ISSN 2181-8622

Manufacturing technology problems

Scientific and Technical Journal Namangan Institute of Engineering and Technology

INDEX COPERNICUS INTERNATIONAL

Google Scholar Crossref doi SLIB.UZ Scientific library of Uzbekistan

Volume 10
Issue 3
2025

GLOBAL DIGITALIZATION: PATHS AND PROBLEMS

BUSTONOV MANSURZHON

Professor, Namangan State Technical University, Namangan, Uzbekistan
Phone.: (0897) 375-0440, E-mail.: bustonov1975@mail.ru

Abstract: During the twentieth century, one of the most striking global shifts was the integration of the Internet into virtually every dimension of human activity. The acceleration of economic and entrepreneurial practices under the pressure of fast-evolving online technologies has reshaped traditional patterns and given rise to what is now recognized as the digital economy. Within this framework, innovative digital tools serve as key drivers for unlocking new potentials: enhancing efficiency of business processes, reducing operational expenditures, creating alternative channels for capital mobilization, and expanding opportunities for the advancement of entrepreneurial initiatives. Enhancing the performance of the digital economy through the application of advanced science and technology, stimulating consumer demand for goods and services, and ensuring the delivery of high-quality products by integrating modern equipment and technologies into production processes have become the central priorities of the global economic agenda. At present, the contribution of the digital economy to the gross domestic product differs markedly across countries: it constitutes 5.5% in developed economies and 4.9% in developing ones. More specific figures demonstrate considerable variation — 12.4% in the United Kingdom, 8% in South Korea, 6.9% in China, 5.6% in India, 2.8% in Russia, and 3.9% in Kazakhstan [1]. At present, leading scientific centers and international research institutions are extensively engaged in exploring the challenges associated with the transition toward a digital economy. Their investigations focus on a broad spectrum of issues: the institutional and practical conditions required for the implementation and expansion of digitalization; the main stages and sequencing of this transition; mechanisms to ensure the sustainability of economic growth under digital conditions; and the qualitative dimensions of growth factors, including their influence on macroeconomic balance and long-term stability. Moreover, scholars are addressing methodological difficulties in assessing these effects and identifying appropriate solutions. Particular attention is also directed to both universal and country-specific features of digitalization processes in developed and developing economies, as well as to optimizing the role of digital technologies as determinants of economic growth.

Keywords: digital economy, economic growth, infrastructure, e-business, e-commerce, information technologies, digital innovations.

Introduction. The digital economy is widely regarded as a transitional stage toward the establishment of a knowledge-based society. Classical theorists such as P. Drucker and D. Bell conceptualized this type of society as one in which knowledge functions as the primary foundation for decision-making, while experts engaged in the creation and utilization of information assume a decisive role. According to their perspective, policies directed at fostering innovation and managing technological change would become increasingly sophisticated and subject to continuous transformation. Furthermore, they emphasized that the supply of knowledge would expand as the number of educated individuals grew, leading to a structural shift from material-oriented production systems toward knowledge-centered economic activity. Within such a framework, knowledge-intensive industries are expected to evolve as dominant drivers of growth. Considering that the term “digital economy” remains relatively novel and less widespread in the academic discourse, this study examines how foreign institutions interpret and define this concept (Table 1).

As demonstrated in Table 1, the majority of international institutions conceptualize the digital economy as one fundamentally grounded in digital resources, intrinsically linked to the processes of production, distribution, and utilization of contemporary information and communication technologies (ICT).

Table 1. Approaches to the interpretation of the digital economy at the regulatory level by foreign institutions

Author	Definition of the term "digital economy"
The World Bank	a new paradigm of accelerated economic development based on the process of exchanging data in real time
Department of Broadband, Communications and the Digital Economy of Government of Australia	a global network of socio-economic and political activities that exist due to the functioning of platforms such as the Internet, as well as mobile and sensor networks
Cabinet of the United Kingdom	production of digital equipment, publishing, media production and programming
BCS, The Chartered Institute for IT	an economy based on digital technologies, doing business in markets that function via the Internet
European Parliament	a complex structure consisting of several levels/layers interconnected by a virtually infinite and constantly growing number of nodes. Platforms exist in an interconnected manner, allowing to reach the direct user through many channels, thereby complicating the exclusion of specific players, i.e. competitors
Economist Intelligence Unit	an economy capable of providing high-quality ICT infrastructure and mobilizing the capabilities of ICT to create benefits for consumers, business and the state
Organization for Economic Co-operation and Development (OECD)	the result of the transformational effects and processes of new general-purpose technologies in the field of information and telecommunications

In analyzing the structure of the digital economy, scholars typically distinguish three interrelated components: the infrastructure that supports e-business; e-business itself, understood as the organization and management of entrepreneurial activities through computer networks; and e-commerce, defined as retail transactions conducted via the Internet [3].

