НАПРЯМ 10. МІЖНАРОДНІ ЕКОНОМІЧНІ ВІДНОСИНИ

Zavhorodnya Elizaveta
Postgraduate student
at the Department of International Management,
State University of Trade and Economics

Melnyk Tetyana
Doctor of Economics,
Professor at the Department of International Management,
State University of Trade and Economics

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GLOBAL ICT INVESTMENT: TRENDS, CHALLENGES, AND OPPORTUNITIES FOR SUSTAINABLE DEVELOPMENT

Investment in information and communication technology (ICT) plays a crucial role in driving economic growth and ensuring the competitiveness of the ICT sector within an economy. Moreover, investing in ICT development is essential for the economy to achieve long-term competitive advantages by driving innovation, enhancing global connectivity, fostering digital transformation, creating jobs, improving efficiency, building resilience, and promoting sustainable growth. Governments, businesses, and other stakeholders should prioritize ICT investments to harness the full potential of technology and drive economic success in an increasingly digital world. As such, investing in ICT infrastructure, research, and development is essential to keep pace with technological advancements and maintain a competitive edge in the global market.

The global ICT market experienced significant growth between 2016 and 2023, with total spending increasing from USD 4.31 trillion to USD 5.82 trillion [1]. This upward trend reflects the growing importance of ICT investments in driving innovation, digital transformation, and economic competitiveness on a global scale (Table 1). The structure of global investments in 2012–2023 remained

largely unchanged: companies spent the most on communications services – 45% of all ICT investments in 2012 and 30.8% – in 2013, and on IT services – 24.8% and 29.5%, respectively. Additionally, there was a gradual increase in investment in software development, with the share rising from 7.8% in 2012 to 19.5% in 2023, and in data centre systems, from 3.8% to 5.2%. The volume of investments in the production and implementation of hardware remained relatively unchanged – at 15% in 2023.

Table 1

Global Investments in ICT in 2012–2023, bln. USD (by key segments)

Segment / Year	Data Centre Systems	Devices	Software	IT Services	Communications Services	Overall ICT
2012	140	676	285	906	1,641	3,648
2013	140	677	300	932	1,624	3,673
2014	142	693	313	948	1,614	3,710
2015	171.2	662.3	313.9	865.8	1,400	3,413.3
2016	170	630	326	894	1,374	3,396
2017	181	665	369	931	1,392	3,539
2018	210	712	419	993	1,380	3,716
2019	214.9	711.5	476.7	1,040.3	1,372.9	3,816.3
2020	178.5	697	529	1,071.3	1,396.3	3,872.1
2021	189.5	807.6	732	1,208	1,459.5	4,396.6
2022	221.2	766.3	811.5	1,305.7	1,423.1	4,527.8
2023	243.1	699.8	913.3	1,381.8	1,440.8	4,678.8

Source: [2]

General reasons of described trends in global ICT spending are: (1) the ongoing importance of connectivity and communication technologies in the digital economy which motivates companies to invest significantly in telecommunications infrastructure, network equipment, and services; (2) the increase in reliance on technology solutions to drive business operations, enhance productivity, and enable digital transformation; (3) the shift towards digitalization, cloud computing, artificial intelligence, and other software-driven technologies that reshaped the way companies operate and deliver value to customers; (4) the increase in demand for scalable, secure, and efficient data storage and processing capabilities to support the expanding volume of digital data generated by businesses and

consumers. Overall, these trends in global ICT spending (Table 1) suggest a comprehensive approach to ICT development, with investments being distributed across various sectors to meet the evolving demands of businesses and consumers for digital solutions and services.

Global ICT companies play a crucial role in driving digital transformation by developing innovative products and services that enable connectivity, automation, and data-driven decision-making. In this context, investing in R&D is essential for ICT companies to stay competitive, drive growth, and address the evolving needs of a digital society (Table 2). Moreover, ICT companies that invest the most in R&D are often from the United States due to a combination of factors that contribute to the country's innovation ecosystem, economic environment, and regulatory framework. The strong tradition of innovation, business-friendly environment, skilled workforce, and collaborative ecosystem make the USA an attractive destination for companies looking to drive technological advancements through research and development. Finally, as the digital landscape continues to evolve, R&D investment will remain crucial for ICT companies from the USA to stay competitive, drive innovation, and shape the future of technology.

It should be noted that the sample average of 30 OECD countries' investments in ICT development is 2.96% of GDP (Figure 1). Additionally, among 3 main categories, OECD countries invested the most into the development of computer software and databases for several reasons: (1) software enables businesses to streamline operations, enhance productivity, and develop new products and services, thus investing in software allows OECD countries to stay competitive in the global market by leveraging technology for growth and efficiency; (2) software investments often require lower upfront costs and can be implemented more quickly, making it a more attractive option for countries looking to adopt new technologies and solutions rapidly; (3) investing in software allows OECD countries to modernize their infrastructure, improve service delivery, and enhance citizen engagement through digital platforms; (4) investing in software for databases and analytics tools is crucial for countries to harness the power of data for evidence-informed policy-making, economic development, and strategic planning.

