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DIGITAL BUSINESS AGILITY

Abstract

In the business environment, a high level of competitiveness is largely determined by technological development, hence the need for continuous adaptation of organizational strategies, often by digitally transforming the business models. Business agility, as the ability to identify and adapt to digital technologies in a timely manner, represents a successful response and plays a profound role in the organization's success. By analyzing recent literature, this paper examines the importance of digital business agility and how digital technologies themselves contribute to the development of comprehensive business agility. The paper describes the results of the research, which can serve as a strategic orientation for organizations on their journey to digital transformation and improved business agility.

Key words: Digital transformation, digital business agility

JEL classification: M1, M15

ДИГИТАЛНА ПОСЛОВНА АГИЛНОСТ

Апстракт

Висок ниво конкурентности у пословном окружењу, условљен првенствено технолошким развојем од организација захтева континуирану стратегијску адаптацију, не ретко на нивоу дигиталне трансформације пословних модела. Пословна агилност као перформанса правовременог идентификовања и усвајања дигиталних технологија представља адекватну реакцију и значајно детерминише успех организације. Циљ овога рада је да се увидом у рецентну литературу укаже на значај дигиталне пословне агилности, њене кључне елементе као и допринос самих дигиталних технологија развоју свеобухватне пословне агилности. У раду су описани резултати истраживања, који организацијама могу послужити

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као стратегијска оријентација на путу дигиталне трансформације и унапређења пословне агилности.

Кључне речи: Дигитална трансформација, дигитална пословна агилност.

Introduction

The strategic and operational challenges of doing business in the digital vortex are complex due to a number of factors such as: economic globalization, hypercompetition, changes in customers' preferences, increased regulation and technological progress. In most cases, organizational agility refers to the ability to identify relevant changes in the environment in a timely manner and to respond appropriately and efficiently (Overby et al., 2006). The authors (Andrade et al., 2022; Murawski et al., 2018; Ravichandran, 2017) define agility as an organization's ability to quickly respond to changes and opportunities in the environment, conceptualizing it into three dimensions: customer responsiveness, operational flexibility and strategic flexibility.

As the digital environment is constantly evolving, the ability to identify relevant changes in such an environment and respond appropriately is one of the key aspects of survival and development for most companies (O. D. Lee et al., 2016; Overby et al., 2006; Park & Sawy, 2017; Peszynski, 2012; Salmela et al., 2022; Tallon & Pinsonneault, 2017). In light of this, Danesh and Hakkak (2016) believe that agility represents the gold standard in the era of information and communication technologies. Tria et al. (2016) also argue that organizations need to react quickly and skillfully to the changing environment in order to be competitive. About 90% of executives surveyed by the Economist Intelligence Unit believe that organizational agility is critical to business success (Tria et al., 2016). Despite a large number of definitions of agility, according to Tria et al. (Tria et al., 2016), they can be summarized by stating that change management is a key determinant of agility in the sense that it creates changes, emphasizing proactivity over reactivity, and learning from them. Technologies such as big data, analytics, cloud computing, mobile applications, social networking, Internet of Things, artificial intelligence and machine learning are examples of real drivers of business change (Brinkhues et al., 2016; Ismail et al., 2017; Matkovic et al., 2018; Sebastian et al., 2017; Wade, 2015). Several authors (Ismail et al., 2017; Matkovic et al., 2018; Schallmo & Williams, 2017) define digital business transformation as the integration of these technologies to improve performance through business change. According to Hess et al. (2016), digital transformation is a complex issue that affects many or all segments within an organization. In order to achieve organizational agility that is a prerequisite for a successful transformation of their organizations, managers must find a balance between research and the use of their organizations' resources (Hess et al., 2016; Karimi & Walter, 2021).

Analyzing the critical success factors of digital transformation from a theoretical perspective, Ubiparipović (2021) in his doctoral dissertation, referring to the empirical findings and research of other authors (AlNuaimi et al., 2022; Berman, 2012; Hartl & Hess, 2017; Friedrich Holotiuk & Beimborn, 2017; Imgrund et al., 2018; Sahu et al., 2018), indicated that organizational agility is one of the most significant critical factors. Yusuf et al. (2022) and Holotiuk (2018) also suggested that digital transformation itself

enhances business agility. Similarly, O. D. Lee et al. (O. D. Lee et al., 2016) found that IT technologies can increase agility, particularly flexible IT infrastructure and alignment between IT and business strategy that are crucial to recognizing and responding to rapid market changes. This allows organizations to rapidly improve their products/services and adapt their operations to market changes (O. D. Lee et al., 2016).