Within the Commonwealth of Independent States (CIS), the emergence of the digital economy can be traced back to the early years of independence, with the process of digitalization steadily intensifying and gradually transforming into a phenomenon of nationwide scale.

Table 2. Stages of development of the digital economy in the CIS countries

	Chronological period	Characteristics
First stage	1990-2000	Creation of infrastructure for the formation of an information environment
Second stage	2000-2010	Users have become a source of information creation, the emergence of e-business and e-commerce.
Third stage	2010-2020	Development of social networks, messengers and mobile applications.
Fourth stage	2030-2040	Development of social networks, messengers and mobile applications.

Research in the fields of computer science, information systems, and digital technologies has gained wide popularity, which in turn stimulates the progressive consolidation of the digital economy. To better systematize its historical trajectory, the development of the digital economy can be divided into several chronological phases, as presented in Table 2. The long-term prospects for its advancement, as well as its role in reinforcing the stability and competitiveness of national economies, are considerable and difficult to overestimate.

Empirical evidence confirms these trends. According to assessments conducted by the Boston Consulting Group and the World Bank, the share of the digital economy in the GDP of advanced countries ranges from 10% to 35%, whereas in developing nations it varies between 5% and 20%. This divergence is largely attributed to differences in the accumulation of digital assets, the establishment and scale of digital services, and the extent to which the corporate sector adopts and integrates digital technologies into its operational and strategic frameworks [10].

The distribution of digital assets across economic sectors demonstrates considerable variation. Within the ICT (information and communication technology) services sector, their share amounts to approximately 22%; in financial services, about 15%; and in technology manufacturing, nearly 14%. It is equally important to emphasize that even traditional sectors of the economy have accumulated a notable volume of digital assets, which are estimated to represent nearly 5% of the gross value added generated in these areas. Forward-looking projections indicate that by 2025 the digital economy will account for roughly 25% of global GDP [9].

Methods. The study employed a comprehensive methodological framework that integrated several interrelated approaches. These included systematic analysis for the identification of structural patterns and interdependencies; statistical observation to collect and document empirical data; statistical aggregation and grouping to classify and generalize indicators; and sampling techniques for targeted selection. In addition, correlation and regression analysis were applied to reveal quantitative relationships among variables, while econometric modeling and forecasting were utilized to evaluate dynamic processes and to predict potential trajectories of the digital economy's development.

Results. Assessing the scope of the digital economy, the value it generates, and the benefits it provides continues to present significant methodological and empirical challenges. One of the fundamental obstacles lies in the absence of a universally accepted definition of the digital economy. Equally problematic is the scarcity of reliable statistical data regarding its core components and dimensions, a gap that is particularly pronounced in developing economies. Although several international initiatives have been launched to mitigate these shortcomings, their effectiveness remains limited and has not kept pace with the rapid and complex evolution of digitalization [12].

The World Bank has explicitly recognized the inadequacy of existing macroeconomic statistics for comprehensively evaluating the benefits of digital and digitally enabled goods, as well as cross-border digital transactions. Responding to this

concern, the International Monetary Fund has recently initiated a broad dialogue among policymakers, scholars, and the business community on methodologies for measuring the digital economy. Nevertheless, substantial uncertainties remain unresolved, including the challenge of quantifying the contribution of sharing platforms, gig-based activities, and other forms of platform economies to GDP growth and productivity dynamics [13].

