

Opportunities of the Digital Economy for Achieving Competitive Advantage of Firms

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Abstract—The present article studies the opportunities and constraints of the digital economy, that have a significant impact on how modern firms attain and sustain competitive advantage. Economic agents that manage to use digitalization of business to their best advantage get access to the most innovative methods of creating, delivering and obtaining product value. However, digital technologies also constitute threats to traditional competitive advantage, which greatly contributed to firms' successful performance in the market. The article discusses the tendencies of creating and developing competitive advantage, with the account taken of the turbulent business environment and the complexity of the digital environment where firms have to compete. The conclusion has been made on the need for a digital strategy to guide firms through opportunities and prospects of applying certain digital economy technologies. Another aspect of creating competitive advantage in the digital economy is related to developing cooperation within interorganizational networks. It is also essential to ensure coordinated actions on building long-term relationships with consumers, according to digital economy technologies being introduced, and creating competitive advantage.

Keywords—*digital economy; competitive advantage; digital economy technologies; business processes*

I. INTRODUCTION

Competitive potential of firms is based on their competitive advantage. The more competitive advantage an economic agent manages to attain, the more likely it is to increase its competitive ability. At the current stage of digital economy development there is no room for doubt over the importance and necessity of digital economy technologies, which cannot but encourage firms to approach their competitive advantage in a more responsible way.

The digital economy, provided by rapid advances in information and communication technology, including the

Internet, is shaping a new digital environment where all firms, from digital economy leaders to those wary of digital technologies, have to compete. In scientific literature, the changes in the business environment influenced by the digital economy are known as Industry 4.0 or the fourth industrial revolution, which is considered the symbiosis of the traditional material and the virtual world [1], [2].

According to one of the definitions, the digital economy is understood as “the economic activity that results from billions of everyday online connections among people, businesses, devices, data, and processes. The backbone of the digital economy is hyperconnectivity which means growing interconnectedness of people, organizations, and machines that results from the Internet, mobile technology and the internet of things (IoT)” [3].

Considering the role of the digital economy in successful business growth, it is essential not only to transform and optimize the internal processes of firms, but also to “understand the digital users” [4]. Meanwhile, “new technology and business strategies transform not only business processes, but also the way products and services are created and marketed, the structure and goals of the enterprise, the dynamics of competition, and all the rules for business success” [5]. It's important for firms to understand that digital economy technologies amount not merely to process automation, but primarily to new ways of doing business (e.g. improving customer service quality, operational optimization or developing new business models); only then the expectations of economic agents for investments in digital technologies will be met [6]. In order to unlock the potential of digital economy technologies, firms are required to develop their employees' management and technology skills. If economic agents do not accept new challenges, either deliberately or due to insufficient experience and skills, they lose their competitive advantage.

The first part of the present article analyses the benefits and challenges of digital transformation, as well as the solutions for modern firms to achieve competitive advantage. The second part presents the main conclusions and results and identifies directions for future research.

II. OPPORTUNITIES AND CHALLENGES OF DIGITAL TRANSFORMATION WHEN CREATING COMPETITIVE ADVANTAGE

Currently, on a global scale, business expenditures on information technology continue to grow by an average of 16-18% per year. In 2017, such expenditures amounted to 1.3 trillion dollars; the further increase up to 2.1 trillion dollars is forecast for 2021 [7]. According to McKinsey, the share of the digital economy is presently 10.9% of GDP in the USA; 8.2%, the average - in the EU; 3.9% - in Russia. Meanwhile, these numbers are likely to continue growing. Thus in China, the GDP growth up to 22% due to Internet technologies is expected in 2025; while in the United States, by the same year, the anticipated increment value provided by digital technology may account for 1.6-2.2 trillion dollars.

