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ISSN: 0133-0179 (Print)  
3057-9376 (Online)

ELŐKÉSZÍTÉS ÉS NYOMDAI KIVITELEZÉS:  
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Hírlap Üzletág. Előfizethető közvetlen a  
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(Budapest VIII., Orczy tér 1.  
t: 06 1 477-6300; p.cím: Bp., 1900).  
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Előfizetési díj egy évre 18000 Ft  
Példányonkénti ár: 1700 Ft

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# VEZETÉSTUDOMÁNY

Vol. 55., Iss. 11. 2024

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## ANNOUNCEMENT

MTA SECTION IX. COMMITTEE ON BUSINESS ADMINISTRATION –  
PUBLICATION EXCELLENCE AWARD 2023 69.



A Budapesti Corvinus Egyetem szakfolyóirata  
Published by the Corvinus University of Budapest

www.vezetestudomany.hu

# IMPACT OF ADDITIONAL IT INVESTMENTS ON FIRM-LEVEL COMPETITIVENESS

## A KIEGÉSZÍTŐ IT-BEFEKTETÉSEK HATÁSA A VÁLLALATI SZINTŰ VERSENYKÉPESSÉGRE

Competitiveness and digitalization are important topics for businesses, as in the rapidly changing environment, they determine the ability to survive and thrive. This study examines the impact of information technology (IT) investments on firms' competitiveness. The study adopts the dynamic capability approach to examine how IT investments enable firms to adapt to digital transformation and generate value. This study employs causal econometrics methods to test the hypothesis that supplementary IT investments enhance the growth, efficiency, and capital accumulation of firms, which are key indicators of ex-ante competitiveness. The hypotheses are tested on a dataset of 65536 Hungarian firms from 1999 to 2014. Empirical evidence was found to support these hypotheses and confirm the positive relationship between IT investments and firm-level growth, efficiency, and capital accumulation. The findings indicate that a small IT investment does not improve efficiency, while an excessive investment is likely to include irrational investments as well.

**Keywords:** competitiveness, digitalization, information technology, resource-based view

A digitalizáció és a versenyképesség napjainkban kiemelten fontos témák, mivel ezek határozzák meg, hogy mely vállalatok lesznek képesek túlélni és növekedni egy gyorsan változó környezetben. A szerzők tanulmánya az információtechnológiai (IT) beruházások cégek versenyképességére gyakorolt hatását vizsgálja a dinamikus képességek elméletén keresztül, annak érdekében, hogy meg lehessen érteni, hogy az IT-befektetések hogyan teszik lehetővé a cégek számára a digitális átalakuláshoz való alkalmazkodást és az értékteremtést. A tanulmányban kauzális ökonometriai módszertant használva tesztelik azt a hipotézist, hogy a többlet IT-befektetések pozitívan fokozzák a cégek növekedését, hatékonyságát és tőkefelhalmozását, amelyek az előretételek szerint versenyképesség kulcsfontosságú indikátorai. A hipotéziseket 65536 magyar vállalat 1999 és 2014 közötti adatait tartalmazó adatbázisán vizsgálták. Az empirikus bizonyítékok megerősítették azon hipotéziseiket, hogy a többlet IT-beruházások és a vállalati növekedési képessége, hatékonysága és tőkefelhalmozásának sebessége között pozitív kapcsolat áll fent. Az eredmények azt mutatják, hogy egy kisméretű informatikai beruházás nem javítja érdemben a vállalatok hatékonyságát, miközben a túlzó méretű támogatások irracionális, nem értékteremtő IT-beruházások megvalósulását is eredményezték.

**Kulcsszavak:** versenyképesség, digitalizáció, információtechnológia, erőforrás-alapú szemlélet

### Funding/Finanszírozás:

The authors did not receive any grant or institutional support in relation with the preparation of the study. A szerzők a tanulmány elkészítésével összefüggésben nem részesültek pályázati vagy intézményi támogatásban.

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The article was received: 14. 03. 2024, revised: 18. 04. 2024, accepted: 22. 04. 2024.

A cikk beérkezett: 2024. 03. 14-én, javítva: 2024. 04. 18-án, elfogadva: 2024. 04. 22-én.

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Competitiveness has been a main topic of academic research on businesses for the past six to seven decades. It is widely acknowledged that sustaining a com-

petitive advantage is of utmost importance for organizations (Barney, 1991). Historically, competitiveness has been associated with the growth and expansion of firms

at a global level. The seminal essays authored by Penrose (1959) and Porter (1980) emphasized the significance of resources and competitiveness as crucial factors in the process of internalization and expansion. The Resource-Based View (RBV) theory serves as a fundamental paradigm for understanding the competitiveness and growth of organizations (Wernerfelt, 1984). The dynamic capability approach, a component of the RBV, emphasizes the ability to effectively allocate and exploit resources, as well as the interconnectedness of these capabilities that result in substantial adaptations in the operations of organizations (Danneels, 2012).

During the fourth industrial revolution, we transformed analog processes, objects, and data into digital form (Fichman et al., 2014). This transformation facilitates the emergence of novel processes for generating value (Gobble, 2018; Móricz et al., 2022). Digitalization is most appropriately situated within the framework of dynamic capabilities theory, given that dynamic capabilities theory is concerned with the ability to adapt to a swiftly evolving context. Therefore, most of the research on the topic examines the effects of digitalization on organizational operations via the lens of the RBV (Parida et al., 2019; Rabetino et al., 2018).

This study aims to examine the effects of information technology (IT) investments on company-level competitiveness, specifically in terms of growth, efficiency, and capital accumulation in the 21st century. The primary research question of this study is how supplementary IT investments affect the competitiveness of businesses. Competitiveness, in the context this study refers to, strictly corresponds to ex-ante competitiveness during the examination. The study defines it as a set of Key Performance Indicators (KPIs) that collectively indicate future profitability, thereby reflecting the current level of competitiveness of a firm. This study applied a methodology known as causal econometrics through the employment of fixed-effect long panel models in conjunction with matching methodology. The dataset includes data on 65,536 Hungarian firms from 1999 to 2014.

This study presents empirical evidence that supplementary IT investments have a positive effect on the growth, efficiency, and capital accumulation of firms, which indicates a better competitive state compared to the companies that have not made supplementary investments in their IT infrastructure and digital transformation. These results align with the findings of Bartel et al. (2007), Zeng et al. (2022), Rachinger et al. (2019), Lawrence and Tar (2010), and Lee-Kelley et al. (2003). While also trying to further increase our understanding regarding the role of IT developments and capabilities in firm-level competitiveness through the concept, this study presents the interconnectedness of these capabilities and resources.

## The theoretical background of firm-level competitiveness

The concept of competitiveness is complex, and various tiers of the economy (such as the macroeconomic, indus-

try, firm, or product levels) have distinct understandings of competitiveness. Competitiveness can be defined in various ways, even at a company level. Krugman's (1994) perspective on competitiveness, which posits that it can be either dangerous or trivial, enables the identification of two primary methods for characterizing competitiveness. The first technique examines competitiveness by analyzing the balance between costs and shares at the intersection. Conversely, the second method discusses competitiveness by emphasizing the way of value creation. The truth can be found in the middle ground, within the correlation between production, value creation, and expenses (Ketels, 2016). Most approaches indicate that competitiveness is strongly correlated with long-term profitability. Multiple theoretical explanations exist for the origin of the ability in question.

The concept of firm-level competitiveness witnessed substantial expansion in the 1980s. Porter's research (1980) examined the competitiveness of firms by analyzing their financial performance in terms of profitability. Porter argues that the financial performance and profitability of companies depend on two crucial factors: the particular market in which the company operates and the strategic position it has achieved within this market.

According to Peng (2009), three key elements exert an effect on the formulation of a company's strategy and subsequently impact its level of competitiveness. This approach considers a comprehensive range of aspects, encompassing both external and internal dimensions: 1) The external factors include the institutional system, history, transitions, and stability; 2) industry competitiveness, industry, and consumer expectations; and 3) the internal factors consist of the firm's resources and skills. The scholarly literature refers to the analysis of a firm's resources and capabilities as resource-based competitiveness analysis.

The resource-based explanation of the firm-level competitiveness method posits that a company's success and competitive advantage stem from its unique and non-replicable resources. These resources are either inherently difficult to imitate or cannot be imitated at all. The theory initially proposed by Penrose (1959) and further developed by Wernerfelt (1984) centers on examining the interplay between firm resources and the external environment, with a particular emphasis on technical advancements.

The resource-based approach fails to consider the significance of resource capabilities in determining competitiveness. According to Grant (1991), capabilities can be defined as the capacity to carry out a specific task by utilizing a suitable range of resources. This concept pertains to the capacity of a company to generate novel resources using organizational procedures, employing a blend of preexisting competencies and resources to accomplish a specific objective (Amit & Schoemaker, 1993). Four conditions must be met to be classified as a capability. The organization must possess the deliberate ability to execute a certain action: 1) intentionally, 2) repeatably, 3) reliably, and 4) at least satisfactorily (Helfat & Winter, 2011).

## Dynamic Capabilities

Danneels (2012) posits that organizations vary both in the resources they possess and in their ability to efficiently distribute and employ these resources, as indicated by the dynamic capability approach. Hence, firms must obtain and deploy novel competencies to efficiently adjust to a dynamic and evolving environment. This approach clarifies a complex network of interdependent relationships, where each capability within a system affects other capabilities and resources, resulting in consequential modifications.

The focus of dynamic capabilities lies in the examination of a „firm's ability to integrate, build, and reconfigure internal and external resources/competencies to address and shape rapidly changing business environments” (Teece et al., 1997, p. 516). According to Teece dynamic capabilities are „higher-level activities that can enable an enterprise to upgrade its ordinary capabilities” (Teece, 2016, p. 210). In a similar vein, ordinary capabilities can be characterized as those that are deemed essential for the attainment of present objectives and necessitate a management approach that prioritizes efficiency (Teece, 2016).

According to Teece (2014), there exists a relationship between dynamic capabilities, strategy, and competitiveness. Teece posits that while general capabilities and resources are inherent to a corporation, certain ones can also be obtained externally. Barney (1991) defined VRIN/VRIO capabilities and resources as those that are exclusive to the organization, shape, and impact the corporate strategy, as they cannot be obtained or substituted. The business strategy is constructed based on the utilization of these resources, while also being subsequently influenced by them (Peng et al., 1983; Peng, 2002). This, in turn, results in competitive advantage, which ultimately manifests in improved financial performance. According to Teece (2014), these factors eventually contribute to the financial performance of an organization, just as the management's capabilities to integrate them into processes (Teece, 2019).

In the context of a two-tier competitiveness paradigm, it is possible to identify and measure the connection between these capabilities and outcomes. According to Pisano (2017), firms engage in competition at both the capacity level and the product market level. Internal factors such as operational processes, organizational structure, technology, and capacity-level rivalry are rarely visible. Financial KPIs are often linked to competitive advantage in connection with product-market rivalry. The theoretical discussions regarding the interaction between the levels and the empirical findings about the association imply that it is affected by various factors. Likewise, there exists an inherent connection at the level of organizational capabilities, specifically regarding the influence of dynamic capabilities on the allocation and utilization of resources (McKelvie & Davidsson, 2009).

According to theoretical literature, dynamic capacities directly affect competitive advantage (Teece et al., 1997; Bitencourt et al., 2020) or product market competitive-

ness (Pisano, 2017). In contrast, empirical studies reveal that dynamic capacities and competitive advantage sometimes have an indirect, temporary, or non-existent link (Ambrosini & Bowman, 2009). The direct relationship can be contextualized so that a resource or routine gives a firm competitive edge in one industry, whereas, in another, it may merely sustain competitiveness.

According to Teece (2007), firms perceive, capture, and reconfigure or transform their capabilities. These capabilities were examined in a longitudinal case study of Hummels' B2C digital strategy (Yeow et al., 2018). Eisenhardt and Martin (2000) conducted a study that found a set of activities that differed slightly from one another in their impact. These activities involved utilizing existing resources, creating new ones, obtaining external resources, and converting these into monetary value. The impact mechanism in question was subsequently delineated by Danneels (2011) through the utilization of a longitudinal case study. Lin et al. (2016) found four common components from multiple interpretations, including 1) perceptual capacity, 2) absorptive ability, 3) relational ability, and 4) integrative ability.

In the 4th Industrial Revolution, companies need new skills and resources to sustain or enhance their competitive edge. According to strategic management theories, technological advances significantly impact businesses' competitiveness. The general components of dynamic capabilities can also be found in related functional abilities. Furthermore, alongside the general components of the dynamic capabilities described previously, we can find related functional abilities as well. The study conducted by Ilmudeen et al. (2020) examines the impact of IT-based dynamic capabilities on firm innovativeness and the subsequent influence on business performance. The study analyzes the mechanism that ties sensing to corporate performance and finds a significant positive correlation between IT-based dynamic skills and firms' innovation capabilities. Innovation also boosts business performance. Additionally, a substantial positive relationship exists between firms' innovation capabilities and performance.

Danneels (2015) examines the influence of different types of capabilities on competitiveness and highlights four primary areas of focus: customer competence, technological competence, marketing competence, and R&D competence. The study finds that in stable environments, firms can grow by exploring new markets and adopting new technology. Conversely, in turbulent times, these competencies become essential for ensuring the survival of such firms, which aligns with the findings of Stocker and Várkonyi (Stocker & Várkonyi, 2022), who found customer orientation and customer competencies are essential for the survival and success of international organizations. Wilden and Gudergan (2015) examined the manifestation of the dynamic capability ladder, identified by Teece, in marketing and technology. The researchers also examined how dynamic capabilities and market instability affect these corporate activities and discovered a significant correlation between marketing capabilities and business success in highly competitive contexts, but technological



capabilities were found to enhance performance in stable competitive conditions. This aligns with the findings of Stocker and Pábli (2023) who found a positive correlation between marketing capabilities and export performance, which is considered a reliable indicator of a highly competitive environment.

## Measurement of competitiveness

Competitiveness is a complex term hence, there are numerous methods to evaluate a company's competitiveness (Mcfetridge & Rao, 1995). In general, we can distinguish between ex-post and ex-ante forms of competitiveness analysis (Capobianco-Uriarte et al., 2019). Ex-post measurements may determine a company's competitiveness at a given time by measuring the results of competitiveness, such as profitability, but they cannot reveal the underlying factors that contribute to competitiveness. On the contrary, ex-ante indicators reveal the primary source of competitive advantage, by measuring different types of efficiencies, but the impact of competence on profitability remains unexplained (Siggel, 2006).

Mainstream economic and business literature employs ex-post analysis to define competitiveness. Porter (1980) initially measured competitiveness based on profitability. Wernerfelt (1984) argues that a firm's competitiveness can still be measured by its profitability, but the source of this profitability is the organization's inimitable capabilities and its ability to innovate or develop its key competencies and capabilities, which will increase profitability. Other academics attempt to measure competitiveness on a global level, international level. Gorynia (2005) measure competitiveness in export-import performance. Due to the complex nature of competitiveness, numerous scholars have developed complex indexes to synthesize the main components (mostly firm-level resources and capabilities) of stakeholder value creation (Buckley et al., 1988; Chikán, 2006, 2008; Chikán et al., 2022; Lafuente, Szerb et al., 2020; Losonci & Borsos, 2015; Márkus & Rideg, 2021; Szerb, 2015). Chikán (2003) argues that the primary objective of a company is to make profit by satisfying consumer demands. In our perspective, this implies that competitiveness can only be achieved if the organization creates value for all its stakeholders. According to Farida and Setiawan (2022), the excess profit compared to competitors, or to the overall market and market expectations, serves as a more efficient measurement. While profit as a metric may seem logical to measure competitiveness, it is important to acknowledge the several issues associated with relying solely on profit as the primary indicator of competitiveness.

