org/10.1086/261725
18. Solow, R. M. (1956). A contribution to the theory of economic growth. The Quarterly Journal of Economics, 70(1), 65–94. https://doi.org/10.2307/1884513
19. Solow, R. M. (1987). We'd better watch out. New York Times Book Review, 12 July, p. 36.
20. UNCTAD (2019). Digital Economy Report 2019: Value Creation and Capture – Implications for Developing Countries. New York and Geneva: United Nations.
21. van Ark, B., O'Mahony, M. & Timmer, M. P. (2008). The productivity gap between Europe and the United States: trends and causes. Journal of Economic Perspectives, 22(1), 25–44. https://doi.org/10.1257/jep.22.1.25
22. Vu, K. M. (2011). ICT as a source of economic growth in the information age: empirical evidence from the 1996–2005 period. Telecommunications Policy, 35(4), 357–372.
23. World Bank (2016). World Development Report 2016: Digital Dividends. Washington, DC: World Bank. https://doi.org/10.1596/978-1-4648-0671-1