Based on the above, this paper uses the phrase “digital business agility” to indicate the agility of an organization in recognizing and applying new digital technologies and models in a timely manner, but also to emphasize that digital technologies themselves influence and contribute to the development of organizational skills as well.

As explained in the introduction, this paper will present a theoretical overview of the key elements and characteristics of digital business agility. The first section focuses on organizational agility in general, its decomposition, and how digital technologies affect individual components of agility. The second section emphasizes the direct and indirect relationship between organizational performance and digital business agility.

Methodology

According to the methodology presented in the paper by Xiao and Watson (2019), a systematic review of the literature was conducted to answer the research questions. The Web of Science and Scopus databases were searched using the keywords “Digital business agility” (the number of hits is shown in Table 1). Analyses of the title, abstract, and keywords were carried out in the first stage. In the first iteration, 35 papers from the WoS database and 32 from Scopus were included in the further analysis. There were 23 papers selected after removing duplicates and analyzing all papers. In addition, six additional papers were identified through forward and backward research. Consequently, 29 papers were included in the further analysis. Below are the results of the analysis of those papers.

Table 1. Search results of electronic databases

Data source	Number of Hits	Number of papers included after analyzing Titles, Abstract and Keywords
Web of Science	413	35
Scopus	419	32

Key components of digital business agility

Referring to a number of authors, Overby et al. (Overby et al., 2006) interpret organizational agility as a permanent awareness of environmental changes and the ability to respond accordingly. This leads Overby et al. (Overby et al., 2006) to decompose organizational agility into two key activities: sensing and responding. Taking into account both academic and practical perspectives and in accordance with the decomposition of agility mentioned earlier, the authors developed a framework for illustrating different combinations of organizational capabilities for sensing and responding. Based on the

degree to which the organization is able to detect or sense changes as well as respond appropriately to those changes, the aforementioned work framework categorizes the organization into one out of four categories (low/high sensing capability, low/high responding capability) (Overby et al., 2006). Among the organizational capabilities that help to detect change, Overby et al. (Overby et al., 2006) mention marketing intelligence, which refers to monitoring competitors' actions, consumer preferences changes, and economic shifts. Based on the observed changes in the environment, the organization undertakes varying levels and ranges of responses, starting with complex undertakings and progressing to simpler ones and finally refraining from taking any action. The range of complex responses includes: launching new products, creating new distribution channels and targeting new customer segments. The category of simple responses includes: making a price change for products and services, increasing or decreasing production of existing products, and adjusting certain product features (Overby et al., 2006). A well-implemented organizational design also results in a high level of organizational agility, although research results indicate a difference between the effect of organizational design on sensing and responding (F. Holotiuk et al., 2018).

In line with the previous, Overby et al. (Overby et al., 2006) describe how agility requires organizational capabilities and capacities that enable sensing and responding function. Information technologies are included in both components, either directly or indirectly through the creation of digital options as an essential component of other processes and functions important for organizational agility (ERP, CRM, SCM). When it comes to direct contribution to the sensing and responding function, it first of all manifests itself through modern digital channels (internet and mobile technology) in order to gain a direct connection with consumers, as well as through the alternative channels of product and service sales and distribution. As important as the direct relationship between IT and agility may appear, perhaps the indirect relationship is even more crucial considering the role that information infrastructure plays in improving the performance of processes such as: product research and development, procurement, manufacturing and sales. By supporting these processes, IT directly contributes to better interconnectivity between internal actors and functions, as well as better integration with external partners such as consumers and suppliers (Overby et al., 2006).