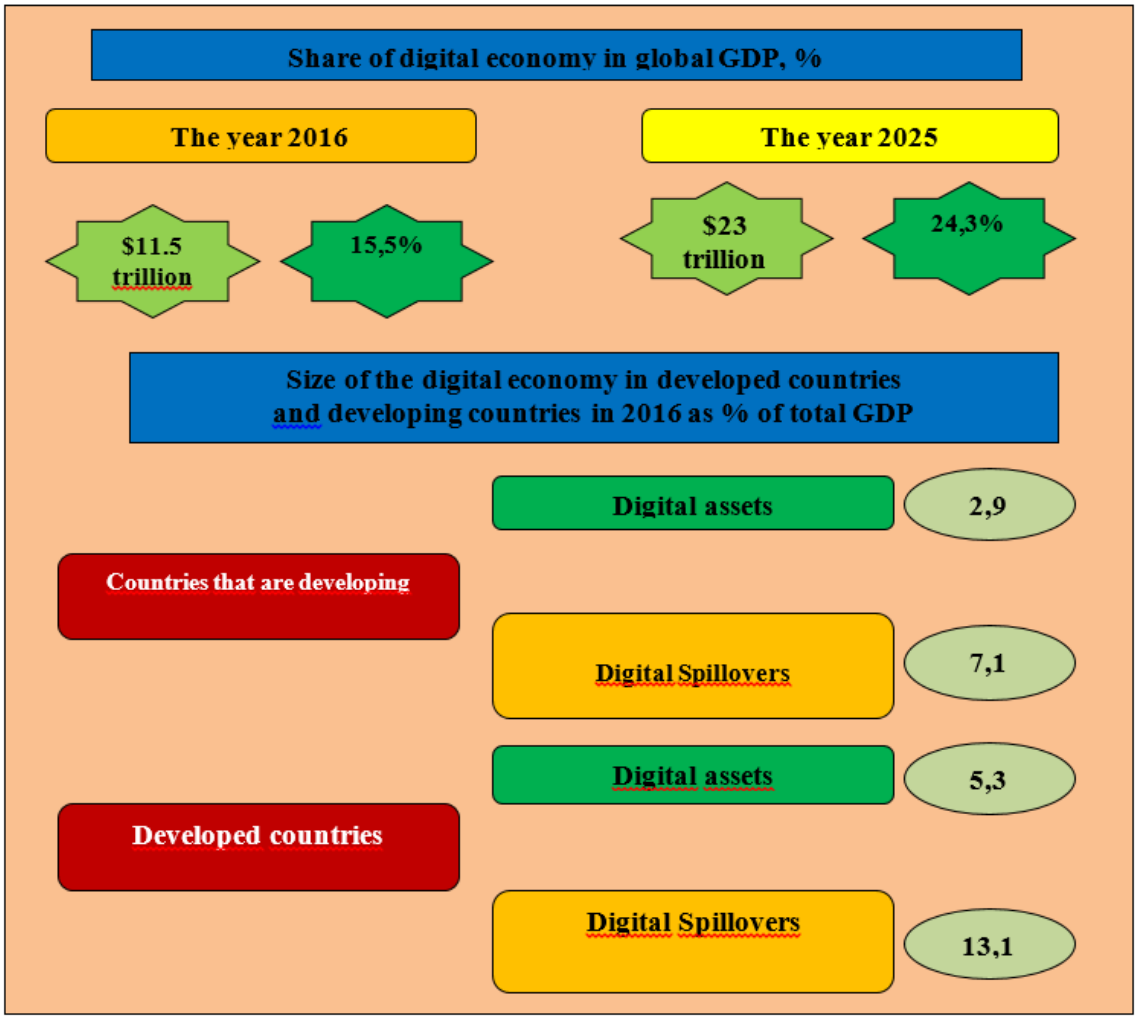

Fig.1. Some indicators of the digital economy [14].

Depending on the definitional framework applied, estimates of the digital economy's size range between 4.5% and 15.5% of global GDP [15]. Approximately 40% of the total value added generated within the global information and communications technology (ICT) sector originates from just two countries — the United States and China.

Employment patterns in the ICT sector also reveal important dynamics. The number of individuals employed worldwide in this field increased from 34 million in 2010 to 39 million in 2015. The majority of these employees, nearly 38%, were concentrated in computer services. During the same period, the ICT sector's share of overall global employment rose from 1.8% to 2% [16].

According to the World Bank, the diffusion of digital technologies is progressively erasing traditional geographic and physical boundaries, thereby creating new opportunities for economic, social, and cultural advancement. At the same time, it plays a critical role in enhancing both regional and global competitiveness by facilitating cross-border integration and accelerating innovation processes [17].