Leading digital economy firms provide greater value to their customers, as compared to the firms focusing on traditional business models. Digital technologies seriously change the relationship between consumers and the supply chain. In his research, M. Porter emphasizes that the firms aiming at achieving competitive advantage should give equal importance to such activities as manufacturing, production turnover, supply and after-sales, on the one hand, and human resources management and information technology, on the other hand [9]. However, traditional ways of creating value to increase modern firms' competitive performance, such as raw materials, labour, capital, effective strategies, are no longer sufficient. For the firms focusing on economic growth and success in the digital economy, intangible assets are becoming of utmost importance; they include the firm's digital strategy and positioning, radical innovations and first mover advantages, intangible resources and competencies, network effects and externalities, transaction costs efficiency, etc. Intangible sources of competitive advantage are actually interconnected and complement each other. The real value of these factors is in their complementarity, while their sustainable competitiveness is provided by the synergy of these sources collective use. This refers to a strategic combination of all or several intangible assets for creating new value and stimulating business model innovations. Put the matter another way, configuring intangible assets reasonably, according to the industry and the sphere of the firm's activity can help it attain and sustain competitive advantage. [10].

Impressive achievements in information and communication technologies, such as digital convergence, Web 2.0, service-oriented architectures, cloud computing, communication networks, multiple data modelling, virtualization and simulation, distributed computing, Internet of things, blockchain, digital twins, augmented reality (AR), additive manufacturing, robots and cognitive technologies are reshaping the competitive landscape by bridging boundaries of time, distance, and function. These and other

solutions of the digital economy provide a range of opportunities for firms in developing their competitive advantage (together with profitability, revenue, and market value), ensuring their current and long-term competitive performance. Interpretation of the previous research on the topic makes it possible to identify some opportunities of the digital economy.

First, increased availability of digital technologies results in "positive network externalities that further accelerate the creation and availability of digital devices, networks, services, and contents" [11]. Moreover, expanding digital innovations reduce entry barriers for potential innovators, thereby making digital technologies more available for firms [12]. In other words, digital technologies development makes them more diverse and available for all firms, even for non-digital firms (digirati).

Second, digital technologies contribute to optimizing routine procedures and traditional activities inside firms: they allow reducing costs, increasing profitability of current assets, returns on new investments and business processes efficiency, and understanding customer needs better. The combination of low incremental costs and scalability of most information technologies allows the most successful firms to achieve results, which previously seemed impossible, in relatively short time. Therefore, digital firms (digirati) demonstrate better financial results, in comparison with the results of the firms, which are sceptical of digital technologies and use only e-mail, the Internet and some software (beginners) or intentionally disengage from digital technologies, even recognizing their effectiveness (conservatives) ("Fig. 1").

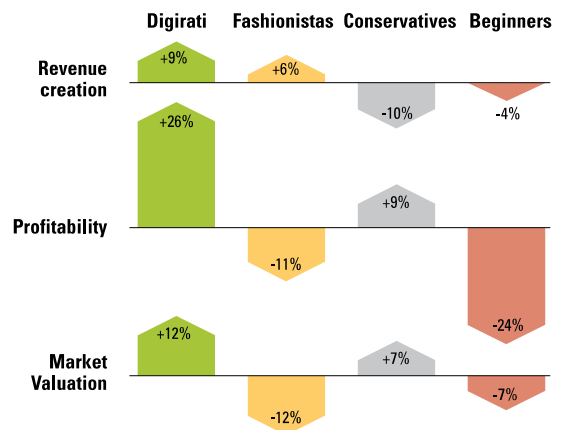


Fig. 1. Financial results of firms according to their receptiveness to digital technology.

³ Source: MIT's Centre for Digital Business and Capgemini report "The Digital Advantage: how digital leaders outperform their peers in every industry (<http://ebooks.capgemini-consulting.com/the-digital-Advantage/index.html>)".

Third, it is digitization "as the socio-technological process of applying digital technology across industries and contexts in ways that affect and shape their underlying infrastructures for the creation, storage, and distribution of content, applications, and services" [13]. For instance, e-books are not just an advanced digital replacement for traditional books, but they also pose a serious challenge to the traditional business model of publishing houses that

control the creation, production and distribution of books as physical goods. Accordingly, more and more products, traditional in form, acquire digital elements.