Information technologies not only support organizations in digitalizing and expanding processes so that they can better integrate with consumers, suppliers, and partners internally and externally, but also provide a significant support for agility, as a critical component of knowledge management systems within an organization. A well-structured information system significantly participates in collecting, synthesizing, processing and distributing knowledge in the organization. Information technologies such as Data Warehouse, Decision Support Systems and OLAP tools can help organizations in creating knowledge through real-time data monitoring, recognition of hidden patterns among data, and scenario modeling. This directly contributes to the sensing function of agility by identifying emerging opportunities or threats (Overby et al., 2006). It is concluded by Overby et al. (Overby et al., 2006) that in support of knowledge management systems, information technologies primarily contribute to improving the sensing component of agility. Similarly, the technologies incorporated into the mentioned business processes primarily contribute to the responding component of agility. In spite of the specific contribution of information technology to agility, Overby et al. (Overby

et al., 2006) indicate that IT technologies by themselves do not perform this role if their infrastructure is monolithic, nonintegrated, inflexible, and insufficiently scalable. As these are expensive technologies, inadequate planning, design, and management will result in a large cost to the organization, not compensating for it by improving the organization's agility and performance (Overby et al., 2006). IT tools and data infrastructure - a well-aligned and consistent IT interfaces, real-time communication and work-management tools are integral component of any agile organization (Shafiee Kristensen et al., 2021). Likewise, Andrade (2022) argues that agility requires orchestration of digital resources.

Defining simplified business agility as effective sensing and responding, Park & Sawy (Park & Sawy, 2017) identify three key phases of the sense-response process: *sensing*, *decision-making* and *acting* (Figure 1).

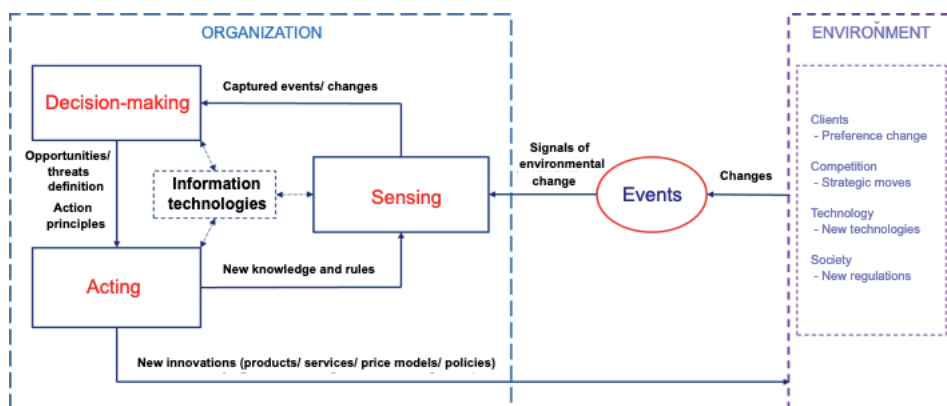


Figure 1. Organizational sense-response process loop
Adapted from source (Park & Sawy, 2017)

The *sensing* phase refers to strategically scanning business events that manifest business environment changes that might have significant impact on organizational strategy, competitive action, and future performance. Sensing involves gathering information about events of environmental change (e.g., customer preferences, competitors' strategic moves, the emergence of new technologies, and new regulations) and eliminating relatively irrelevant information. The *decision making* phase involves several interrelated activities that interpret the captured events and categorize them as opportunities or threats. To understand the implications of captured events, the organization gathers, aggregates, structures, and evaluates relevant information from multiple external and internal sources. Opportunities and threats are defined through these activities. Decisions are then made and a plan of action is drawn up to maximize the effects of opportunities or minimize the consequences of threats. The *acting* phase refers to a set of activities defined in an action plan that explains how to reconfigure resources or adapt business processes in a way that initiates new competitive actions in the market (Park & Sawy, 2017).

According to Park and Sawy (Park & Sawy, 2017), IT supports all of the activities mentioned in the sense-response process, and they emphasize business intelligence (BI)

and communication technologies as they play an integral role in all key tasks. The authors (Park & Sawy, 2017) claim that the functionalities provided by BI and communication technologies (to capture, process, store and share data, information, rules and knowledge) form a central nervous system of the sense-response process. Through sensing and decision-making activities, organizations learn from new events and create new data, rules and knowledge that BI systems store and distribute to different business units and sectors through communication technologies. More specifically, BI technologies provide a set of functionalities that help efficiently build, manage and access consistent data across an organization and extract patterns from big data, which supports sense-response activities. BI technologies allow organizations to store and manage codified knowledge and rules, which, in turn, enables them to automatically monitor and register important business events (e.g., digital dashboard with workflow algorithms). BI technologies also enable access to consistent databases at the level of the entire organization (Data Warehouse) including the creation of what-if analyses, data exploration and visualizations, which can significantly support and facilitate timely decision-making. In practice, in order to cope with rapid and uncertain changes in business, organizations have extensively developed business intelligence systems, including Data Warehouse, data mining, Balanced Scorecard, digital dashboard and online analytical processing (OLAP) (Park & Sawy, 2017).