Table 3. GDP growth in the Eurasian Economic Union region due to digitalization, % (taking into account GDP growth due to the implementation of country and regional digital agendas in 2018-2025) [18]

	Growth of international Internet bandwidth	Growth of fixed broadband penetration	Spread of e-commerce
Country-by-country scenario	0,55	0,8	0,44
Digital agenda scenario	0,66	1,7	0,88
Growth	0,11	0,9	0,44

In assessing the potential contribution of digital technologies to EU GDP growth by 2025, the World Bank Group highlights several key factors: a 1.7% increase linked to fixed broadband penetration, an additional 0.66% associated with the expansion of international bandwidth, and a further 0.88% resulting from the growth of e-commerce adoption [19].

Illustratively, estimates by the European Commission suggest that the establishment of a unified digital market within the European Union could generate up to €415 billion annually for the EU economy, stimulate significant job creation, and accelerate the transition toward a knowledge-based society [20]. At the global level, cross-border data flows expanded forty-fivefold between 2005 and 2014, reaching an estimated value of $2.8 trillion [21]. Importantly, their contribution to global GDP growth exceeded that of international trade in physical goods, as emphasized in the “Fact Sheet: Key Barriers to Digital Trade.” Collectively, these trends underscore that the rise of the digital economy is poised to unlock a wide array of new economic opportunities on both regional and global scales [22].

It is widely anticipated that digital data will play a pivotal role in addressing a broad range of social challenges, while simultaneously contributing to the enhancement of both economic and social indicators, fostering innovation, and driving productivity growth. Digital platforms, by facilitating transactions, establishing interactive networks, and enabling information exchange, serve as crucial instruments in this transformation. From the standpoint of enterprises, the pervasive digitalization of markets and industries has the potential to improve the quality of goods and services, streamline operations, and significantly reduce production and transaction costs [10].

The concept of *e-business* was first introduced into professional discourse by IBM Corporation, which defined it as the transformation of core business processes through the application of Internet technologies. According to D. Chaffey, the fundamental

objective of e-business is to enhance an organization's competitiveness by leveraging innovative information and communication technologies.

Although the strategic aims of e-business largely converge with those of traditional offline business models—namely, (1) profit maximization, (2) improved managerial efficiency, (3) value creation for consumers, and (4) cost reduction—the use of electronic technologies provides an additional layer of consumer value by integrating digital platforms into the production and service cycle.

The analysis reveals that e-business encompasses the digital execution of interactions with suppliers, customers, employees, and external partners, aimed at generating consumer value and minimizing costs, ultimately serving the primary objective of profit generation. Electronic transactions, in particular, have enabled firms not only to strengthen relationships with stakeholders but also to achieve significant cost efficiencies.

It is worth noting that some scholars treat *e-business* and *e-commerce* as interchangeable concepts, while others emphasize a hierarchical relationship between the two. From the latter perspective, e-commerce is regarded as a subset of e-business, focusing specifically on the management of commercial transactions, whereas e-business extends beyond commerce to include the digital transformation of internal organizational processes. In this sense, the scope of *e-business* is considerably broader than that of *e-commerce*.

According to D. Chaffey, *e-commerce* can be defined as the digital interaction of an organization with its external stakeholders through the electronic exchange of goods, services, and information. The expansion of e-commerce represents a key source of competitive advantage for modern enterprises, as it enables more efficient transactions, enhanced customer engagement, and wider market outreach. At present, e-commerce remains one of the most dynamic forms of digital economic activity, with its growth driven by advances in online platforms, secure payment systems, and the globalization of consumer markets.

E-commerce may be broadly conceptualized as a set of economic transactions conducted through information and telecommunication technologies, systems, and networks. In this broader sense, e-commerce extends beyond simple sales transactions to encompass **customer relationship management (CRM)**, **supply chain management (SCM)**, and interactions with suppliers through **supplier relationship management (SRM)**.

It is therefore necessary to distinguish clearly between *e-business* and *e-commerce*. While the terms are sometimes used interchangeably, their scope differs significantly. **E-commerce** refers specifically to the digital exchange of goods and services—essentially online trade—whereas **e-business** includes both commercial activities and the digital transformation of internal business processes such as production planning, logistics, and knowledge management. In this hierarchy, e-commerce constitutes a subset of e-business.