Table 2

Global R&D Investment Leaders in the ICT Sector

Company	Insustry	Country	2019	2020	2021	2022	2023
Samsung	Semiconductors, Telecommunications and Digital Media Technologies	Republic of Korea	17.5	19.6	19	19.8	21.3
Microsoft	Computer Software	USA	18	19.9	22.2	26.6	27.5
Alphabet	Internet Services	USA	26	27.6	31.6	39.5	45.4
Meta	Internet Software	USA	13.6	18.4	19.6	35.3	38.5
Amazon	Internet Commerce	USA	35.9	42.7	56.1	73.2	85.6
Apple	Computers – Minicomputers	USA	16.8	19.5	23.1	27.7	29.9
TSM	Semiconductor – Fabrication Foundries	Taiwan	3.1	3.9	4.2	5.3	5.5
Cisco	Computer Networks	USA	6.6	6.3	6.5	6.8	7.6
Oracle	Computer Software	USA	6,0	6.1	6.5	7.2	8.6
Broadcom	Semiconductors	USA	4.7	5.0	4.9	4.9	5.3
Intel	Semiconductor – General	USA	13.4	13.6	15.2	17.5	16
QUALCOMM	Wireless Equipment Manufacturers	USA	5.4	6,	7.2	8.2	8.8
IBM	Computers – Integrated Systems	USA	5.9	6.3	6.5	6.6	6.8
Applied Materials	Semiconductor – Wafer Fabrication Equipment	USA	2.1	2.2	2.5	2.8	3.1

Source: [3–4]

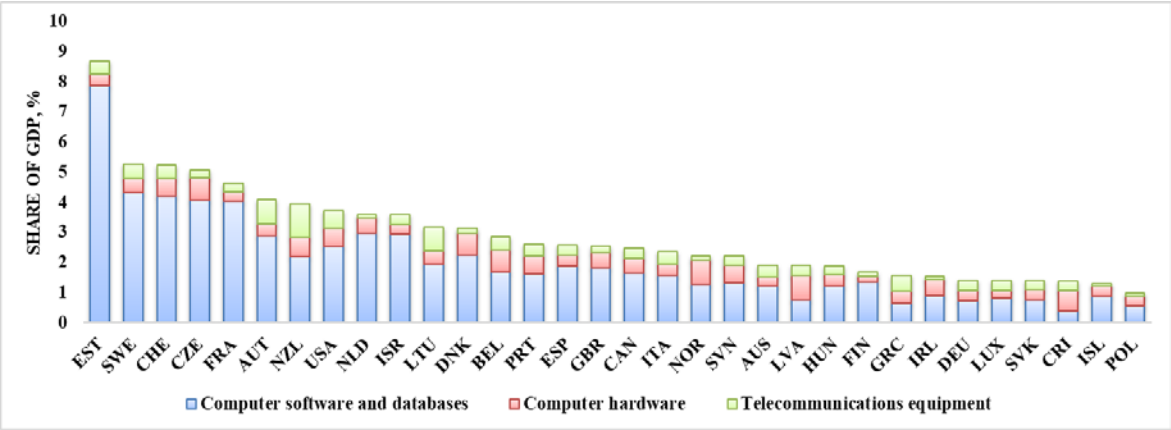

Figure 1. Structure of ICT investments by OECD countries by category

Source: [5]

As for EU context, based on their performance relative to the EU average, member states fall into 4 different performance groups: innovation leaders (Belgium, Denmark, Finland, the Netherlands, and Sweden), strong innovators (Austria, Cyprus, France, Germany, Ireland, and Luxembourg), moderate innovators (Czechia, Estonia, Greece, Hungary, Italy, Lithuania, Malta, Portugal, Slovenia, and Spain) and emerging innovators (Bulgaria, Croatia, Latvia, Poland, Romania, and Slovakia) [6, p. 2]. In global comparison, the EU lags behind the Republic of Korea, one of the top innovation performers, as well as Canada, the USA, and Australia. Additionally, the EU outperforms China, Japan, Brazil, Chile, India, Mexico, and South Africa [6, p. 3].

Moreover, the digital revolution, fuelled by substantial ICT investments, has had a profound impact on job market trends, particularly in the tech sector [7]. The rising demand for tech professionals across various industries (e.g. healthcare, marketing, retail, and education) has created a dynamic and competitive job market landscape, as well as led to the emergence of new job roles that require unique skills and expertise, reflecting the evolving nature of the ICT industry.

The advent of ICT has also facilitated the widespread adoption of remote work models, allowing teams to collaborate and perform tasks regardless of their physical locations. However, while remote work offers flexibility to employees and enables organizations to tap into a broader talent pool, it also presents challenges such as coordinating across different time zones and maintaining efficient communication.

In conclusion, investment in ICT is paramount for driving economic growth, fostering innovation, and ensuring the competitiveness of economies globally. The upward trend in global ICT spending reflects the increasing importance of ICT investments in driving digital transformation and enhancing connectivity. As the digital landscape continues to evolve, R&D investment will remain essential for ICT companies to stay competitive and shape the future of technology.

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