The first reason this study opposes using profit as a measure of competitiveness is its volatile nature. Profit fluctuation has many causes, but one particularly concerning factor must be acknowledged. Companies can influence their short-term profitability by making strategic investments to partially reduce tax liabilities. Furthermore, the evaluation of long-term profitability can only be performed retrospectively, so these results only imply that a company was competitive at a given point in the past.

The second concern about using profit as the primary measure of competitiveness is related to the impact of disruptive technologies in the market. Companies that bring disruptive innovations in their respective markets often face a prolonged period of unprofitability. Despite the introduction of innovative technologies and business models, the expenses of breakthroughs can cause years-long financial losses. On the other hand, disruptive innovations give these companies a competitive edge in the industry. They excel in efficiency and growth, providing the best customer experience in the industry in a short period of time after the innovation is launched. In the meantime, the enterprise value of these companies continues to rise as a direct consequence of their innovation and the long-term profit potential it generates.

KPIs that enable scholars to measure ex-ante competitiveness tend to demonstrate a competitive advantage at the organizational function or product level, rather than at the firm level. These KPIs quantify distinct competitive advantages, such as higher operational efficiency relative to competitors, studied by Lafuente et al. (2020), and directly link them to a specific function of the organization. The proxy KPIs on the outcome side, such as rapid growth or productivity, can signal ex-ante competitiveness (Bartel et al., 2007; Lawrence & Tar, 2010; Lee-Kelley et al., 2003). The problem with ex-ante indicators of competitiveness lies in the existence of uncertainty. The function-specific competitive advantage's impact on a company's financial success and business sustainability is unknown. The indicators may be present, and the product may be superior to competitors, but the precise reaction of the market remains unpredictable.

Upon careful observation, it is evident that both examination approaches include inherent limitations. This study's opinion is that relying just on a single proxy KPI for the outcome might not translate to a definite increase in competitiveness; however, a combination of multiple indicators can be utilized to predict the increased competitiveness of a company. This aligns with Buckley et al. (1988) who emphasize the importance of the sustainability and resilience of our measures and methodologies. From this study's perspective, it is more advantageous to identify the investments and innovations that can result in future competitiveness rather than engaging in a retrospective study of competitiveness. Thus, this study utilizes KPIs that allow for ex-ante examinations of competitiveness rather than employing KPIs for retrospective evaluations.

## Digitalization and its impact on competitiveness

The advent of the fourth industrial revolution precipitated the swift advancement of computational tools, resulting in the emergence of information systems that exhibited notable divergence from their predecessors. One of the most significant transformations is the Internet of Things (IoT). Wireless internet networks have rendered device activity and condition data more accessible. This leads to data-driven networks and techniques in production and

service (Atzori et al., 2010; Chen et al., 2014; Xu et al., 2018; Oztemel & Gursev, 2020).

The concept of “digitization” pertains to the conversion of physical or analog processes, objects, and data into digital form (Fichman et al., 2014). This transformation facilitates the emergence of novel processes for generating value (Gobble, 2018). Digital transformation involves integrating new digital technology into an organization’s operations and obtaining new digital competencies that effectively leverage digital technology (Matt et al., 2015; Móricz, 2022) while encompassing the reevaluation of a company’s operational procedures, aiming to seamlessly include digitized data, objects, or process steps into overall workflows (Drótos & Móricz, 2012). According to Davenport and Westerman (2018), altered processes can change how value is created, often resulting in a significant shift in the value-creation process. Digitization is helping companies to create value, explore new revenue streams, develop innovative products and services, and create new business models (Rachinger et al., 2019).

The proliferation of data generated by modern technological gadgets has given rise to the notion of big data. Three primary attributes characterize big data: 1) it encompasses a substantial volume of data; 2) it encompasses many data sets and data kinds that provide descriptions of various components of the entirety; and 3) big data exhibits a notable velocity, indicating a quick flow of data (Gandomi & Haider, 2015). The acquisition of this dataset requires sophisticated technological tools, encompassing both hardware and software components. The utilization of big data enables companies to develop solutions based on machine learning and artificial intelligence (AI). The utilization of AI improves data analytical capabilities, which eventually results in increased efficiency and productivity. These benefits are especially valuable when business performance is experiencing a decline (Brynjolfsson et al., 2017).

During the fourth industrial revolution, organizations must acquire novel resources and develop additional capabilities to uphold their competitiveness. According to strategic management theories, technological advances in business can significantly impact firms’ competitiveness (Porter, 1980; Wernerfelt, 1984). Most related research examines how digitalization affects organizational operations via the lens of the RBV (Parida et al., 2019; Rabetino et al., 2018). Digitalization is most appropriately situated within the framework of dynamic capabilities theory, given that this theory is concerned with the ability to adapt to a swiftly evolving context. Dynamic capabilities theory describes the process and dynamics of this transition. According to Teece (2007), dynamic capacities enable market- and technology-aligned innovation.

Peng (2009) claims that strategy is affected by many factors while also being susceptible to the challenges of digitalization. Digitization is shifting customer needs and changing the competitive landscape. According to Lee-Kelley et al. (2003), organizations that, in the digital world, cater to consumer demands on a higher level are more likely to achieve a higher level of customer loy-

alty. Simultaneously, the rapid evolution of advertising channels, formerly considered to be sales channels, now have a different function and therefore altered the competitive environment (Reinartz et al., 2019). Digitalization also changes the products and services of enterprises, which subsequently results in renewed value propositions (Lepak et al., 2007). The study conducted by Lee-Kelley et al. (2003) the ability to adapt manufacturing and service processes, enabling the customization of products and services, provides firms with the means to cater to the unique requirements of their clientele. To accomplish this objective, service providers must adopt some attributes of industrial production, such as standardization, modularization, and specialization of service operations (Porter & Heppelmann, 2014; Scholten, 2017). Ultimately, digital transformation and digital markets are forcing business model transformations in industrialized economies (Gozman et al., 2018).

According to Porter (2001), the emergence of the Internet and electronic sales has led corporations to prioritize pricing as a key factor in product differentiation, shifting away from traditional methods. E-commerce has substantially lower transaction costs than in-person trade; hence, it more closely resembles the ideal market structure than the in-person mode of trade. Porter (2001) states that using the Internet alone rarely gives a company a competitive edge, but it allows businesses to build unique strategic positioning and gain a competitive advantage without overhauling their company style. According to Lee-Kelley et al. (2003), the competitive advantage achieved through enhanced efficiency and decreased internal costs is expected to have a limited duration due to the entry of other enterprises into the e-commerce sector.

The Fourth Industrial Revolution has the potential to bring substantial changes in industry competition, alter company-customer and supplier relationships, and introduce disruptive business models through substitute products (Porter & Heppelmann, 2014). According to Teece (2016), dynamic capabilities facilitate identifying, capturing, and organizing market opportunities into operational processes. Rachinger et al. (2019) developed a framework that delineates the sequential stages of digitization, namely sensing, seizing, and reconfiguring, as originally conceptualized by Teece (2007). This framework links these steps with the business model, specifically the value proposition, value delivery, and value capture.

The empirical methodology employed in the literature to measure these effects is divided based on the approach utilized. When it comes to technological skills and developments, the database of empirical studies in the business field primarily relies on cross-sectional data obtained through self-report questionnaires. Dannels (2015), Wilden and Gundergan (2015), Ilmudeen et al. (2020), Song et al. (2005), and Chen et al. (2009) are other notable examples.

The alternative approach is grounded in empirical research employing economic techniques. This approach incorporates a more comprehensive statistical analysis in empirical studies; the analyses place significant emphasis

on financial and other quantifiable data as opposed to relying on self-reported preference rankings. Additionally, it is important to note that they assess performance and outcomes, as well as the accumulation of resources, and tie these findings to business-related modifications and advancements (Bartel et al., 2007; De Stefano et al., 2014; Muraközy & Telegdy, 2020; Rajan & Wulf, 2006).

Since corporations are required to publish financial reports, this method provides more reliable data; however, comprehending the underlying business rationale behind the figures poses a greater challenge. Integrating publicly available financial data and a specialized database with distinct information related to the subject of inquiry enables the analysis of the relationship between the broader financial data and the specific business question, as well as the analysis of the underlying mechanism at play. As a result, the methodology commonly employed relies on panel-type models, which are more appropriate for examining causal correlations compared to cross-sectional data. It is imperative to acknowledge, that the two methodologies exhibit inherent distinctions and that the studies are undertaken with distinct objectives. However, it is frequently seen that the outcomes of both methodologies exhibit a high degree of similarity, leading to comparable conclusions.

Multiple studies have indicated that IT investments have contributed to a notable increase in productivity growth when compared to the final years of the 20th century (Bartel et al., 2007; Oliner & Sichel, 2000; Zeng et al., 2022). According to McAfee and Brynjolfsson (2012), the utilization of digital processes and the increased accessibility of data can potentially yield a substantial competitive edge by enabling the derivation of fresh insights. In the study conducted by Rajan and Wulf (2006) the authors' most important finding, from an information technology and technology standpoint, was the correlation between modern IT systems and decentralized decision-making processes among various divisions of the organization, resulting in increased autonomy, which aligns with the findings of Szukits and Möricz (2023) who found that data-driven decision making is independent of centralized data usage. In their study, Bartel et al. (2007) found, that the implementation of novel IT systems centered around IT-driven production, resulted in enhanced business models and increased productivity.

## Research question and hypotheses

The primary research question of this study is how supplementary IT investments affect the competitiveness of businesses. Competitiveness, in the context this study refers to, strictly corresponds to ex-ante competitiveness during the examination. This study defines competitiveness as a set of KPIs that collectively indicate future profitability, thereby reflecting the current level of competitiveness of a firm.

Given the absence of dependable financial data, our hypotheses center on the quantifiable financial impacts of the recently enhanced capabilities, which have a notewor-

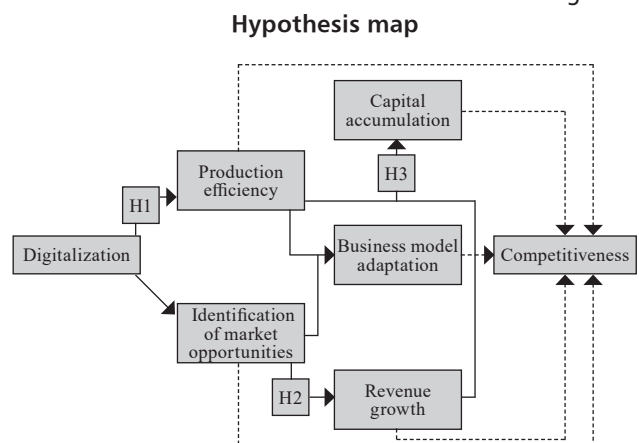
thy influence in the background. This statement is consistent with Teece's (2014) concept that IT investments primarily affect a company's resources, with a secondary focus on enhancing core capabilities. Furthermore, it expands on Barney's (1991) theoretical framework, which highlights the significance of resources in establishing a competitive edge. This study hypothesizes that additional IT investments and digitalization have a positive impact on efficiency, market opportunity identification which results in more rapid revenue growth, and capital accumulation. We measure efficiency with revenue per employee.

Digitalization, specifically the process of converting information into a digital format known as digitization, has a twofold impact on improving production efficiency and identifying market opportunities. These effects ultimately result in optimizing the business model (Rachinger et al., 2019). In our view, digitalization has the potential to improve understanding and adaptability in meeting consumer expectations, thereby exerting a substantial influence on a company's business model and strategy. Companies engage in a process of evaluating and adjusting their company strategy after acquiring new and distinct knowledge, thus increasing their intellectual capital (Boda et al., 2009) to reposition themselves in the market. It is essential to comprehend that digitization does not directly lead to the creation or modification of the business model. Nevertheless, the modification in the business model is a direct consequence of gaining supplementary knowledge that stems from digitization.

This study hypothesizes the subsequent impact mechanism to explain the effects of IT investments and digitalization, with the hypotheses stated formally (Figure 1):

- *H1: Additional IT investments have a positive effect on production efficiency.*
- *H2: Additional IT investments have a positive effect on market opportunity identification, which results in a positive effect on revenue growth.*
- *H3: Additional IT investments have a positive effect on capital accumulation, which happens through the simultaneous combination of improvements in production efficiency (H1) and the recognition of market opportunities (H2).*

Figure 1



Source: own compilation

The correlation between IT investments from 1999 to 2014 and digitalization may not be immediately evident. However, it is worth considering the progression of IT and the factors that contributed to the complete digitalization of services and the adoption of data-driven decision-making. The issue originated in the year 2000 due to the constraints of the IT systems of the 1990s (Anderson et al., 2006). The incapability of numerous IT systems to process dates beyond 31.12.1999 highlighted the necessity for new IT systems. Companies began making substantial investments in information technology, leading to the process of digitization (Diermeier & Goecke, 2017). Through the acquisition of new investments, companies were able to collect a greater amount of data and information on their customers, resulting in an enhanced understanding of customer needs (Matt et al., 2015; Rachinger et al., 2019). The proliferation of newly acquired data has necessitated the development of data processing skills and the implementation of digital automation, hence facilitating the digitalization of internal operations. Additionally, the analysis of consumer data has indicated a demand for digitalized services among customers. Consequently, this resulted in the adoption of data-driven decision-making and the incorporation of big data analytics findings into the development of corporate strategies (Adaga et al., 2024; Woerner & Wixom, 2015). Based on this logical progression, we can infer that the IT investments made from 1999 to 2014 were primarily related to digitization if not digitalization itself. Studies such as Anderson et al. (2006) have provided evidence indicating that organizations that made greater investments in information technology (IT) at the start of the 21st century tend to become more competitive in the years that followed.

## Materials and methods

This study aims to examine the effects of IT investments on company-level competitiveness, specifically in terms of growth, efficiency, and economies of scale. In order to assess the direct impact of IT investments, we used a database that encompasses data on companies who have explicitly expressed intentions to invest in IT, as well as whether these investments were carried out or not. Additionally, the database includes financial information on these companies. The dataset used in this study includes data on 65536 Hungarian firms from 1999 to 2014, after the completion of data cleansing procedures 38866 companies' data were used. The integration of more up-to-date data into the database necessitates the gathering of more recent data from the European Union. However, given the interdependence of the data with the financing cycles of the EU, the database including more recent data will only be accessible within the next few years. The data was obtained from the database maintained by the Central European University.

This study applied a methodology known as causal econometrics. During the modeling process, the technique effectively manages all key influencing elements, ensuring that variations across organizations are solely

considered for the specific variable being investigated. This is achieved through 84 dummy variables, with 81 of them specifically designed to account for variations in geography and industry categorization, where the field of activity is identified by NACE codes. The inclusion of 3 more dummy variables enabled the categorization of enterprises into 4 distinct groups based on the extent of their supplementary IT investment: small (less than 25% of the previous year's revenue), medium (25%-75% of the previous year's revenue), large (more than 75% of the previous year's revenue), and none. Following the completion of data cleansing procedures and the establishment of all necessary control variables, the final dataset comprises a total of 54406934 data points.