In the context of the digital technologies' effect on organizational agility, Danesh and Hakkak (Danesh & Hakkak, 2016) discuss in their study how business intelligence technologies contribute to the improvement of agility. According to the authors, in response to the pressures of a changing environment and innovations, modern organizations have complex structures and are constantly forced to change. An environment like this requires an agile organization that must make complex strategic, tactical, and operational decisions under time constraints. The decision-making process requires effective management of data, information and knowledge, which is the task of a business intelligence system. Business intelligence systems, through analytical tools, combine information collection, storage and processing techniques to deliver and present complex internal and external information to planners and decision makers in a timely manner (Danesh & Hakkak, 2016).

The study conducted by Troise et al. (2022) highlighted three antecedents of agility: digital technologies capability, relational capability and innovation capability. The research results confirm that the above three prerequisites contribute to the business agility of the organization, while digital technologies play a central role in the above process and business agility contributes to the success of the organization. Liu et al. (2023) empirically demonstrated that digital platform capabilities enable organizations to adapt rapidly, flexibly, and effectively to market changes (representing digital agility), implement strategic adjustments, and improve their business performance.

Lee et al. (2015) argue that in today's highly competitive business environment, organizational agility is essential to success as it reflects the organization's ability to continuously monitor and sense market changes and respond accordingly. It is also recognized by Lee et al. that information technology (IT) provides a key platform on which modern organizations compete by leveraging their digitized processes and knowledge. Accordingly, the strategic management of organizational IT resources has attracted attention as an important factor of organizational agility. In particular, with continuous progress in IT solutions and services, IT ambidexterity - the ability of organizations to

simultaneously explore new IT resources and practices (IT exploration), as well as the ability to exploit current IT resources and practices (IT exploitation) - is recognized as a fundamental capability that can enable organizational agility and good performance. Lee et al. (O. K. Lee et al., 2015) propose a conceptual model that shows dual capacity of IT (IT ambidexterity) has a positive effect on the ability of operational ambidexterity, which directly affects the improvement of organizational agility, emphasizing that dynamism of a company's environment affect those relationships (O. K. Lee et al., 2015).

The impact of digital business agility on organizational performance

In their research, Tallon and Pinsonneault (Tallon & Pinsonneault, 2017) discussed the relationship between IT competencies and organizational agility and their impact on organizational performance in a volatile business environment. The conceptual model presented by the authors shows that, historically, aligning IT and business strategy has a positive impact on organizational performance (profitability, productivity, sales growth, etc.), with organizational agility playing a significant role in a changing environment. Their model also shows that IT infrastructure flexibility has a positive impact on agility, as strong as the impact of alignment on agility. The mediating influence of agility is particularly significant in the context of a volatile market environment caused by greater uncertainty in international financial markets, changing consumer demands and rapid product obsolescence. In such an environment, agility defined as the ability to quickly detect opportunities and threats and effectively respond to them becomes a key business imperative (Tallon & Pinsonneault, 2017).

Murawski et al. (Murawski et al., 2018) refer in their study to the approach of Bharadwaj et al. (2013) who propose the concept of Digital Business Strategy (DBS). According to their rather broad definition, DBS is *“organizational strategy formulated and executed by leveraging digital resources to create differential value”*. The conceptual model developed by Bharadwaj et al. (Bharadwaj et al., 2013) shows that digital business strategy has a positive impact on organizational performance. Based on empirical research, conducted on a sample of 123 large enterprises from Germany, Austria and Switzerland, Murawski et al. (Murawski et al., 2018) confirm the assumptions that a suitable DBS, which is fully integrated into the organization and which is fully accepted by the leading staff, will significantly influence the level of innovation of the organization. According to the research, organizational innovation affects profitability, but there is no direct interdependence between the two. Instead, the relationship was found to be fully mediated by organizational agility (Murawski et al., 2018). The study conducted by Ravichandran (Ravichandran, 2017) shows that the innovation capacity of an organization has a positive relationship with organizational agility that provides flexibility to configure resources into a system of activities that can be profitable.