Global data further illustrate the rapid expansion of e-commerce. For example, the Asia–Pacific region has emerged as the dominant global market, with forecasts estimating turnover between **2.5 and 2.7 trillion USD by 2020**. This trend reflects not only the growing share of online trade in total retail volume but also the structural reorganization of global trade flows under the influence of digitalization.

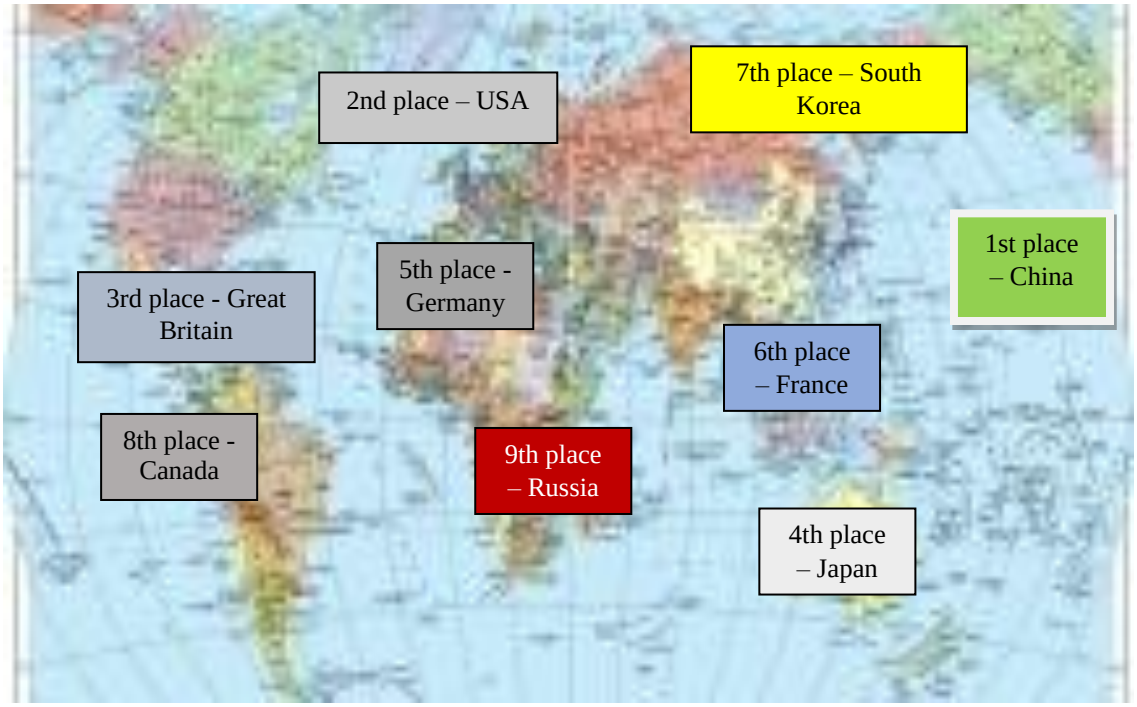

Fig. 2. Countries leading in online trade in total retail trade.

Mobile commerce, often referred to as *m-commerce*, represents a specialized branch of electronic commerce in which financial and informational transactions are executed through mobile and wireless communication technologies. Unlike traditional e-commerce, which primarily relies on fixed internet connections, m-commerce leverages **mobile devices such as smartphones, tablets, laptops, and personal digital assistants (PDAs)**, as well as technologies including **satellite networks, Wi-Fi, and 3G/4G/5G systems**.

In essence, m-commerce can be defined as the integration of digital commerce with mobile communication services, thereby enabling consumers and enterprises to engage in **real-time, location-independent transactions**. Its applications extend beyond simple online purchases and encompass **mobile banking, digital wallets, ticketing, location-based services, and peer-to-peer financial transfers**.

The rise of m-commerce reflects the broader structural shift in the global digital economy toward mobility, personalization, and immediacy. This transformation not only facilitates consumer convenience but also reshapes business models, creating new competitive advantages and challenges for firms operating in both developed and emerging markets.

The rapid pace of digital transformation has fundamentally reshaped the global device landscape. By May 2014, the number of active mobile devices worldwide had already surpassed the combined total of desktop computers (743 million) and laptops (789 million) by a factor of five. At that time, approximately **7 billion mobile devices** were in use, including **5.2 billion mobile phones, 1.6 billion smartphones, and 439 million tablets**.