The main goal of the methodology is to detect the consequence of an unambiguous and quantifiable change in the operation, thereby discovering a cause that would otherwise be unobservable (Borenstein et al., 2010). This is achieved by employing fixed-effect long panel models in conjunction with matching methodology, which pairs businesses that have made the supplementary IT expenditure with nearly equivalent companies that have not made the supplementary IT investment.

This study employs a proxy to represent the supplementary IT investment, which is defined as a subsidy received from the European Union specifically for IT advancements. By employing this definition, we can differentiate between firms that have made an increased amount of IT investments during a specific timeframe and those who have solely planned it. In order to qualify for EU subsidies, enterprises were required to submit a comprehensive business plan as part of their application. This strategy should encompass the long-term utilization and future expansion of the substantially refinanced investment. The presence of legally enforceable agreements ensures that investments have been made and that firms have effectively integrated newly acquired tangible and intangible assets into their operational frameworks. This offers the chance to examine the differences between companies that have made these investments and those that have not.

Capital accumulation is mainly connected with tangible resources, however capabilities that are required by IT developments are usually connected to human capital resources or organizational capital resources, therefore they serve as part of intellectual capital (Stocker, 2013) which is included in the extended production function of firms (Boda et al., 2009). Hence, in this study, we decided to use total assets as a proxy for capital accumulation in order to encompass all the quantifiable values of all forms of capital throughout the production process in our analysis.

When using econometric models, it is desirable to closely replicate a randomized experiment by ensuring that the treated and control groups have similar distributions of covariates. The term used to describe this process is "matching methodology". The objective of the matching methodology is to mitigate the natural bias, resulting from the covariates, by matching organizations based on several factors that may impact the variable being studied. In this way, the control group will serve as a representation



of the alternative reality experienced by, in our case, the enterprises who received the EU subsidies. Please refer to the following papers for a comprehensive methodological explanation: Stuart (2010), Chiappori & Salanié (2016), and Gertler et al. (2011). The companies were paired according to the following criteria:

- The data regarding the subsidy's fiscal year is available, and the following criteria will be applicable henceforth.
- The NACE code remains consistent for both companies.
- All years exhibit a consistent alignment between the NACE code of the companies and their operational regions.
- The company's revenue is comparable for both companies, with a maximum differential of 15%.
- The total assets of the corporation exhibit similar magnitudes for both companies, with a maximum differential of 15%.
- The per capita revenue of the company is similar for both companies, with a maximum differential of 15%.

Despite the strong limitations, a total of 2487 out of the subsidized 3050 companies were paired, whereas 229 companies emerged as the most suitable match for multiple supported entities. The companies that experienced several matches were incorporated into the modeling database with a corresponding number of entries equal to the frequency of their matches with subsidized companies. It was imperative to maintain an equal representation of subsidized and non-subsidized enterprises in the modeling database to prevent any potential bias in estimating the effects of additional IT investment. Given the disparity in the timing of subsidies received by the companies, it was necessary to introduce an additional variable that may assess the impact of the supplementary IT investments, regardless of the specific year in which the companies got them. To address this problem, we examined the impact of additional IT investments using 13 dummy variables that represent the years before and after the subsidy, without specifying the precise years. Due to the utilization of a matching methodology, this approach facilitates the comparability of effects by ensuring that the study group and control group possess identical compositions, hence minimizing inherent biases. This implies that the methodology successfully handles the issue of varying timing of subsidies. The findings are consistent regardless of the year in which the subsidies were provided, consistently demonstrating a relative disparity between enterprises that received subsidies and those that did not.

## Findings

### The general impact of additional IT investments

Initially, we must examine the overall effects of the additional IT investment (Table 1), prior to digging into the detailed analysis of the effects. According to the hypotheses, revenue increase is the result of new capabilities that enable enterprises to identify market possibilities

effectively. Regrettably, the financial data included in the database does not allow the examination of the impact of digitalization on the identification of market opportunities. According to the studies conducted by Lee-Kelley et al. (2003), Teece (2007, 2016), Lepak et al. (2007), and Rachinger et al. (2019) there is an undeniable connection between investments in information technology and the ability to identify market opportunities. Therefore, this study will include this relationship in its argument.

Enterprises that have made additional IT investments have observed improvements in their revenue, total assets, and operational efficiency. The primary effect of these investments manifests in the context of physical capital, which is reflected in the total assets within the framework of this study. Given that investments in information technology are long-term investments, a 20% increase in asset valuation seems realistic and justifiable. Furthermore, it is important to mention that the additional IT projects resulted in a significant improvement in efficiency. The observed improvement in efficiency indicates that although firms use additional human labor to achieve the 20% increase in revenue, they necessitate a reduced number of new employees to attain increases in revenue per unit compared to the previous state.

Table 1  
The effects of additional IT investments

	Revenue	Total assets	Efficiency
Subsidy	0.197773 *** (0.0183023)	0.202419 *** (0.0158060)	0.0498102 *** (0.0126329)
Observations	64670	64670	64670
	78.9%	86.4%	76.6%
Within	8.1%	44.7%	3.6%

\*\*\*Statistical significance at a confidence level of no less than 99% ( $p$ -value < 0.01)

Source: own compilation

After conducting an analysis of the overall impacts of the supplementary IT investments, we have proceeded to examine the specific effects associated with various investment sizes, as presented in Table 2. It seems, that the main goal of a modest IT investment is to procure equipment. The data suggests that asset purchases increase the revenue of businesses but in a smaller proportion. Furthermore, the absence of advancement in terms of efficiency indicates that a small investment may not be enough for enterprises to obtain assets that would permanently boost their return on assets. Hence, it can be concluded that this type and size of resource allocation towards information technology has not resulted in a significant improvement regarding the added value of human capital.

Supplementary IT investments of medium magnitude appear to be the most efficient. The data indicates that the increase in income surpasses the growth in assets. This indicates that the new technology yields a higher percentage of value-added activities when compared to the previous technology. Moreover, it is important to mention that significant enhancements in efficiency are found in this scenario. Consequently, an IT investment of this magni-

tude leads to the growth of value generated by both physical and human capital.

For substantial expenditures on IT, the asset growth surpassing revenue growth can be explained by two independent theories. One argument posits that a fraction of the investment was allocated not towards production or services, but rather towards convenience. This assertion is substantiated by the fact that the rise in revenue is limited to the level of a moderate-sized investment. Another possible interpretation could be that the substantial investment in assets indicates a profound technological transformation. In this case, the consequences of the technological shift also entail the advancement of novel internal operational procedures, which may not have been accurately represented in the existing dataset.

Table 2

### The effects of the IT subsidies by size

	Revenue	Total assets	Efficiency
small/modest subsidy	0.122710 *** (0.0324430)	0.150532 *** (0.0283965)	0.00553048 (0.0220165)
medium-sized subsidy	0.227048 *** (0.0266258)	0.189909 *** (0.0235643)	0.0600914 *** (0.0180315)
substantial subsidy	0.237999 *** (0.0323209)	0.276174 *** (0.0269746)	0.0833444 *** (0.0220022)
Observations	64670	64670	64670
	78.9%	86.4%	76.6%
Within	8.2%	44.8%	3.7%

\*\*\*Statistical significance at a confidence level of no less than 99% ( $p$ -value < 0.01)

Source: own compilation

Upon evaluating the overall impact of IT investments, the results correspond to the expected predictions outlined in the first three hypotheses. Regrettably, the database does not permit the examination of the business model adaptation. Consequently, other researchers' studies will support this theory.

## Discussion

The findings of this study align with those of Bartel et al. (2007), indicating that investments in information technology have a favorable effect on productivity, contingent upon the presence of suitable organizational adaptation. Chen et al. (2009) assert that the integration of technology and IT capabilities with other forms of capabilities within organizations can be effectively achieved. As a result of the constraints imposed by the database, this study was unable to investigate this matter. However, the consistent findings imply that this association is also plausible in this instance.

The results of this study are consistent with the conclusions of Zeng et al. (2022), who provide evidence that digitalization has a positive effect on the financial performance of companies. The results also align with the findings of Rachinger et al. (2019) who also found evidence that digitalization has a positive effect on revenue growth.

The main factor driving the fast increase in income may be explained by the findings of Teece (2016), who

suggests that dynamic capabilities play a pivotal role in sensing market prospects, seizing upon them, and then orchestrating them into operational frameworks (reconfiguring). The research conducted by Lawrence and Tar (2010) and Lee-Kelley et al. (2003) demonstrates the significant influence of digital information technology in the development of dynamic capabilities. The findings of their study indicate that companies that prioritized these capabilities from the beginning experienced accelerated growth, demonstrated a deeper comprehension of market demands, and consequently garnered support that facilitated their further expansion. As a result, these companies sustained their rapid growth trajectory, outperforming their counterparts that did not receive similar support. According to Danneels (2015), the assertion is substantiated by the fact that technology dynamism enables organizations to effectively navigate through periods of turbulence and effectively cater to emerging markets.

In general, the outcomes of this research exhibit several parallels with esteemed authors in the scholarly literature, and the results are mutually corroborative of the investigations put forth. It also provides a unique opportunity to study the effects of subsidization policies. The EU subsidies were effective in increasing productivity in Hungarian firms. However, there is potential for the government to fine-tune subsidization policies to increase their efficiency and move toward the empirical optimum in the size of subsidies.

## Business model adaptation as a result of the increased understanding of market needs

Although we were unable to test for these effects due to the constraints of our database, it is important to mention the potential business model adaptation as a consequence of additional IT investments. Businesses frequently encounter market uncertainty, making it vital for them to not only achieve stability but also generate new prospects for growth and sustained profitability. Primarily, this necessitates adaptability (Cavalcante et al., 2011; Pohle & Chapman, 2006), but also foster additional dynamic capabilities including the ability and skill to implement changes (Zahra et al., 2006). The ability of a corporation to thrive in an ever-changing environment typically hinges on its capacity to understand and interpret shifts in the market, and subsequently, execute the adjustments that are required (Zahra et al., 2006; Zott, 2003).

Teece (2010) argues that a company's ability to develop its dynamic capacities allows it to maintain a competitive advantage, while it is in close relation with the adaptation of its business model as well. Pohle and Chapman (2006) argue that when a company integrates the potential to reinvent its business model into its basic operations, it gets embedded in the company's corporate culture and can result in a continuous innovation of the business model. Thus, business models, especially significant innovations of the business model, which often occurs as a result of internationalization (Trąpczyński & Wrona, 2013), might result in long-lasting competitive advantage (Asemokha et al., 2019; Zott & Amit, 2008).

IT investments may speed up data gathering and processing operations, leading to more accurate projections and expectations of the future. Consequently, the response time for implementing changes can be accelerated (Matt et al., 2015; Parida et al., 2019; Rabetino et al., 2018; Rachinger et al., 2019). The empirical evidence presented earlier in the study has demonstrated that investing in IT leads to superior operational efficiency, resulting in increased productivity and higher incomes. Developing IT capabilities can result in improved capabilities in other areas of a company, as well as the desired ability to be flexible and adaptable (Teece, 2007). The combined effect of these factors, including the firm's potential to generate long-term profits, indicates that the impact is not solely due to IT investments and digitalization, but rather the result of the accompanying business model innovation (Gozman et al., 2018; Teece, 2010).

### Limitations and further research

This study is not without limitations that present multiple research avenues. Firstly, the correlations posited are underpinned by theories of competitiveness, yet there is a dearth of empirical evidence validating the postulated relationships underlying the two distinct approaches. To substantiate these claims, it would be necessary to possess a quantitative, disaggregated database including the activities of many companies, together with a comprehensive understanding of the underlying concepts and business models governing these operations, as well as how they are measured.

Secondly, the data is solely obtained from Hungary. Although the extensive size of the database is convincing and enables robust statistical modeling, the strength of the conclusions is constrained by their reliance on data from a single country, so diminishing the strength of the findings. An international database might increase our understanding of the impacts on IT investments across different market conditions and varying levels of digitalization.

Thirdly, the inclusion of EU subsidies in the model may be concerning. However, in the absence of a scientific technique to classify IT investments based on their necessities under various circumstances, it is not possible to precisely evaluate the impacts of various types and sizes of IT investments. This presents a potential area for future research that could improve our understanding of the effects of information technology concerning market conditions, customer expectations, internal resources and capabilities, and managerial decision-making regarding the timing of investments in different IT and digital solutions.

### References

Adaga, E.M., Okorie, G.N., Egieya, Z.E., Ikwue, U., Udeh, C.A., DaraOjimba, D.O., & Oriekhoe, O. I. (2024). The role of big data in business strategy: A critical review. *Computer Science & IT Research Journal*, 4(3), 327–350. <https://doi.org/10.51594/csitrj.v4i3.686>

- Ambrosini, V., & Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, 11(1), 29–49. <https://doi.org/10.1111/j.1468-2370.2008.00251.x>
- Amit, R., & Schoemaker, P.J.H. (1993). Strategic Assets and Organizational Rent. *Strategic Management Journal*, 14(1), 33–46. <https://doi.org/10.1002/smj.4250140105>
- Anderson, M.C., Banker, R.D., & Ravindran, S. (2006). Value Implications of Investments in Information Technology. *Source: Management Science*, 52(9), 1359–1376. <https://www.jstor.org/stable/20110610>
- Asemokha, A., Musona, J., Torkkeli, L., & Saarenketo, S. (2019). Business model innovation and entrepreneurial orientation relationships in SMEs: Implications for international performance. *Journal of International Entrepreneurship*, 17(3), 425–453. <https://doi.org/10.1007/s10843-019-00254-3>
- Atzori, L., Iera, A., & Morabito, G. (2010). The Internet of Things: A survey. *Computer Networks*, 54(15), 2787–2805. <https://doi.org/10.1016/j.comnet.2010.05.010>
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Bartel, A., Ichniowski, C., & Shaw, K. (2007). How does information technology affect productivity? Plant-level comparisons of product innovation, process improvement, and worker skills. *The Quarterly Journal of Economics*, 122(4), 1721–1758. <https://academic.oup.com/qje/article/122/4/1721/1850517>
- Bitencourt, C.C., de Oliveira Santini, F., Ladeira, W.J., Santos, A.C., & Teixeira, E.K. (2020). The extended dynamic capabilities model: A meta-analysis. *European Management Journal*, 38(1), 108–120. <https://doi.org/10.1016/j.emj.2019.04.007>
- Boda, G., Juhász, P., & Stocker, M. (2009). A tudás mint termelési tényező. *Köz-Gazdaság*, 4(3), 117–132. <https://retp.eu/index.php/retp/article/view/996/947>
- Borenstein, M., Hedges, L.V., Higgins, J.P.T., & Rothstein, H.R. (2010). A basic introduction to fixed-effect and random-effects models for meta-analysis. *Research Synthesis Methods*, 1(2), 97–111. <https://doi.org/10.1002/jrsm.12>
- Brynjolfsson, E., Rock, D., Syverson, C., Abrams, E., Agrawal, A., Autor, D., Benzell, S., Gans, J., Goldfarb, A., Goolsbee, A., Saint-Jacques, G., Meyer, A., & Trajtenberg, M. (2017). *Artificial intelligence and the modern productivity paradox: A clash of expectations and statistics*. <http://www.nber.org/papers/w24001>
- Buckley, P.J., Pass, C.L., & Prescott, K. (1988). Measures of international competitiveness: A critical survey. *Journal of Marketing Management*, 4(2), 175–200. <https://doi.org/10.1080/0267257X.1988.9964068>
- Capobianco-Uriarte, M.M., Casado-Belmonte, M.P., Marín-Carrillo, G.M., & Terán-Yépez, E. (2019). A bibliometric analysis of international competitiveness (1983-2017). *Sustainability*, 11(7), 1877. <https://doi.org/10.3390/su11071877>