Fourth, it is digital convergence as “an essential, pervasive and interactive reconfiguration of the technical and social information infrastructures of modern society” [13]. It refers to the convergence of media, storage and distribution technologies, which brings together formerly separated user experiences [14]. Thus, firms get opportunities to develop new competitive advantage based on new combinations and reintegration of devices, networks, services and content, originally created for different purposes. Digital convergence also enables firms to create value outside their industry.

Despite the fact that the described benefits of the digital economy provide ample opportunities for firms to create (develop) their competitive advantage, the constraints of digital transformation in firms’ activities should also be taken into account.

To begin with, the sources of creating value and competitive advantage in the digital economy are established and based on unstable and constantly developing intangible assets, such as digital strategy and radical innovation, etc. [10]. Meanwhile, many firms find it quite difficult and often impossible (due to limited financial resources, lack of personnel, etc.) to monitor and maintain their intangible assets - the sources of competitive advantage in the digital economy. Therefore, it is advisable to use such dynamic competitive advantages of the digital economy to complement traditional factors of production, in case firms are aimed not only at surviving, but also at achieving high results in the digital economy. It is assumed that traditional factors of production are used effectively and the firm is able to create competitive advantage on their basis.

The next constraint is related to the fact that the introduction of digital technologies leads to intensified competition, thereby posing innovation-based threats to existing market leaders. For instance, in 1993-2013, in the US industries, which actively applied digital economy technologies, profit margins of leaders and laggards differed by 2-4 times. It illustrates that the principle of “the winner takes all” works in the most digitally developed sectors of the economy. Another remarkable example is Tinkoff Bank, having no bank offices, which in ten years became recognized as the largest independent bank of such a type in the world [8]. It is evident that each time the “winner” will be the firm that manages to create market value based on “new” innovations, thereby intensifying competition.

Despite the recognized need for digital transformation, most firms fail to achieve the anticipated outcomes and its visible benefits due to the lack of positive experience in managing transformation with digital technologies. So, possessing certain intangible assets and technologies of the digital economy does not guarantee success in attracting customers and expanding market shares. Using the existing assets of the digital economy effectively is much more important than possessing them. Moreover, even the firms whose leading positions have demonstrated their ability to apply digital technologies can face challenges from next-

generation innovations. For example, social networks, mobile devices, analytics and embedded devices require a way of thinking and skills different from those demanded by previous transformation waves. Another possible constraint is that many firms, while recognizing the importance of digital technology, do not prioritize digital transformation of their business. They explain it with unawareness of where digital transformation will bring them.

So, the digital environment where modern firms have to compete is characterized as complex, turbulent, and fast moving. Under such conditions, creating competitive advantage is associated with a high level of uncertainty and risks for firms.

III. DIRECTIONS FOR DEVELOPING COMPETITIVE ADVANTAGE IN THE DIGITAL ECONOMY

Nevertheless, digital technologies do not just pose threats to traditional competitive advantage of firms (which provided firms’ successful performance on the market for over a dozen years); they open up development opportunities based on the latest innovations. The analysis conducted by the Bain & Company shows that over the past ten years, digital natives or post-millennials have generated 80% of the growth in market capitalization of the leading global firms [15].

It is considered that creating competitive advantage of firms in the digital economy requires accounting for the factors and specifics of the process in the digital environment.

Taking the opportunities of the digital economy for developing competitive advantage of firms presupposes several conditions and factors:

- resources necessary for discovering, understanding and creating new technologies. Not only do such resources refer to the firm’s internal environment (e.g. financial opportunities), but they are also related to the external environment where it operates. It includes the availability of qualified and talented personnel in the country (the opportunities of human capital development), the level and quality of education and training, and production of scientific knowledge [16];
- the degree of technological development at the macro level, i.e. the general environment that allows developing digital technologies in a particular firm (industry). This includes favourable regulatory environment, the level of technological base development, investment opportunities;
- the level of the firms’ commitment to digital transformation - its adaptability to digital economy technologies and flexibility in making decisions towards integrating digital technologies into business processes. Apparently, the discussed firm’s commitment to digital transformation largely depends on the industry’s and the country’s commitment to digitalization.