The trend continued to accelerate. By August 2015, the number of mobile subscriptions (SIM cards) had reached **7.529 billion**, while the number of unique mobile users amounted to **3.734 billion**. By January 2017, the number of mobile devices globally rose to **8.1 billion**, exceeding the world's total population of **7.476 billion**. Of these, **4.917 billion were unique mobile users**, and **2.549 billion were active social media users via mobile platforms**.

This unprecedented proliferation of mobile technologies underscores a fundamental shift in consumer behavior: **the Internet is increasingly accessed through mobile channels rather than fixed desktops or laptops**. Consequently, businesses are compelled to realign their strategies, marketing models, and service delivery mechanisms to a **"mobile-first" paradigm**, where consumer interaction, e-commerce, and social engagement are predominantly mediated through mobile devices.

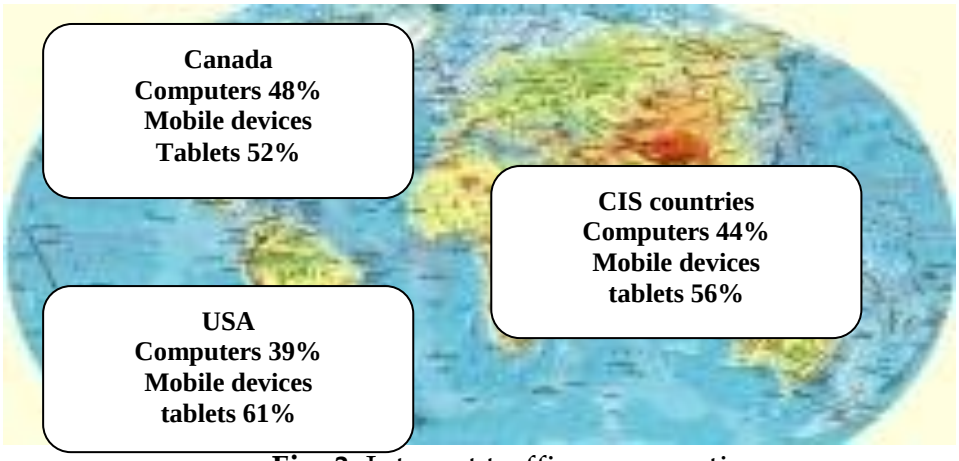

Fig. 3. Internet traffic consumption

Modern enterprises have recognized the strategic advantage of maintaining continuous contact with consumers through mobile devices, which have become an indispensable part of daily life. With the rapid expansion of mobile Internet penetration, entirely new markets have emerged in recent years, including **instant messaging platforms, mobile applications, and mobile advertising ecosystems**. Firms lacking mobile-friendly websites or dedicated applications face a growing risk of losing market share, as consumer engagement increasingly shifts toward mobile channels.

The accelerated development of mobile commerce has also produced new challenges. One such issue is the proliferation of spam across instant messaging platforms—a byproduct of their explosive growth and rising popularity as marketing

tools. For example, according to J'son & Partners, by 2015 monthly active users reached **832 million for QQ (China), 800 million for WhatsApp, 549 million for WeChat, and 205 million for Line (Japan)**.

Social networks and instant messengers are no longer limited to communication functions; they are integrating **online trade technologies** directly into their business models. This integration has significantly boosted mobile sales within online retail and is reshaping the global competitive landscape. Looking forward, mobile commerce is expected to serve as a **primary driver of growth in the global e-commerce market**, reshaping consumer behavior and corporate strategies alike [14].

Conclusion. The integration of e-commerce tools into corporate development strategies has become a **strategic necessity** rather than an optional choice for modern enterprises. The emergence of new business architectures—such as the **freemium model, print-on-demand systems, donation-based platforms, and full crowdsourcing approaches**—illustrates the structural transformation of competitive landscapes under the influence of digital technologies.

However, achieving market leadership in this environment requires more than the introduction of innovations. Companies must also **systematically monitor and respond to the innovations of competitors**, ensuring continuous adaptation to rapidly evolving market dynamics. A failure to adopt and implement online technologies in a timely manner results in the erosion of competitive advantage, the loss of customer loyalty, and ultimately, the inability to compete in increasingly digitalized markets.

Thus, sustained competitiveness in the digital era demands a dual strategy: **proactive innovation combined with vigilant competitive intelligence**. Firms that can align these two imperatives are more likely to secure leadership positions in the global digital economy.

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