- Cavalcante, S., Kesting, P., & Ulhøi, J. (2011). Business model dynamics and innovation: (re)establishing the missing linkages. *Management Decision*, 49(8), 1327–1342. <https://doi.org/10.1108/00251741111163142>
- Chen, M., Mao, S., & Liu, Y. (2014). Big data: A survey. *Mobile Networks and Applications*, 19(2), 171–209. <https://doi.org/10.1007/s11036-013-0489-0>
- Chen, X., Zou, H., & Wang, D.T. (2009). How do new ventures grow? Firm capabilities, growth strategies and performance. *International Journal of Research in Marketing*, 26(4), 294–303. <https://doi.org/10.1016/j.ijresmar.2009.08.004>
- Chiappori, P.A., & Salanié, B. (2016). The econometrics of matching models. *Journal of Economic Literature*, 54(3), 832–861. <https://doi.org/10.1257/jel.20140917>
- Chikán, A. (2003). A kettős értékteremtés és a vállalat alapvető célja. *Vezetéstudomány*, 34(5), 10–12. <https://unipub.lib.uni-corvinus.hu/4363/>
- Chikán, A. (2006). A vállalati versenyképesség mérése. *Pénzügyi Szemle*, 51(1), 42–56.
- Chikán, A. (2008). National and firm competitiveness: A general research model. *Competitiveness Review*, 18(1–2), 20–28. <https://doi.org/10.1108/10595420810874583>
- Chikán, A., Czakó, E., Kiss-Dobronyi, B., & Losonci, D. (2022). Firm competitiveness: A general model and a manufacturing application. *International Journal of Production Economics*, 243, 108316. <https://doi.org/10.1016/j.ijpe.2021.108316>
- Danneels, E. (2011). Trying to become a different type of company: Dynamic capability at Smith Corona. *Strategic Management Journal*, 32(1), 1–31. <https://doi.org/10.1002/smj.863>
- Danneels, E. (2012). Second-order competences and Schumpeterian rents. *Strategic Entrepreneurship Journal*, 6(1), 42–58. <https://doi.org/10.1002/sej.1127>
- Danneels, E. (2015). Survey measures of first- and second-order competences. *Strategic Management Journal*, 37(10), 2174–2188. <https://doi.org/10.1002/smj.2428>
- Davenport, T.H., & Westerman, G. (2018). Business Models Why So Many High-Profile Digital Transformations Fail. *Harvard Business Review*. <https://hbr.org/2018/03/why-so-many-high-profile-digital-transformations-fail>
- De Stefano, T., Kneller, R., & Timmis, J. (2014). *The (Fuzzy) Digital Divide: The Effect of Broadband Internet Use on UK Firm Performance*. Discussion Papers, University of Nottingham, School of Economics. <https://econpapers.repec.org/scripts/redir.pf?u=https%3A%2F%2Fwww.nottingham.ac.uk%2F%2Fdocuments%2Fdiscussion-papers%2F14-06.pdf;h=repec:not:note:14/06>
- Diermeier, M., & Goecke, H. (2017). Productivity, technology diffusion and digitization Productivity, Technology Diffusion and Digitization. *CESifo Forum*, 18(1), 26–32. <https://hdl.handle.net/10419/166707>
- Drótos, G., & Móricz, P. (2012). A vállalati informatika szerepe a versenyképesség alakításában a pénzügyi és gazdasági válság időszakában. *Vezetéstudomány*, 42(2. kül), 80–89. <https://doi.org/10.14267/VEZTUD.2012.ksz2.08>
- Eisenhardt, K.M., & Martin, J.A. (2000). Dynamic Capabilities: What Are They? *Strategic Management Journal*, 21(10/11, Special Issue), 1105–1121. <https://www.jstor.org/stable/3094429>
- Farida, I., & Setiawan, D. (2022). Business Strategies and Competitive Advantage: The Role of Performance and Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3). <https://doi.org/10.3390/joitmc8030163>
- Fichman, R.G., Dos Santos, B.L., & Zheng, Z. (2014). Digital Innovation as a Fundamental and Powerful Concept in the Information Systems Curriculum. *MIS Quarterly*, 38(2), 329–354. <https://doi.org/10.2307/26634929>
- Gandomi, A., & Haider, M. (2015). Beyond the hype: Big data concepts, methods, and analytics. *International Journal of Information Management*, 35(2), 137–144. <https://doi.org/10.1016/j.ijinfomgt.2014.10.007>
- Gertler, P.J., Martinez, S., Premand, P., Rawlings, L.B., & Vermeersch, C.M.J. (2011). *Impact Evaluation in Practice*. The International Bank for Reconstruction and Development/The World Bank. <http://www.worldbank.org/pdt>
- Gobble, M.A.M. (2018). Digital Strategy and Digital Transformation. *Research Technology Management*, 61(5), 66–71. <https://doi.org/10.1080/08956308.2018.1495969>
- Gorynia, M. (2005). Competitiveness of firms from Ziemia Lubuska and Poland's accession to the European Union. *Journal of East European Management Studies*, 10(3), 195–217. <https://www.jstor.org/stable/23281056>
- Gozman, D., Liebenau, J., & Mangan, J. (2018). The Innovation Mechanisms of Fintech Start-Ups: Insights from SWIFT's Innofit Competition. *Journal of Management Information Systems*, 35(1), 145–179. <https://doi.org/10.1080/07421222.2018.1440768>
- Grant, R.M. (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. *California Management Review*, 33(3), 114–135. <https://doi.org/10.1016/b978-0-7506-7088-3.50004-8>
- Helfat, C.E., & Winter, S.G. (2011). Untangling dynamic and operational capabilities: Strategy for the (N) ever-changing world. *Strategic Management Journal*, 32(11), 1243–1250. <https://doi.org/10.1002/smj.955>
- Ilmudeen, A., Bao, Y., Alharbi, I.M., & Zubair, N. (2020). Revisiting dynamic capability for organizations' innovation types: Does it matter for organizational performance in China? *European Journal of Innovation Management*, 24(2), 507–532. <https://doi.org/10.1108/EJIM-06-2019-0144>
- Ketels, C.H.M. (2016). *Review of Competitiveness Frameworks*. National Competitiveness Council.



- [https://www.hbs.edu/ris/Publication%20Files/Review%20of%20Competitiveness%20Frameworks%20\\_3905ca5f-c5e6-419b-8915-5770a2494381.pdf](https://www.hbs.edu/ris/Publication%20Files/Review%20of%20Competitiveness%20Frameworks%20_3905ca5f-c5e6-419b-8915-5770a2494381.pdf)
- Krugman, P. (1994). Competitiveness: A Dangerous Obsession. *Foreign Affairs*, 73(2), 28-44. <http://gesd.free.fr/krugman94.pdf>
- Lafuente, E., Leiva, J.C., Moreno-Gómez, J., & Szerb, L. (2020). A nonparametric analysis of competitiveness efficiency: The relevance of firm size and the configuration of competitive pillars. *BRQ Business Research Quarterly*, 23(3), 203–216. <https://doi.org/10.1177/2340944420941440>
- Lafuente, E., Szerb, L., & Rideg, A. (2020). A system dynamics approach for assessing SMEs' competitiveness. *Journal of Small Business and Enterprise Development*, 27(4), 555–578. <https://doi.org/10.1108/JSBED-06-2019-0204>
- Lawrence, J.E., & Tar, U.A. (2010). Barriers to ecommerce in developing countries. *Information, Society and Justice*, 3(1), 23–35. [https://eprints.londonmet.ac.uk/88/1/InformationSocietyAndJustice\\_v3n1\\_p23-35.pdf](https://eprints.londonmet.ac.uk/88/1/InformationSocietyAndJustice_v3n1_p23-35.pdf)
- Lee-Kelley, L., Gilbert, D., & Mannicom, R. (2003). How e-CRM can enhance customer loyalty. *Marketing Intelligence & Planning*, 21(4), 239–248. <https://doi.org/10.1108/02634500310480121>
- Lepak, D.P., Smith, K.G., & Taylor, M.S. (2007). Introduction to special topic forum: value creation and value capture: a multilevel perspective. *The Academy of Management Review*, 32(1), 180-194. <https://www.jstor.org/stable/20159287>
- Lin, H. F., Su, J. Q., & Higgins, A. (2016). How dynamic capabilities affect adoption of management innovations. *Journal of Business Research*, 69(2), 862–876. <https://doi.org/10.1016/j.jbusres.2015.07.004>
- Losonci, D., & Borsos, J. (2015). A lean menedzsment és a vállalati versenyképesség kapcsolata. *Vezetéstudomány*, 46(7), 52–62. <https://doi.org/10.14267/veztud.2015.07.05>
- Márkus, G., & Rideg, A. (2021). A magyar mikro-, kis- és középvállalatok versenyképessége és pénzügyi teljesítménye. *Közgazdasági Szemle*, 68(6), 617–644. <https://doi.org/10.18414/ksz.2021.6.617>
- Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business and Information Systems Engineering*, 57(5), 339–343. <https://doi.org/10.1007/s12599-015-0401-5>
- McAfee, A., & Brynjolfsson, E. (2012). Big data: the management revolution. *Harvard Business Review*, (Oct), 60–69. <https://hbr.org/2012/10/big-data-the-management-revolution>
- McFetridge, D.G., & Rao, S. (1995). *Competitiveness: Concepts and measures*. Gouvernement du Canada - Industrial Organization 5, Gouvernement du Canada - Industry Canada.
- McKelvie, A., & Davidsson, P. (2009). From resource base to dynamic capabilities: An investigation of new firms. *British Journal of Management*, 20(SUPP. 1), S63-S80. <https://doi.org/10.1111/j.1467-8551.2008.00613.x>
- Móricz, P. (2022). A magyarországi vállalatok digitális képessége a pandémia előtt. *Vezetéstudomány*, 53(3), 2–18. <https://doi.org/10.14267/V>
- Móricz, P., Marciniak, R., & Baksa, M. (2022). Excellence and renewal - digital transformation patterns in the Hungarian business services sector. *Vezetéstudomány*, 53(5), 32–44. <https://doi.org/10.14267/VEZTUD.2022.05.03>
- Muraközy, B., & Telegdy, Á. (2020). The effects of EU-funded enterprise grants on firms and workers. *Journal of Comparative Economics*, 51(1), 216-234. <https://doi.org/10.1016/j.jce.2022.09.001>
- 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://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.14.4.3>
- Oztemel, E., & Gursev, S. (2020). Literature review of Industry 4.0 and related technologies. *Journal of Intelligent Manufacturing*, 31(1), 127–182. <https://doi.org/10.1007/s10845-018-1433-8>
- Parida, V., Sjödin, D., & Reim, W. (2019). Reviewing literature on digitalization, business model innovation, and sustainable industry: Past achievements and future promises. *Sustainability*, 11(2), 391. <https://doi.org/10.3390/su11020391>
- Peng, M., Li Sun, S., Pinkham, B., & Chen, H. (1983). The institution-based view as a third leg for a strategy tripod. *Academy of Management Perspectives*, 23(3), 63-81. <https://doi.org/10.5465/AMP.2009.43479264>
- Peng, M.W. (2002). Towards an institution-based view of business strategy. *Asia Pacific Journal of Management*, (19), 251-267. <https://doi.org/10.1023/A:1016291702714>
- Peng, M.W., Li Sun, S., Pinkham, B., & Chen, H. (2009). The institution-based view as a third leg for a strategy tripod. *Academy of Management*, 23(3), 63-81. <https://journals.aom.org/doi/10.5465/amp.2009.43479264>
- Penrose E. (1959). *The Theory of the Growth of the Firm*. John Wiley & Sons.
- Pisano, G.P. (2017). Toward a prescriptive theory of dynamic capabilities: Connecting strategic choice, learning, and competition. *Industrial and Corporate Change*, 26(5), 747–762. <https://doi.org/10.1093/icc/dtx026>
- Pohle, G., & Chapman, M. (2006). IBM's global CEO report 2006: Business model innovation matters. *Strategy and Leadership*, 34(5), 34–40. <https://doi.org/10.1108/10878570610701531>
- Porter, M.E. (1980). *Competitive Strategy*. Free Press.
- Porter, M.E. (2001). Strategy and the Internet. *Harvard Business Review*, (3), 63-78. <https://hbr.org/2001/03/strategy-and-the-internet>
- Porter, M.E., & Heppelmann, J.E. (2014). How smart, connected products are transforming companies. *Harvard Business Review*, (Nov). <https://hbr.org/2014/11/how-smart-connected-products-are-transforming-competition>