The understanding of how firms create and develop their competitive advantage in the digital economy is primarily based on key concepts of competitive advantage, with certain assumptions.

Thus, according to M. Porter's concept, strategic positioning of a firm in the selected industry clarifies the results of the firm towards the external environment [9]. The resource-based view highlights that firms can sustain competitive advantage by obtaining valuable, rare, imperfectly imitable and unique resources for a particular firm [17]. The presented approaches assume that the environment of the firm is relatively sustainable. However, the digital environment is described as complex, turbulent and fast changing. Value creation and competition are difficult to predict, which leads to a high degree of uncertainty. In this regard, some authors consider firm's interorganizational network as the primary source of sustained competitive advantage in the digital economy [12]. They mean dynamic and turbulent ecosystems, in which firms are embedded. Value is co-created with several other firms and strategy-making is based on shaping the environment. Thus, sustainable competitive advantage is created within interorganizational network. From a network-centric perspective, firms' resources and capabilities extend beyond firm boundaries and are embedded in a set of relationships between firms.

In order to progress in the digital environment characterized by high uncertainty, a firm must clearly understand its current market position, including from the viewpoint of its capabilities in applying digital economy technologies. Analysing digital initiatives, the firm can identify strategic investment areas, as well as risks that need to be addressed on a first-priority basis. Firms not having a coordinated digital strategy frequently fail to achieve the expected competitive advantage. Furthermore, when identifying strategic activities in the digital environment, the firm should understand the main aspects of innovative development of the industry in which it operates.

The need to keep up-to-date with the latest technological trends and take every opportunity to make their business more efficient encourages firms to develop their competencies in digital economy technologies development and implementation. The choice of information technology is substantiated by financial opportunities of the firm itself and the expected effect of digitalization, as well as by product type and its acquisition. Thus, when optimizing costs and profit, the key point for a number of companies (e.g. for retail) is adapting the corresponding business model according to the desired level of consumer involvement, which requires selecting the most effective digital economy technology for each particular case. Products with high consumer involvement require positive, personalized experience, which implies using appropriate technology and top employees. For products with low consumer involvement, speed, efficiency and price are key factors, so automated sales channels will be the most preferable technology in this case.

IV. CONCLUSION

Nowadays, the digital economy embraces almost every firm, regardless of how receptive to digital technology they are. The integration of digital economy technologies into business processes is affecting the dynamics of competition between firms. On the one hand, there are growing opportunities for creating competitive advantage, while on the other hand, this constitutes new challenges and threats to the development of existing firms and practical solutions to business problems. According to the research, the opportunities of the digital economy for companies in terms of developing competitive advantage include: availability of digital technologies; optimization of internal processes in companies; digitization; digital convergence. The problems that companies face in the digital economy has been identified in the study: the instability and high dynamism of competitive advantage provided by fast changing digital technologies; intensified competition; lack of management experience, lack of understanding of the high priority of digital transformation.

Impressive developments in digital technologies have resulted in the introduction of new features that have influenced the parameters of competitive advantage of firms. As modern firms develop their business models based on digital economy technologies, it is critical for them to have the appropriate opportunities to service new solutions. These opportunities require developing digital strategies, commitment to innovation and cooperation (building firm's interorganizational networks). It is also necessary to ensure coordinated actions on building long-term relationships with consumers, according to digital economy technologies being introduced, and creating competitive advantage. These requirements allow firms to develop competitive advantage, with the account taken of the uncertainty of the digital environment. Consequently, each firm has its own ideas on how to compete in the digital economy and individually identifies a set of its competitive advantages.

The conducted study does not intend to provide a comprehensive overview of all the opportunities and challenges of the influence the digital economy has on the development of competitive advantage of firms; however, consistent activity on monitoring and solving the existing prerequisites and constraints of business processes digitalization will significantly contribute to further advances in this direction.

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