Brinkhues et al. (Brinkhues et al., 2016) focused on the understanding the impact of specific digital capabilities on improving digital business performance. These authors see digital capabilities as skills that are needed to go beyond pure IT and to include specific technologies, such as: social media, mobile, and analytic skills to drive value from big data. Brinkhues et al. (Brinkhues et al., 2016) conceptualized and showed that agility, ecosystem connectivity, process digitization and visualization have a positive impact on digital business

performance. According to Brinkhues et al. (Brinkhues et al., 2016), the mentioned digital capabilities enable the improvement of processes and customer relationships, thereby improving the overall digital business, affecting at the same time operational and strategic fields. The agility of the organization enables quick decision-making, which directly affects the client's satisfaction and the image of the organization itself (Brinkhues et al., 2016). According to (2018), dealing with dynamic changes in the market is about developing agility techniques to respond to threats and turn them into opportunities for adaptation and differentiation. Therefore, increasing performance refers to effective and timely response to potential changes occurring in the business environment (Fotso, 2018).

Troise et al. (2022) focused their study on small and medium-sized enterprises by investigating three antecedents of agility, digital technology capability, relational capability and innovation capability, as well as the effects of agility on three outcomes: financial performance, product, and process innovation. The results of the study indicated that the aforementioned three capabilities contribute to building organizational agility in small and medium-sized enterprises and that agility has a positive impact on financial performance. Consequently, agility contributes to the success or performance of small and medium-sized enterprises, while digital technologies play a key role in this process.

A quantitative and qualitative study conducted by Yusuf et al. (2022) explores the impact of strategic agility on organizational performance based on the claim that IT drives change and innovation in business. Having conducted the research, their assumption of related studies was confirmed that organizations that use strategic agility move to a higher level of organizational performance. In a study conducted by Holitluk et al., the results revealed that agility has a positive impact on organizational performance, which illustrates how agility is essential to improving organizational performance in times where digitalization and digital innovations are driving a lot of changes. The studies (Lungu, 2020; Troise et al., 2022) also emphasize the importance of organizational agility in determining company performance.

According to the created working framework, Overby et al. (Overby et al., 2006) suggest that agility requires an extensive engagement of operational and strategic capacities in the organization. The creation and maintenance of these capacities also generate costs, so it is essential to be aware of the contexts in which agile approaches are necessary and those in which they generate unnecessary costs. The determining factor is the dynamics of environmental changes. A high level of agility is not required in some industries, such as energy, where the environment is relatively stable and regulated. However, in industries where market conditions are dynamic and turbulent, agility becomes an indispensable success factor (Overby et al., 2006). The organization risks assuming the adoption of new technologies for sustainable and performing business by overemphasizing agility in the context of digital transformation (Nwaiwu, 2018). According to the same author, technology, despite its undisputed importance, does not in itself represent value, but the value is rather derived from business being done differently as a result of the technology. Furthermore, Troise et al. (2022) note that the mere availability of digital technologies is insufficient, so they must develop their capabilities. Consequently, transformation processes require a holistic perspective beyond a narrow view of technology as a dominant factor (Nwaiwu, 2018).

Conclusion

In the conducted theoretical research, the assumptions about the business context of modern organizations were confirmed. As the business environment changes rapidly, driven primarily by technological advancement, organizations must continuously and efficiently adapt through digital transformation. To ensure that digital transformation proceeds at a pace consistent with the aforementioned dynamics of environmental changes, organizations need to develop business agility, which manifests itself as a constant awareness of changes in the environment and a capability to respond rapidly and adequately.

An organization practices business agility through three sensing-responding activities: timely sensing of changes, informed decision making, and effective acting. It is the application of modern digital technologies that makes each of the above activities effective, which in this case represents both the goal and the means of achieving digital business agility.

The research results also showed that organizational agility has a positive effect on organizational performance. However, that contribution to performance is mediated and conditioned by various factors such as: type of industry, dynamics of the environment, IT capacities, size and age of the organization. Furthermore, the existing organizational capabilities, skills, attitudes, and behaviors of the employees are crucial to a successful transition to an organizational state characterized by fluidity, adaptability, and constant change.

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