- Rabetino, R., Harmsen, W., Kohtamäki, M., & Sihvonen, J. (2018). Structuring servitization-related research. *International Journal of Operations and Production Management*, 38(2), 350–371. <https://doi.org/10.1108/IJOPM-03-2017-0175>
- Rachinger, M., Rauter, R., Müller, C., Vorraber, W., & Schirgi, E. (2019). Digitalization and its influence on business model innovation. *Journal of Manufacturing Technology Management*, 30(8), 1143–1160. <https://doi.org/10.1108/JMTM-01-2018-0020>
- Rajan, R.G., & Wulf, J. (2006). The flattening firm: evidence from panel data on the changing nature of corporate hierarchies. *The Review of Economics and Statistics*, 88(4), 759–773. <https://www.jstor.org/stable/40043033?seq=1&cid=pdf>
- Reinartz, W., Wiegand, N., & Imschloss, M. (2019). The impact of digital transformation on the retailing value chain. *International Journal of Research in Marketing*, 36(3), 350–366. <https://doi.org/10.1016/j.ijresmar.2018.12.002>
- Scholten, C. (2017). *Industrial internet of things: Digitisation, value networks and changes in work*. European Foundation for the Improvement of Living and Working Conditions. <https://www.technopolis-group.com/wp-content/uploads/2020/05/internet-of-things.pdf>
- Siggel, E. (2006). International competitiveness and comparative advantage: A survey and a proposal for measurement. *Journal of Industry, Competition and Trade*, 6(2), 137–159. <https://doi.org/10.1007/s10842-006-8430-x>
- Song, M., Droge, C., Hanvanich, S., & Calantone, R. (2005). Marketing and technology resource complementarity: An analysis of their interaction effect in two environmental contexts. *Strategic Management Journal*, 26(3), 259–276. <https://doi.org/10.1002/smj.450>
- Stocker, M. G. (2013). *Value Creation of Knowledge-intensive Companies* [Ph.D. Dissertation]. Corvinus University of Budapest. [https://phd.lib.uni-corvinus.hu/690/1/Stocker\\_Miklos\\_den.pdf](https://phd.lib.uni-corvinus.hu/690/1/Stocker_Miklos_den.pdf)
- Stocker, M., & Pábli, B. (2023). A marketingmix-szel kapcsolatos képességek hatása az exportáló közép- és nagyvállalatok versenyképességére. *Vezetéstudomány*, 54(3), 2–11. <https://doi.org/10.14267/VEZTUD.2023.03.01>
- Stocker, M., & Várkonyi, L. (2022). Impact of market orientation on competitiveness: Analysis of internationalized medium-sized and large enterprises. *Entrepreneurial Business and Economics Review*, 10(1), 81–96. <https://doi.org/10.15678/EBER.2022.100106>
- Stuart, E.A. (2010). Matching methods for causal inference: A review and a look forward. *Statistical Science*, 25(1), 1–21. <https://doi.org/10.1214/09-STS313>
- Szerb, L. (2015). A versenyképesség mérése és empirikus vizsgálata a magyar kisvállalati szektorban. *Prosperitas*, 1(2), 14–18. <https://publikaciotar.uni-bge.hu/id/eprint/1070/1/Szerb-L..pdf>
- Szukits, Á., & Móricz, P. (2023). Towards data-driven decision making: the role of analytical culture and centralization efforts. *Review of Managerial Science*, (18), 2849–2887. <https://doi.org/10.1007/s11846-023-00694-1>
- Teece, D.J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. <https://doi.org/10.1002/smj.64>
- Teece, D.J. (2010). Business models, business strategy and innovation. *Long Range Planning*, 43(2–3), 172–194. <https://doi.org/10.1016/j.lrp.2009.07.003>
- Teece, D.J. (2014). The foundations of enterprise performance: Dynamic and ordinary capabilities in an (economic) theory of firms. *Academy of Management Perspectives*, 28(4), 328–352. <https://doi.org/10.5465/amp.2013.0116>
- Teece, D.J. (2016). Dynamic capabilities and entrepreneurial management in large organizations: Toward a theory of the (entrepreneurial) firm. *European Economic Review*, 86, 202–216. <https://doi.org/10.1016/j.eurocorev.2015.11.006>
- Teece, D.J. (2019). A capability theory of the firm: an economics and (strategic) management perspective. *New Zealand Economic Papers*, 53(1), 1–43. <https://doi.org/10.1080/00779954.2017.1371208>
- Teece, D.J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Management Journal*, 18(7), 509–533. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z)
- Trępczyński, P., & Wrona, T. (2013). From going international to being international-strategies for international competitiveness. *The Poznań University of Economics Review*, 13(1), 89–114. <https://doi.org/10.18559/ebr.2013.1.816>
- Wernerfelt, B. (1984). A resource-based view of the firm. *Management Journal*, 5(2), 171–180. <https://www.jstor.org/stable/2486175?seq=1&cid=pdf>
- Wilden, R., & Gudergan, S.P. (2015). The impact of dynamic capabilities on operational marketing and technological capabilities: investigating the role of environmental turbulence. *Journal of the Academy of Marketing Science*, 43(2), 181–199. <https://doi.org/10.1007/s11747-014-0380-y>
- Woerner, S.L., & Wixom, B.H. (2015). Big data: extending the business strategy toolbox. *Journal of Information Technology*, 30, 60–62. <https://doi.org/10.1057/jit.2014.31>
- Xu, L.D., Xu, E.L., & Li, L. (2018). Industry 4.0: State of the art and future trends. *International Journal of Production Research*, 56(8), 2941–2962. <https://doi.org/10.1080/00207543.2018.1444806>
- Yeow, A., Soh, C., & Hansen, R. (2018). Aligning with new digital strategy: A dynamic capabilities approach. *Journal of Strategic Information Systems*, 27(1), 43–58. <https://doi.org/10.1016/j.jsis.2017.09.001>

Zahra, S.A., Sapienza, H.J., & Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. *Journal of Management Studies*, 43(4), 917–955.

<https://doi.org/10.1111/j.1467-6486.2006.00616.x>

Zeng, H., Ran, H., Zhou, Q., Jin, Y., & Cheng, X. (2022). The financial effect of firm digitalization: Evidence from China. *Technological Forecasting and Social Change*, (183), 121951.

<https://doi.org/10.1016/j.techfore.2022.121951>

Zott, C. (2003). Dynamic capabilities and the emergence of intraindustry differential firm performance: Insights from a simulation study. *Strategic Management Journal*, 24(2), 97–125.

<https://doi.org/10.1002/smj.288>

Zott, C., & Amit, R. (2008). The fit between product market strategy and business model: Implications for firm performance. *Strategic Management Journal*, 29(1), 1–26.

<https://doi.org/10.1002/smj.642>

# OPTIMIZING CORPORATE CULTURE DIMENSIONS AND OPERATIONAL PERFORMANCE IN THE CONTEXT OF MULTINATIONAL COMPANIES IN KENYA

## A VÁLLALATI KULTÚRA DIMENZIÓINAK ÉS MŰKÖDÉSI TELJESÍTMÉNYÉNEK OPTIMALIZÁLÁSA A KENYAI MULTINACIONÁLIS VÁLLALATOK KONTEXTUSÁBAN

The performance of multinational firms in Eastern Africa has raised concerns about their future sustainability. In this paper, the authors argue that optimal management of corporate culture is a way these firms could improve their operational performance. Edgar Schein's Model of Culture and the Contingency Theory served as the foundation for the research study. The study utilized the descriptive cross-sectional survey technique, in which structured questionnaires were administered to 150 foreign multinational companies in Kenya. Data were analysed for descriptive statistics, correlation, and multiple regression analysis using SPSS. The results showed that adhocracy and bureaucratic culture had a significant positive influence on operational performance. However, market and consensual culture had a positive influence that was not significant. Empirically, the study contributes to management practice by diagnosing corporate traits as a process factor, especially in instances where activities such as recruitment, onboarding, international management, and innovation are being carried out by an organization.

**Keywords:** corporate culture, market culture, consensual culture, bureaucratic culture, adhocracy culture, operational performance (OP), multinational companies (MNCs)

A kelet-afrikai multinacionális cégek teljesítménye aggályokat vet fel a jövőbeni fenntarthatóságukat illetően. Ebben a cikkben a szerzők azzal érvelnek, hogy a vállalati kultúra optimális menedzselése egy módja lehet annak, hogy ezek a cégek javítsák működési teljesítményüket. Edgar Schein kultúramodellje és a kontingenciaelmélet szolgált a kutatás alapjául. A tanulmány a leíró keresztmetszeti felmérés technikáját alkalmazta, amelyben strukturált kérdőíveket adtak ki Kenyában 150 külföldi multinacionális cégnek. Az adatokat leíró statisztikák, korreláció és többszörös regressziós elemzés céljából SPSS segítségével elemezték a szerzők. Az eredmények azt mutatták, hogy az adhokrácia és a bürokratikus kultúra jelentős pozitív hatással volt a működési teljesítményre. A piaci és a konszenzusos kultúra azonban olyan pozitív hatást gyakorolt, ami nem volt jelentős. Empirikusan a tanulmány hozzájárul a vezetési gyakorlathoz azáltal, hogy a vállalati jellemzőket folyamatényezőként diagnosztizálja, különösen olyan esetekben, amikor olyan tevékenységeket végeznek, mint a toborzás, a beépítés, a nemzetközi menedzsment és az innováció.

**Kulcsszavak:** szervezeti kultúra, piackultúra, konszenzusos kultúra, bürokratikus kultúra, adhokratikus kultúra, működési teljesítmény (OP), multinacionális vállalatok (MNCs)

### Funding/Finanszírozás:

The authors did not receive any grant or institutional support in relation with the preparation of the study. A szerzők a tanulmány elkészítésével összefüggésben nem részesültek pályázati vagy intézményi támogatásban.

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The article was received: 16.11. 2023, revised: 02. 02. 2024, 07. 02. 2024, and 26. 03. 2024, accepted: 26. 03. 2024.

A cikk beérkezett: 2023. 11. 16-án, javítva: 2024. 02. 02-án, 2024. 02. 07-én és 2024. 03. 26-án, elfogadva: 2024. 03. 26-án.

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The global market environment is constantly evolving, and entities worldwide are pursuing financial, operational, and managerial strategies to attain competitive advantage (Kotabe & Helsen, 2022). As a result of the prevailing complexity of the global marketplace, corporate culture has been proposed by scholars as one of the strategic elements of corporate performance. Scholars argue that the operational performance (OP) of firms is dependent on both the external market environment and internal business factors (Hameed et al., 2021; Rokicki et al., 2022; Saini & Singh, 2020). To that end, companies pursue central operational aspects of production quality, service quality, customer preferences, market research, cost measures and employee productivity to achieve competitive advantage (Holub et al., 2021). With growing commercial and social opportunities, multinational companies (MNCs) struggling with optimizing their operations in different settings present one of the most questioned areas of corporate culture practices (Berti & Simpson, 2021; Fang et al., 2023).

Culture, a dominant concept in organizational behaviour and social psychology, remains an evolving source of research interest. Corporate culture has been studied through the lens of management practice, and existing studies reveal divergent arguments concerning the phenomenon. Guiso et al. (2015) argue that culture plays a profound role in influencing organizational behaviour, which can establish the difference between a company's strategic success in terms of both financial and OP and its failure. Consequently, organizations are investing heavily in building the right kind of work environment for their employees (Guiso et al., 2015). The ever-changing nature of international business, economic conditions, workforce preferences, and MNC host locations in developing countries have raised unique challenges that require cultural adaptation (Yousef, 2020).

## Research perspective and framework

### The conceptualization of corporate culture

There are multiple dimensions, values, and specialties that constitute culture (Yousef, 2020). According to Hofstede (2011), culture generally consists of the unwritten rules of the social game therefore distinguishing the members of a particular group from another; categorized into three dimensions: national culture, corporate culture and personality. On the other hand, Warrick (2017) defines corporate culture as unseen yet uniting themes that give a sense of direction and meaning to a company. Thus, culture to an organization, may be referred to as what personality is to an individual.

Putting together these definitions, this study adopted the definition derived from Andreas & Gumanti (2022), that corporate culture is a pattern of shared basic learned (lacuna) as groups solved their problems of external adaptation and internal integration; and therefore, worked well enough to be considered valid and taught to new members as the correct way you perceive, think, and feel in relation to those problems. We adopted market, adhocracy,

bureaucratic and consensual culture as the four dimensions of corporate culture, derived from Deshpandé et al.'s (1993) conceptualization. Other scholars who have used this classification are: Moonen (2017), Carlos Pinho et al. (2014), Quinn & Cameron (1999) in order to contribute to development of corporate culture knowledge in a changing organizational landscape. Table 1 breaks down the adopted dimensions of culture and the suggested strategy orientations from Quinn and Cameron (1999), cited in (Bukoye & Abdulrahman, 2023).

Table 1  
Dimensions of corporate culture & strategy orientation

Culture Dimension	Adopted Definitions	Conceptualized Strategy Orientation
Market	A goal-oriented culture that focusses on accomplishment of tasks and achievement of expected results and outcomes. It establishes a highly competitive environment for both the leaders and the employees.	Productivity and stakeholder satisfaction strategies.
Adhocracy	A dynamic, ever changing and creative work-environment that encourages experimentation and innovation backed up by the prominence and support of leadership.	Accountability, innovation, high degree of freedom & personal initiative, flexibility, openness and risk strategies.
Bureaucratic/hierarchical	A procedural, structured and formalized work environment with clear guidelines on what is generally acceptable and what is unacceptable.	Quality output, stability, efficiency, structured coordination strategies.
Consensual/Clan	A set of values that make up an internally oriented value system which focuses on tradition, loyalty and internally controlled mechanisms.	Commitment, people-involvement, loyalty, open communication and team-oriented strategies.

Source: own compilation based on Deshpandé et al. (1993)

### The conceptualization and classification of operational performance (OP)

Performance is a multi-dimensional concept, with two broad categories: financial and non-financial performance (Alatawi et al., 2023; Dalton et al., 1980; Lenz, 1981; Low & Siesfeld, 1998). Traditionally, organizations paid significant attention to financial performance as the only factor that determines success or failure of a business; leading to overreliance on financial indicators. Arguments on the goals of performance measurement, the process and its systems indicate the nexus between financial and non-financial aspects (Alatawi et al., 2023; Low & Siesfeld, 1998). Therefore, modern theories of performance have advanced

a mixed approach, that captures both qualitative and quantitative outcomes of a business (Kaplan & Norton 2001; Nguyen et al., 2020). Table 2 shows the adopted dimensions and definitions of operational performance proposed by Bhagwat & Sharma (2007) to measure the OP of MNCs in Kenya.

Table 2  
Dimensions of operational performance

Dimensions of OP	Adopted Definition	Conceptualized Strategy Orientation
Quality Performance	Evaluated gap between expected and delivered good and service.	Client expectations, durability and specification driven strategies.
Flexibility Performance	Processes, designs, volume, product development and product/marketing mix actions of the firm.	Involves action like adoption of new systems, decisions on new product development, alteration of processes.
Cost Performance	Cost per unit of product produced or service offered, constituting: manufacturing cost, operational cost, service charges, transaction cost and value-added cost.	Unit cost reduction strategies translate to superior performance.
Service Performance	Customer interaction, point of sale and after sale performance.	Feedback evaluation and score strategies.

Source: own compilation based on Bhagwat & Sharma (2007)

### Corporate culture and operational performance of MNCs in Kenya

The significance of the efficiencies and inefficiencies of the dimensions of corporate culture and their influence on operational performance in the context of MNCs remain under explored thus hindering its optimum utilization. Therefore, our objective was to determine the antecedent relationship between the contributions of the various dimensions of cul-

Table 3  
Research questions

Main Objective	
To determine the influence of corporate culture on operational performance (OP) of multinational companies (MNCs) in Kenya by aiming to answer the following research questions:	
Research Questions	
RQ 1	What is the effect of market culture on operational performance of MNCs in Kenya?
RQ 2	What is the influence of adhocracy culture on operational performance of MNCs in Kenya?
RQ 3	What is the influence of bureaucratic culture on operational performance of MNCs in Kenya?
RQ 4	What is the effect of consensual culture on operational performance of MNCs in Kenya?

Source: own compilation

ture on operational performance by focusing on the multinational sector in Kenya. We posit that pursuing optimal management of corporate culture dimensions is a way for the entities to improve their operational performance. To our knowledge, this is among the few organizational level studies to empirically determine relationships between the adopted classification of corporate culture and operational performance of these firms in Kenya. Table 3 outlines the research questions.

### Theoretical background

The discourse on the existence of organizations as distinct entities with peculiar traits is embedded in strategy and policy publications. Literature has captured culture as a unique element in studying organizations and their complex ecosystems. In 1958, Fred Fiedler, during his research on the effectiveness and fit of organizational characteristics, emphasized the role of leadership and management in delivering the corporate vision and desired performance outcomes (Fiedler, 1964).

The contingency theory on different leadership and organizational structures and designs perceives culture as an imminent and varying characteristic that can be optimized if understood (Fiedler, 2015; Wadongo & Abdel-Kader, 2014). The theory posits that there is no defined way of leading an organization that will automatically result in success and increased performance (Fiedler, 2015; Wadongo & Abdel-Kader, 2014). Therefore, unique organizational circumstances would call for the adoption of varied strategic orientations. The theory (!) points to the pre-eminent dissonance/incongruence of evolutionary organizational processes. We formulated the research questions based on the dimensions of culture (market, adhocracy, bureaucratic and consensual), which we evaluated against a set of distinct elements: organizational traditions, leadership styles, priorities and origin.

We used the Schein Model developed in 1980 as a diagnostic tool for the various dimensions of culture. The model is premised on the ability of employees to realize goals on the basis of deep cultural alignment, which leads to motivation, satisfaction, and performance (Schein, 2010). In addition, we used the four culture types proposed by Deshpandé et al. (1993): market, adhocracy, bureaucratic, and consensual cultures to analyze behavior, espoused values, and cultural alignment to strategic goals.

### Empirical review

Though the rationale for studying corporate culture is based on its influence on terminal outcomes (Fang et al., 2023; Striteska & Zapletal, 2020), to a large extent, empirical studies so far available on corporate culture and OP reveal mixed results. For example, some scholars have underscored the critical role of corporate culture in performance, while others introducing leadership as a mediating variable to the impact of market culture on performance (Krizanova & Michulek, 2022; Li et al., 2001; Nguyen et al., 2020). Similarly, in Kenya, studies have found that culture has a significant positive influence on employee per-

formance (Wambugu, 2014; Wanjiku & Agusioma, 2014). Therefore, we identified a gap in employee performance and firm operational performance metrics.

Opoku et al. (2022) studied the effect of the dominance of entrepreneurial culture on employee performance. Using a descriptive survey, the study assessed the interactive effects of culture and its influence on employee performance at GCB Bank in Ghana. The study found that entrepreneurial/adhocracy, bureaucratic, and consensual culture had a statistically significant relationship with employee performance. The multiple regression output showed that corporate culture (consensual, bureaucratic, adhocracy) significantly improves employee performance, with adhocracy culture demonstrating the highest influence.

However, challenging growth patterns have been attributed to strong cultures that lead to operational difficulties/inefficiencies; depending on the culture dimensions, especially in highly volatile business environments and crisis situations which require practical adaptation of changes in corporate culture to business practice (Hofstede, 2011; Holub et al., 2021; Quinn & Cameron, 1999; Saini & Singh, 2020; Zakari et al., 2013). In an attempt to correlate the frequency and prominence of culture patterns, Guiso et al. (2015) observed no significant correlation and, therefore, concluded that advertised values are possibly not as important and suggest alternative measures of cultural patterns. Therefore, in as much as existing correlations do not prove causation, the importance corporations have attached to culture could be justified, as has been proven by management (Guiso et al., 2015).

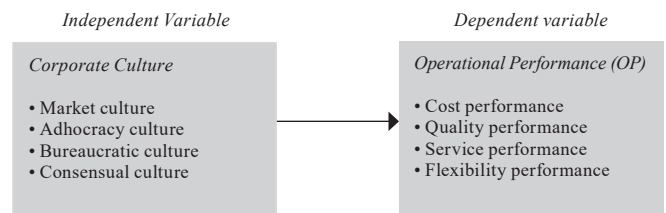
Onyango & Ondiek (2021) studied the digitalization and integration of sustainable development goals (SDGs) in public organizations in Kenya. The study evaluated organizational culture practices and found that cultures that pre-disposed the entities to change resistance hindered the integration and performance of SDGs. Other scholars have measured culture quantitatively through the use of surveys (Scott et al., 2003; Weech-Maldonado et al., 2023). Empirical studies have supported little evidence to prove the influence of corporate culture on both financial and OP (Joseph & Kibera, 2019; San Park & Kim, 2009; Soomro & Shah, 2019; Tuan, 2010). This study, therefore, sought to demystify the susceptibility of OP of firms to various cultural dimensions.

### Hypothesis development

We came up with four hypotheses arising from the literature review (Figure 1). The first one postulates a significant positive influence of market culture on OP. That is, MNCs in which market culture traits dominate exemplify high OP. The second hypothesis posits a significant negative influence of adhocracy culture on OP. That is, MNCs in which adhocracy culture traits dominate exemplify low OP. The third one also posits a significant negative influence of bureaucratic culture OP. That is, MNCs in which bureaucratic culture traits dominate exemplify low OP. The fourth hypothesis also posits a significant positive influence of consensual culture on OP.

Figure 1

### Conceptual framework



Source: own compilation based on Bhagwat & Sharma (2007) and Quinn & Cameron (1999)

### Research methodology

The research design was quantitative methodology, specifically a cross-sectional survey (Michulek et al., 2023; Scott et al., 2003; Weech-Maldonado et al., 2023). The study population was 238 foreign MNCs, as listed by the Kenya National Bureau of Statistics (KNBS, 2016). As a result of the COVID-19 pandemic, the country was under prolonged lockdown; most employees were working from home, and many MNCs were shut down. Using the list from KNBS, we identified the companies in operation and ended up with a sample size of 150 operational MNCs. We used Yamane's formula for sample size determination. This parametric measure accommodates a stipulated level of precision, confidence, and hence, margin of error to verify the representativeness of this sample (Adam, 2020). Due to the unique circumstances, the study used a non-probability sampling approach at two different levels. At stage one, the quota sampling Field (Jung, 2022; Khosravani et al., 2020) was used to generate the sampling distribution, illustrated in Table 4.

Consequently, we purposively selected organizational representatives on the basis of the level of management. The researchers, therefore, reached out to the most knowledgeable company representatives who were available and at work at the time of the study (Bagga et al., 2023). Senior managers are the vision and strategy bearers who set the overarching corporate values. Middle managers translate the vision into actionable tasks, foster adoption, and reinforce set corporate traits, operational managers, fully cascade assigned corporate value priorities, monitor and encourage daily practice (Behie et al., 2023; Carvalho et al., 2023). Therefore, collaboratively, the selected representatives play formidable roles in culture alignment.

Table 4

### Quota distribution

Headquarters	Number of Companies (N)	% of Population (N)	Sample distribution (n)
Africa	17	7.14%	11
Asia	56	23.53%	35
Europe	122	51.26%	77
Oceania	1	0.42%	1
America	42	17.65%	26
<b>Total</b>	<b>238</b>	<b>100%</b>	<b>150</b>

Source: own compilation based on KNBS (2016)

The questionnaire (Annex 1) comprised closed ended questions to gather useful information that contributed to the study findings (Hancock et al., 2021). The quantitative data was measured using a five-point Likert scale (Joseph & Kibera, 2019; Tuan, 2010). The tool was divided into three main sections, the first section sought the bio profile of the organization, the second addressed the independent variable and the last section covered OP. Data was collected within the period February 2020 and May 2020.

### Demographic profile

The study targeted three managers of each of the 150 operational MNCs. However, 80 MNCs responded to the survey. The results in Table 5 show that the majority of the respondents were female (50.3%) and most of the respondents were aged between 36-40 years (36.72%). Of these respondents, a majority (44.96%) had worked for the MNCs for a period ranging between 6-9 years. The findings suggest that employees aged between 36-45 years are structurally in charge of driving cultural practice in the organization. Therefore, they are more likely to be concerned with promoting corporate culture. Consequently, they are keen on both positive and negative changes in menial aspects affect their work. Of the responses, 46.09% were from MNCs which are headquartered in Europe.

### Descriptive statistics

Respondents were requested to indicate the extent to which they agreed or disagreed with statements drawn from the variables on a scale of 1 to 5 where 1 is strongly disagree, 2 is disagree, 3 is somewhat agree, 4 is agree, and 5 is strongly agree (Table 6).

Table 5

### Demographic data

Demographic Characteristics		Frequency	%
Gender	Male	148	49.66%
	Female	150	50.34%
	<b>Total</b>	<b>298</b>	<b>100%</b>
Age	25 & below	4	1.56%
	26- 35 years	60	15.63%
	36 – 40 years	93	36.72%
	41 – 45 years	81	27.34%
	46 – 50 years	48	12.5%
	51 years & above	12	6.25%
<b>Total</b>	<b>298</b>	<b>100%</b>	
Management Level	Senior	73	24.50%
	Middle	128	42.95%
	Operational	97	32.56%
	<b>Total</b>	<b>298</b>	<b>100%</b>
Work Duration	1 year & below	14	4.70%
	2-5 years	95	31.88%
	6-9 years	134	44.96%
	10 years & above	55	18.46%
	<b>Total</b>	<b>298</b>	<b>100%</b>
Company Headquarters	Africa	40	13.42%
	Asia	67	22.48%
	Europe	134	44.97%
	Oceania	3	1.01%
	America	54	18.12%
<b>Total</b>	<b>298</b>	<b>100%</b>	

Source: own compilation

Table 6

### Statistical summary

Descriptive Statistics			
Key Variables	N	Mean	Std. Deviation
Market Culture	298	4.25	0.704
Adhocracy Culture	298	4.17	0.761
Bureaucratic Culture	298	4.34	0.618
Consensual Culture	298	4.22	0.674

Source: Survey Data (2020)

Table 7

### Results of the Correlation Analysis Model

PEARSON'S CORRELATION		MC	AC	BC	CC	OP
Market Culture (MC)	Pearson Correlation	1	.443**	.350**	.361**	.274**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000
	N	298	298	298	298	298
Adhocracy Culture (AC)	Pearson Correlation	.443**	1	.307**	.563**	.441**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000
	N	298	298	298	298	298
Bureaucratic Culture (BC)	Pearson Correlation	.350**	.307**	1	.360**	.313**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000
	N	298	298	298	298	298
Consensual Culture (CC)	Pearson Correlation	.361**	.563**	.360**	1	.307**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000
	N	298	298	298	298	298
Operational Performance (OP)	Pearson Correlation	.274**	.441**	.313**	.307**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	
	N	298	298	298	298	298

\*\* statistical significance at 90% level of confidence i.e..  $p < 0.01$

Source: own compilation



The results indicate a slight average difference in cultural practice dimensions in MNCs in Kenya; market (M=4.25, SD= .704); adhocracy (M=4.17, SD= .761); bureaucratic (M=4.34, SD= .618) and consensual (M=4.22, SD= .674). While bureaucratic culture registered the least standard deviation and adhocracy culture registered the highest standard deviation of all the corporate culture variables, all the standard deviations were within the spread range of ± 2, therefore were considered acceptable in this study.

**Correlation matrix**

Table 7 presents the results obtained from the correlation analysis model.

The results illustrate that the correlation coefficient between all the dimensions of corporate culture and OP is significant (<.001) but to varied degrees. Market culture demonstrated a weak positive correlation with OP (r= .274, p< 0.01). Therefore, adhocracy culture (r= 0.441, p<0.01) has a moderate positive correlation, followed by bureaucratic culture and OP (r=.313, p<0.01) and consensual culture and OP (r= .307, p< 0.01). Hence, adhocracy culture has a significant moderate positive correlation the OP, while the other three culture types have a weak positive correlation with OP.

**Results of the regression**

The output of the model equation for the regression model is on Table 8.

The coefficients were used to come up with the following equation:

$$Y = 2.554 + 0.037X_1 + 0.200X_2 + 0.141X_3 + 0.023X_4 + e$$

where:  $X_1$  is market culture;  $X_2$  is adhocracy culture;  $X_3$  is bureaucratic culture;  $X_4$  is consensual culture and Y is operational performance (OP); e – error term.

Table 9

**Interpretation of model findings**

Interpretation of Model Results			
Hypothesis	Coefficients Outcome (ceteris paribus)		Decision
H1	Market Culture	Every unit increase in the value of market culture, increases the value of OP by 0.037	H1 not rejected
H2	Adhocracy Culture	Every unit increase in the value of adhocracy culture, increases the value of OP by 0.200	H2 rejected
H3	Bureaucratic Culture	A unit increase in the value of bureaucratic culture, increases the value of by 0.141 ceteris	H3 rejected
H4	Consensual Culture	A unit increase in the value of consensual culture, increases the value of OP by 0.023	H4 not rejected

Source: own compilation

Table 8

**Regression model**

Model Summary <sup>b</sup>						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	
	.481a	0.232	0.221	0.26665	1.704	
a. Predictors: (Constant), Consensual Culture, Bureaucratic Culture, Market Culture, Adhocracy Culture						
b. Dependent Variable: Operational Performance (OP)						
ANOVA <sup>a</sup>						
Model	Sum of Squares	Df	Mean Square	F	Sig. P-value	
Regression	6.281	4	1.570	22.084	.000b	
Residual	20.833	293	0.071			
Total	27.114	297				
a. Dependent Variable: Operational Performance (OP)						
a. Predictors: (Constant), Consensual Culture, Bureaucratic Culture, Market Culture, Adhocracy Culture						
Model B	Unstandardized Coefficients		Standardized Coefficients		T	Sig. Pvalue VIF
	Std. Error	Beta				
(Constant)	2.554	0.230			11.110	0.000
Market Culture	0.037	0.048	0.045	0.045	0.766	0.445 1.340
Adhocracy Culture	0.200	0.037	0.350	0.350	5.349	0.000 1.629
Bureaucratic Culture	0.141	0.045	0.179	0.179	3.146	0.002 1.232
Consensual Culture	0.023	0.050	0.029	0.029	0.460	0.646 1.568

Source: own compilation

Based on the model summary output,  $R$  (0.481) exhibits a moderate strength of positive linear relationship between corporate culture and OP. Consequently, the coefficient of multiple determination ( $R$ - squared) illustrates the extent to which the independent variables (market, adhocracy, bureaucratic and consensual culture) explained OP. Thus, the degree of variation explained by the model is only 23.2%. For ANOVA, a significance level of  $< 0.05$  was interpreted as significant, otherwise not significant. The  $p$  value was 0.000 which is less than 0.05 hence the model is significant. The values of each of the independent variables and their intercepts are also described in the multiple regression model. At 95% level of confidence (5% margin of error), only adhocracy culture and bureaucratic culture were found to be significant (Table 9).

## Discussion

The study sought to determine the influence of market, adhocracy, bureaucratic and consensual culture on OP of MNCs in Kenya.

### Influence of market culture on OP

Results show that market culture has an insignificant positive influence on OP. This finding is surprising considering that existing literature shows that the adoption of market culture helps organizations to adopt strategies that build on market orientation in terms of customer and competitor orientation (Newman et al., 2016). The strategies include continuous modules of process and product innovation, which we consider a means of achieving efficiency and flexibility. Modern day strategies and appropriate departmental competition and recognition of performance have been found to be effective in converting personal goals and boosting individual efficiency levels into desired levels of firm OP (Guiso et al., 2015; Harris & Ogbonna, 2011; Moonen, 2017). The findings in this study are supported by the argument that market culture is susceptible to unforeseen scenarios in the business environment (Guiso et al., 2015; Harris & Ogbonna, 2011). Additionally, organizations possess different culture types but these traits do not contribute to significant differences in innovation and performance (Zakari, 2013). Past scholars contended that in as much as existing correlations between culture and performance do not prove causation, the importance corporates have attached to culture could be justified (Guiso et al., 2015; Zakari, 2013).

### Influence of adhocracy culture on OP

Results indicate that adhocracy culture has a significant positive influence on OP. According to Joseph and Kibera (2019), Mihajlovski (2023), Tuan (2010) adhocracy culture promotes organizational learning. The corporate trait improves the acquisition of knowledge, skills, competencies and other capabilities that promote innovativeness in the company, with which scholars have viewed individuals in organizations as instigators of entrepreneurship (Lorincová et al., 2022; Szabó & Aranyossy, 2022).

A high degree of freedom and personal initiative result in proactiveness, resilience, determination and a sense of responsibility in an organization (Hetzner et al., 2012). In this context, MNCs operate in a highly competitive and dynamic global environment that demands consistent innovation and creation of better products, processes and procedures as a means of a consumer-based approach to achieving competitive advantage (Graham et al., 2022; Wei et al., 2014). In conclusion, the influence of adhocracy culture on performance is optimized within the limits of volatile operations characterized by risk, creativity, spontaneity and dynamism since the dimension leans towards adapting to and even creating change.

### Influence of bureaucratic culture on OP

Results indicate that bureaucratic culture has a significant positive influence on OP. According to Tekauchi et al. (2007), companies with structured/well spelt out tasks have more influence on their employees than companies with unstructured ad hoc tasks. Bureaucratic culture creates constitutional order and, as a result, supports employees in mastering their tasks more efficiently. To increase productivity and reduce costs, division of labour and specialization can be used as effective strategies. The bureaucratic culture encourages building expertise and proficiency, which are prerequisites to productivity (Chao et al., 2017). Consequently, skills are sharpened and product quality can be improved in the case of manufacturing and production facilities (Nauffal & Nader, 2022). Leaders exercise control over subordinates using laid down rules and regulations, hence breeding consistency in performance (Nauffal & Nader, 2022).

Therefore, the study emphasizes the role of bureaucratic factor efficiencies such as rules, policies, company guidelines, shared/common goals, and clear instructions on duties & tasks in ensuring operational success and preserving the value for stability.

### Influence of consensual culture on OP

The output shows that consensual culture has an insignificant positive influence on OP. This insignificant result could be attributed to the effect of the construct on quality and cost. According to Dosoglu-Guner (2001) and Opoku et al. (2022), considerably, elements of consensual culture are one of the most effective approaches to motivating employees and maximizing the value of people in a company. The trait is characterized by high levels of people involvement, participation, and teamwork that promote employee development and commitment. However, its dominance might have effects on firm outcomes if not managed.

The findings are supported by the argument that organizations exhibit different cultural traits or dimensions, but these traits do not contribute to significant differences in innovation and performance (Cherian, 2021; Zakari, 2013). Therefore, consensual culture does not significantly influence operational performance as a factor on its own. This is supported by the findings of the studies done by Odhiambo (2014), Odhiambo (2015), and García-Morales

et al. (2008), which found that there exists a non-significant linear relationship between corporate culture and operating expense.

## Conclusion

In conclusion, market and consensual culture traits do not independently have a significant influence on the OP of MNCs in Kenya. Extensionally, dominant bureaucratic and adhocracy culture traits have a significant influence on the OP of MNCs. Our findings are consistent with Lund (2003), who found that each culture type affects the level of job satisfaction differently, and Berson et al. (2008) who also found that different cultural dimensions (bureaucratic, supportive, and innovation-oriented cultures) constituted different associations with firm outcomes including sales growth, firm efficiency and job satisfaction (Gorton & Zentefis, 2023).

Conversely, the findings of our study differ from the arguments of Kerr and Slocum (2005), who found that market culture linked with reward systems was crucial to the growth of firms in the United States of America. Odhiambo (2014), Odhiambo et al. (2015) also found that there exists a non-significant linear relationship between corporate culture and operating expense among microfinance institutions in Kenya.

According to Chao et al. (2017) and Odhiambo (2014), the balance between bureaucratic efficiencies and bureaucratic inefficiencies is hard to achieve. In turn, making it difficult to establish concretely if bureaucratic culture affects OP positively or negatively (Nauffal & Nader, 2022). This study established that among foreign MNCs in Kenya, bureaucratic efficiencies outweigh bureaucratic inefficiencies. This finding could be justified by the complexities and diversity in the business environment that they operate in.

According to Yousef (2020), some aspects of corporate culture may generate superior performance in specific settings and contexts while resulting in highly dysfunctional or inefficient performance in others especially when there exists significant regional differences and consumption patterns. This is consistent with Petheó et al. (2023), who studied high-potential gazelle multinational companies to underscore the maximization of the benefits of pre-qualified firms' corporate dimensions. Therefore, we contend that the nature of the relationship between corporate culture and operational performance is a function of culture types, various firm activities, and allocated resources (Kosiciarova et al., 2021).

## Implications of research

Stakeholder groups can derive significant practices from the study findings and use them in exercising judgment depending on their areas of need.

## *Contribution to management and organizational policy*

Management can base practice decisions on the arguments presented in this paper. Further, they can clas-

sify individual actions of management and employees guided by the potential influences derived from the study. Diagnosing traits, Chau et al. (2021) is the first step to managing them effectively. Activities such as recruitment, onboarding, performance management, and innovation in companies will call for this nature of engagements. The findings also inform organizational policy development encompassing issues: reward systems, compliance, customer engagement, performance appraisals, and employee development.

## *Contribution to knowledge*

Our study findings contribute to the understanding of the influence of the various dimensions of corporate culture on the OP of MNCs. We have highlighted potential areas for further study in cases where our findings contradicted the findings of other scholars therefore arousing scholarly debate. Additionally, this study fills contextual gaps that arose in the empirical review by focusing on both MNCs and Kenya. By adopting a quantitative approach, the study has addressed concerns raised by scholars Berson et al. (2008) on the importance of studying culture from a quantitative approach other than the dominant qualitative approach.

## Limitations of the study

The study was carried out with empirical conceptual limitations. First, corporate culture was conceptualized based on the classification put forward by Deshpandé et al. (1993), Quinn and Cameron (1999): market, adhocracy, bureaucratic and consensual culture hence other aspects of corporate culture were not covered in this study. The measurement of OP was also limited to four metrics: flexibility, quality, service and cost performance yet there are other financial measures of performance as well as convenience and efficiency which have been adopted by other scholars to make up comprise five metrics. The study was also limited to data collected using a cross-sectional survey. Corporate culture may be affected by time, unprecedented occurrences, and technological advancements that may warrant disruptions in the manner in which a business carries out its day-to-day activities. Lastly, the study was limited by the COVID-19 pandemic, which limited our interaction with the respondents and also slowed down the speed of obtaining responses. Future studies could address these limitations.

## Areas of further studies

The study recommends further research on the influence of corporate culture on the OP of other firms since this study only focused on foreign MNCs. Progressive investigation on the potential of existing moderating variables when studying the influence of corporate culture and OP since some variables that displayed correlation proved to be insignificant when multiple regression was run. Variables such as marketing capabilities, market orientation, job satisfaction, and employee productivity could be introduced in the relationship, to build a more explanatory model.

### Ethical consideration

We carried out this study with the approval of the Strathmore University Ethics Review Committee (SU-IERC0669/20). Additionally, we were issued with the National Commission for Science, Technology and Innovation (NACOSTI) permit ref no. NACOSTI/P/20/4595, a license authorizing data collection for the study.

### References

- Adam, A.M. (2020). Sample size determination in survey research. *Journal of Scientific Research and Reports*, 26(5), 90-97.  
<https://doi.org/10.9734/jsrr/2020/v26i530263>
- Alatawi, I.A., Ntim, C.G., Zras, A., & Elmagrhi, M.H. (2023). CSR, financial and non-financial performance in the tourism sector: A systematic literature review and future research agenda. *International Review of Financial Analysis*, 89, 102734.  
<https://doi.org/10.1016/j.irfa.2023.102734>
- Andreas, A., & Gumanti, T.A. (2022). Organizational culture and company values: a cross-sectional study on public companies in Indonesia. *Jurnal Siasat Bisnis*, 27(1), 76-85.  
<https://doi.org/10.20885/jsb.vol27.iss1.art6>
- Annosi, M.C., Martini, A., Brunetta, F., & Marchegiani, L. (2020). Learning in an agile setting: A multilevel research study on the evolution of organizational routines. *Journal of Business Research*, 110, 554-566.  
<https://doi.org/10.1016/j.jbusres.2018.05.011>
- Bagga, S.K., Gera, S., & Haque, S.N. (2023). The mediating role of organizational culture: Transformational leadership and change management in virtual teams. *Asia Pacific Management Review*, 28(2), 120-131.  
<https://doi.org/10.1016/j.apmr.2022.07.003>
- Behie, S.W., Pasman, H.J., Khan, F.I., Shell, K., Alarfaj, A., El-Kady, A.H., & Hernandez, M. (2023). Leadership 4.0: The changing landscape of industry management in the smart digital era. *Process Safety and Environmental Protection*, 172, 317-328.  
<https://doi.org/10.1016/j.psep.2023.02.014>
- Berson, Y., Oreg, S., & Dvir, T. (2008). CEO values, organizational culture and firm outcomes. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior*, 29(5), 615-633.  
<https://doi.org/10.1002/job.499>
- Berti, M., & Simpson, A.V. (2021). The dark side of organizational paradoxes: The dynamics of disempowerment. *The Academy of Management Review*, 46(2), 252-274.  
<https://doi.org/10.5465/amr.2017.0208>
- Bhagwat, R., & Sharma, M.K. (2007). Performance measurement of supply chain management: A balanced scorecard approach. *Computers & Industrial Engineering*, 53(1), 43-62.  
<https://doi.org/10.1016/j.cie.2007.04.001>
- Billings, M.B., Klein, A., & Shi, Y.C. (2022). Investors' response to the #MeToo movement: does corporate culture matter? *Review of Accounting Studies*, 27(3), 897-937.  
<https://doi.org/10.1007/s11442-022-09695-z>
- Blumberg, B., Cooper, D., & Schindler, P. (2014). *Business research methods*. McGraw Hill.
- Bukoye, O.T., & Abdulrahman, A.H. (2023). Organizational culture typologies and strategy implementation: Lessons from nigerian local government. *Policy Studies*, 44(3), 316-335.  
<https://doi.org/10.1080/01442872.2022.2051467>
- Calciolari, S., & Prenestini, A. (2022). *Values-based methods for measuring organizational culture: logic, evidence and critique*. Edward Elgar Publishing Limited. <http://dx.doi.org/10.4337/9781788976268>
- Carlos Pinho, J., Paula Rodrigues, A., & Dibb, S. (2014). The role of corporate culture, market orientation and organisational commitment in organisational performance: The case of non-profit organisations. *Journal of Management Development*, 33(4), 374-398.  
<https://doi.org/10.1108/JMD-03-2013-0036>
- Carvalho, A.M., Sampaio, P., Rebentisch, E., McManus, H., Carvalho, J.Á., & Saraiva, P. (2023). Operational excellence, organizational culture, and agility: Bridging the gap between quality and adaptability. *Total Quality Management & Business Excellence*, 34(11-12), 1598-1628.  
<https://doi.org/10.1080/14783363.2023.2191844>
- Chao, M.M., Takeuchi, R., & Farh, J. (2017). Enhancing cultural intelligence: The roles of implicit culture beliefs and adjustment. *Personnel Psychology*, 70(1), 257-292.  
<https://doi.org/10.1111/peps.12142>
- Chau, T.L.D., Thach, K.S.R., Nguyễn, Q.T., Nguyen, T.N.H., & Nguyen, P.T.A. (2021). Study on corporate culture of Vietnamese enterprises: An approach of denison's model. *Can Tho University Journal of Science*, 13(2), 12-19.  
<https://doi.org/10.22144/ctu.jen.2021.025>
- Cherian, J., Gaikar, V., Paul, R., & Pech, R. (2021). Corporate culture and its impact on employees' attitude, performance, productivity, and behavior: An investigative analysis from selected organizations of the United Arab Emirates (UAE). *Journal of Open Innovation*, 7(1), 1-27.  
<https://doi.org/10.3390/joitmc7010045>
- Dalton, D.R., Todor, W.D., Spendolini, M.J., Fielding, G.J., & Porter, L.W. (1980). Organization structure and performance: A critical review. *Academy of Management Review*, 5(1), 49-64.  
<https://doi.org/10.5465/amr.1980.4288881>
- De Toni, A., & Tonchia, S. (2001). Performance measurement systems-models, characteristics and measures. *International Journal of Operations & Production Management*, 21(1/2), 46-71.  
<https://doi.org/10.1108/01443570110358459>
- Deshpandé, R., Farley, J.U., & Webster Jr, F.E. (1993). Corporate culture, customer orientation, and innovativeness in Japanese firms: a quadrad analysis. *Journal*



- of Marketing*, 57(1), 23-37.  
<https://doi.org/10.1177/002224299305700102>
- Dosoglu-Guner, B. (2001). Can organizational behavior explain the export intention of firms? The effects of organizational culture and ownership type. *International Business Review*, 10(1), 71-89.  
[https://doi.org/10.1016/S0969-5931\(00\)00040-8](https://doi.org/10.1016/S0969-5931(00)00040-8)
- Fang, Y., Fiordelisi, F., Hasan, I., Leung, W.S., & Wong, G. (2023). Corporate culture and firm value: Evidence from crisis. *Journal of Banking & Finance*, 146, 106710.  
<https://doi.org/10.1016/j.jbankfin.2022.106710>
- Fiedler, F.E. (1964). A contingency model of leadership effectiveness. *Advances in Experimental Social Psychology*, 1, 149-190.  
[https://doi.org/10.1016/S0065-2601\(08\)60051-9](https://doi.org/10.1016/S0065-2601(08)60051-9)
- Fiedler, F. (2015). *Contingency theory of leadership*. Routledge.
- García-Morales, V.J., Lloréns-Montes, F.J., & Verdú-Jover, A.J. (2008). The effects of transformational leadership on organizational performance through knowledge and innovation. *British Journal of Management*, 19(4), 299-319.  
<https://doi.org/10.1111/j.1467-8551.2007.00547.x>
- Gorton, G.B., & Zentefis, A.K. (2023). Social progress and corporate culture. *Industrial and Corporate Change*, 32(3), 733-754.  
<https://doi.org/10.1093/icc/dtac042>
- Graham, J.R., Grennan, J.A., Harvey, C.R., & Rajgopal, S. (2022). Corporate culture: The interview evidence. *Journal of Applied Corporate Finance*, 34(4), 22-41.  
<https://doi.org/10.1111/jacf.12528>
- Guiso, L., Sapienza, P., & Zingales, L. (2015). The value of corporate culture. *Journal of Financial Economics*, 117(1), 60-76.  
<https://doi.org/10.1016/j.jfineco.2014.05.010>
- Gupta, A.K., & Gupta, N. (2020). Effect of corporate environmental sustainability on dimensions of firm performance –Towards sustainable development: Evidence from India. *Journal of Cleaner Production*, 253, 119948.  
<https://doi.org/10.1016/j.jclepro.2019.119948>
- Hameed, W.U., Nisar, Q.A., & Wu, H. (2021). Relationships between external knowledge, internal innovation, firms' open innovation performance, service innovation and business performance in the pakistani hotel industry. *International Journal of Hospitality Management*, 92, 102745.  
<https://doi.org/10.1016/j.ijhm.2020.102745>
- Hancock, D.R., Algozzine, B., & Lim, J.H. (2021). *Doing case study research: A practical guide for beginning researchers*. Teachers College Press.
- Harris, L.C., & Ogbonna, E. (2011). Antecedents and consequences of management-espoused organizational cultural control. *Journal of Business Research*, 64(5), 437-445.  
<https://doi.org/10.1016/j.jbusres.2010.03.002>
- Hetzner, S., Heid, H., & Gruber, H. (2012). Change at work and professional learning: How readiness to change, self-determination and personal initiative affect individual learning through reflection. *European Journal of Psychology of Education*, 27, 539-555.  
<https://doi.org/10.1007/s10212-011-0094-1>
- Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture*, 2(1), 8.  
<https://doi.org/10.9707/2307-0919.1014>
- Holub, R., Ignatieva, I., Serbenivska, A., & Sydorenko, T. (2021). Corporate culture of companies in the conditions of transformations. *Finansovo-Kreditna Diáln'nist': Problemi Teorii Ta Praktiki (Online)*, 4(39), 541-549.  
<https://doi.org/10.18371/fcaptv.v4i39.241441>
- Joseph, O.O., & Kibera, F. (2019). Organizational culture and performance: Evidence from microfinance institutions in Kenya. *SAGE Open*, 9(1), 2158244019835934.  
<https://doi.org/10.1177/2158244019835934>
- Jung, J. (2022). The effect of authentic leadership of deans and directors on sustainable organizational commitment at universities: Mediated by organizational culture and trust. *Sustainability*, 14(17), 11051.  
<https://doi.org/10.3390/su141711051>
- Kaplan, R.S., & Norton, D.P. (2001). Transforming the balanced scorecard from performance measurement to strategic management: Part I. *Accounting Horizons*, 15(1), 87-104.  
<https://doi.org/10.2308/acch.2001.15.1.87>
- Kerr, J., & Slocum Jr, J.W. (2005). Managing corporate culture through reward systems. *Academy of Management Perspectives*, 19(4), 130-138.  
<https://doi.org/10.5465/ame.2005.19417915>
- Khosravani, M., Khosravani, M., Borhani, F., & Mohsenpour, M. (2020). The relationship between moral intelligence and organizational commitment of nurses. *Clinical Ethics*, 15(3), 126-131.  
<https://doi.org/10.1177/1477750920908008>
- Kosciarova, I., Kadekova, Z., & Starchon, P. (2021). Leadership and motivation as important aspects of the international company's corporate culture. *Sustainability*, 13(7), 3916.  
<https://doi.org/10.3390/su13073916>
- Kotabe, M.M., & Helsen, K. (2022). *Global marketing management*. John Wiley & Sons.
- Krizanova, A., & Michulek, J. (2022). Does corporate culture and leadership influence employee work performance? Evidence from the Slovak Republic. *Economic and Managerial Spectrum*, 16(2), 37-48.  
<https://doi.org/10.26552/ems.2022.2.37-48>
- Lenz, R.T. (1981). 'Determinants' of organizational performance: An interdisciplinary review. *Strategic Management Journal*, 2(2), 131-154.  
<https://doi.org/10.1002/smj.4250020204>
- Li, J., Lam, K., & Qian, G. (2001). Does culture affect behavior and performance of firms? The case of joint ventures in China. *Journal of International Business Studies*, 32, 115-131.  
<https://doi.org/10.1057/palgrave.jibs.8490941>

- Lorincová, S., Miklošik, A., & Hitka, M. (2022). The role of corporate culture in economic development of small and medium-sized enterprises. *Technological and Economic Development of Economy*, 28(1), 220-238. <https://doi.org/10.3846/tede.2021.15983>
- Low, J., & Siesfeld, T. (1998). Measures that matter: Non-financial performance. *Strategy & Leadership*, 26(2), 24-38. <https://doi.org/10.1108/eb054615>
- Lund, D.B. (2003). Organizational culture and job satisfaction. *Journal of Business & Industrial Marketing*, 18(3), 219-236. <https://doi.org/10.1108/0885862031047313>
- Michulek, J., Gajanova, L., Krizanova, A., & Nadanyiova, M. (2023). Determinants of improving the relationship between corporate culture and work performance: Illusion or reality of serial mediation of leadership and work engagement in a crisis period? *Frontiers in Psychology*, 14, 1135199. <https://doi.org/10.3389/fpsyg.2023.1135199>
- Mihajlovski, G. (2023). Human resource management in unprofitable companies. *International Journal of Scholarly Research and Reviews*, 2(2), 118-121. <https://doi.org/10.56781/ijssr.2023.2.2.0050>
- Moonen, P. (2017). The impact of culture on the innovative strength of nations: A comprehensive review of the theories of Hofstede, Schwartz, Boisot and Cameron and Quinn. *Journal of Organizational Change Management*, 30(7), 1149-1183. <https://doi.org/10.1108/JOCM-08-2017-0311>
- Nauffal, D., & Nader, J. (2022). Organizational cultures of higher education institutions operating amid turbulence and an unstable environment: The Lebanese case. *Higher Education*, 84(2), 343-371. <https://doi.org/10.1007/s10734-021-00771-y>
- Newman, A., Prajogo, D., & Atherton, A. (2016). The influence of market orientation on innovation strategies. *Journal of Service Theory and Practice*, 26(1), 72-90. <https://doi.org/10.1108/JSTP-02-2015-0044>
- Nguyen, T.H.H., Ntim, C.G., & Malagila, J.K. (2020). Women on corporate boards and corporate financial and non-financial performance: A systematic literature review and future research agenda. *International Review of Financial Analysis*, 71, 101554. <https://doi.org/10.1016/j.irfa.2020.101554>
- Odhiambo, J.O. (2014). *Organizational culture, marketing capabilities, market orientation, industry competition and performance of microfinance institutions in Kenya* [Ph.D. Thesis]. University of Nairobi. [http://erepository.uonbi.ac.ke/bitstream/handle/11295/76112/Odhiambo\\_Organizational%20culture,%20marketing%20capabilities.pdf?sequence=2](http://erepository.uonbi.ac.ke/bitstream/handle/11295/76112/Odhiambo_Organizational%20culture,%20marketing%20capabilities.pdf?sequence=2)
- Odhiambo, O.J., Kibera, F., & Musyoka, R. (2015). Organizational culture, industry competition and performance of microfinance institutions in Kenya. *DBA Africa Management Review*, 5(2). <http://journals.uonbi.ac.ke/damr/article/view/1300/1099>
- Onyango, G., Ondiek, J.O. (2021) Digitalization and Integration of Sustainable Development Goals (SGDs) in Public Organizations in Kenya. *Public Organization Review*, 21, 511-526. <https://doi.org/10.1007/s11115-020-00504-2>
- Opoku, E.O., Hongqin, C., & Aram, S.A. (2022). The influence of organizational culture on employee performance in the banking sector: Evidence from GCB Bank, Ghana. *European Journal of Business and Management Research*, 7(2), 168-175. <https://doi.org/10.24018/ejbm.2022.7.2.1345>
- Petheő, A., Szabó, K., & Nagy, K. Á. (2023). Second-round entrants and winners of the 'Future Hungarian Multinationals' in terms of financial, regional and organizational culture. *Vezetéstudomány/Budapest Management Review*, 54(12), 66-78. <https://doi.org/10.14267/VEZTUD.2023.12.06>
- Quinn, R., & Cameron, K. (1999). *Diagnosing and changing organizational culture*. Wiley Online Library.
- Rokicki, T., Bórawski, P., Bedycka-Bórawska, A., Szeberényi, A., & Perkowska, A. (2022). Changes in logistics activities in Poland as a result of the COVID-19 pandemic. *Sustainability*, 14(16), 10303. <https://doi.org/10.3390/su141610303>
- Saini, S., & Singh, D. (2020). Impact of implementing lean practices on firm performance: a study of Northern India SMEs. *International Journal of Lean Six Sigma*, 11(6), 1005-1034. <https://doi.org/10.1108/IJLSS-06-2019-0069>
- San Park, J., & Kim, T.H. (2009). Do types of organizational culture matter in nurse job satisfaction and turnover intention? *Leadership in Health Services*, 22(1), 20-38. <https://doi.org/10.1108/17511870910928001>
- Schein, E. H. (2010). *Organizational culture and leadership*. John Wiley & Sons.
- Scott, T., Mannion, R., Davies, H., & Marshall, M. (2003). The quantitative measurement of organizational culture in health care: a review of the available instruments. *Health Services Research*, 38(3), 923-945. <https://doi.org/10.1111/1475-6773.00154>
- Soomro, B.A., & Shah, N. (2019). Determining the impact of entrepreneurial orientation and organizational culture on job satisfaction, organizational commitment, and employee's performance. *South Asian Journal of Business Studies*, 8(3), 266-282. <https://doi.org/10.1108/SAJBS-12-2018-0142>
- Striteska, M.K., & Zapletal, D. (2020). The role of corporate culture in performance measurement and management systems. *International Journal of Financial Studies*, 8(4), 1-12. <https://doi.org/10.3390/ijfs8040075>
- Szabó, K., & Aranyosy, M. (2022). Nascent entrepreneurship: A bibliometric analysis and systematic literature review. *Vezetéstudomány/Budapest Management Review*, 53(11), 29-42. <https://doi.org/10.14267/VEZTUD.2022.11.03>
- Szász, L., Demeter, K., Rác, B., & Losonci, D. (2021). Industry 4.0: A review and analysis of contingency and performance effects. *Journal of Manufacturing Tech-*

- nology Management*, 32(3), 667-694.  
<https://doi.org/10.1108/JMTM-10-2019-0371>
- Takeuchi, R., Lepak, D.P., Wang, H., & Takeuchi, K. (2007). An empirical examination of the mechanisms mediating between high-performance work systems and the performance of Japanese organizations. *Journal of Applied Psychology*, 92(4), 1069.  
<https://psycnet.apa.org/doi/10.1037/0021-9010.92.4.1069>
- Tuan, L.T. (2010). Organisational culture, leadership and performance measurement integratedness. *International Journal of Management and Enterprise Development*, 9(3), 251-275.  
<https://doi.org/10.1504/IJMED.2010.037066>
- Van den Berg, P.T., & Wilderom, C.P. (2004). Defining, measuring, and comparing organisational cultures. *Applied Psychology*, 53(4), 570-582.  
<https://doi.org/10.1111/j.1464-0597.2004.00189.x>
- Wadongo, B., & Abdel-Kader, M. (2014). Contingency theory, performance management and organisational effectiveness in the third sector: A theoretical framework. *International Journal of Productivity and Performance Management*, 63(6), 680-703.  
<https://doi.org/10.1108/IJPPM-09-2013-0161>
- Wambugu, L.W. (2014). Effects of organizational culture on employee performance (case study of Wartsila-Kipevu Ii Power Plant). *European Journal of Business and Management*, 6(32), 80-92. <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=4c37b36f-225cdc99a34189d9a109989f14d95a4a>
- Wanjiku, N.A., & Agusioma, N.L. (2014). Effect of organisation culture on employee performance in non governmental organizations. *International Journal of Scientific and Research Publications*, 4(11), 1-12. <https://www.ijsrp.org/research-paper-1114/ijsrp-p3503.pdf>
- Warrick, D.D. (2017). What leaders need to know about organizational culture. *Business Horizons*, 60(3), 395-404.  
<https://doi.org/10.1016/j.bushor.2017.01.011>
- Weech-Maldonado, R., Ghiasi, A., Lord, J., Davlyatov, G., Hearld, L., Zengul, F. D., & Rondeau, K. (2023). Organizational Culture, Human Resource Management Practices, and Blue and Gray Collar Workers' Turnover: The Case of Underresourced Nursing Homes in the USA. In Paliszkievicz, J. & Varoğlu, D. (Eds.), *Management and Organizational Studies on Blue-and Gray-collar Workers: Diversity of Collars* (pp. 181-195). Emerald Publishing Limited.  
<https://doi.org/10.1108/S2051-233320230000008017>
- Wei, Y., Samiee, S., & Lee, R.P. (2014). The influence of organic organizational cultures, market responsiveness, and product strategy on firm performance in an emerging market. *Journal of the Academy of Marketing Science*, 42, 49-70.  
<https://doi.org/10.1007/s11747-013-0337-6>
- Xie, J., Su, R.L.G., & Song, J. (2022). An analytical study of employee loyalty and corporate culture satisfaction assessment based on sentiment analysis. *Frontiers in Psychology*, 13, 971569. <https://10.3389/fpsyg.2022.971569>
- Yousef, K. (2020). Four pillars of cross-cultural management: A systematic literature review. *Vešetűstudomány/Budapest Management Review*, 51(5), 27-38.  
<https://doi.org/10.14267/VEZTUD.2020.05.03>
- Zakari, M., Poku, K., & Owusu-Ansah, W. (2013). Organizational culture and organisational performance: Empirical evidence from the banking industry in Ghana. *International Journal of Business, Humanities and Technology*, 3(1), 95-107. [https://www.ijbhtnet.com/journals/Vol\\_3\\_No\\_1\\_January\\_2013/12.pdf](https://www.ijbhtnet.com/journals/Vol_3_No_1_January_2013/12.pdf)

## Operationalization of variables/questionnaire proxies

Construct	Questionnaire Proxies	Source
Section A: Questions 1 to 6, related to study participants' socio-demographic information. These questions were asked to enable us to place the respondent within the organization. We assigned codify/assign unique IDs to each participant.		
<b>Section B: Questions on Corporate Culture: On a scale of 1-5 where: 1 - Strongly Disagree, 2- Disagree, 3- Somewhat Agree 4- Agree, 5- Strongly Agree, kindly answer the questions below:</b>		
Market Culture	Individual performance; Leadership expectations; Reputation; Goals; Progress Reports; Cross-unit competition; Achievement recognition	(Calciolari & Prenestini, 2022; Joseph & Kibera, 2019; Tuan, 2010)
Adhocracy Culture	Leadership support for new ideas; Innovations; Experimentation, risk taking and dynamism; Encouraging failure; Reward systems for new projects; Work environment design (color, graphics, music, breakout rooms)	(Calciolari & Prenestini, 2022; Joseph & Kibera, 2019; Tuan, 2010)
Bureaucratic Culture	Rules, policies & company guidelines; Shared/common goals; Procedural, structured and formal work environment; Clear instructions on duties & tasks; Basis of success is smooth functionality/operations; Value for consistent and stability	(Calciolari & Prenestini, 2022; Joseph & Kibera, 2019; Tuan, 2010)
Consensual Culture	Open information sharing; employee development prioritization; Investment in relationship with the company; Employee interaction; Company's mission towards social welfare; Collection of employees towards operations; Social interaction events (seminars, games, cocktails and parties)	(Calciolari & Prenestini, 2022; Joseph & Kibera, 2019; Tuan, 2010)
<b>Section C: Questions on Operational Performance: On a scale of 1-5 where: 1 - Strongly Disagree, 2- Disagree, 3- Somewhat Agree 4- Agree, 5- Strongly Agree, kindly answer the questions below:</b>		
Quality Performance	Goods/services (customized, durable, superior); Fees an elasticity; Referrals; Employee Competence; Robust Quality Management Systems; Conformity to national, industrial and corporate specifications	(Bhagwat & Sharma, 2007; De Toni & Tonchia, 2001; Gupta & Gupta, 2020)
Flexibility Performance	Response to Demand; Product variety; New product development; Adaptive decision making; Systems and technology; Employees reaction to change	(Bhagwat & Sharma, 2007; De Toni & Tonchia, 2001; Gupta & Gupta, 2020)
Cost Performance	Selling price; Variable cost; Affordability; Financial goals; Sales and marketing costs	(Bhagwat & Sharma, 2007; De Toni & Tonchia, 2001; Gupta & Gupta, 2020)
Service Performance	Product & service availability; Customer preference; Delivery cycle; Customer feedback/complaint resolution duration; Market research; Senior management interaction with customers	(Bhagwat & Sharma, 2007; De Toni & Tonchia, 2001; Gupta & Gupta, 2020)

Source: own compilation



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## IMPACT OF COVID-19 PANDEMIC ON SMES DIGITAL TRANSFORMATION JOURNEY – SLOVENIAN AND HUNGARIAN EXPERIENCES

### A COVID-19 VILÁGJÁRVÁNY HATÁSA A KIS- ÉS KÖZÉPVÁLLALATOK DIGITÁLIS ÁTALAKULÁSÁRA – SZLOVÉN ÉS MAGYAR TAPASZTALATOK

This article investigates patterns in SMEs' digital transformation journey during the COVID-19 pandemic and whether the lessons learnt from this crisis have influenced their future digital transformation objectives. Following a multiple case study design, semi-structured interviews were conducted with SME owners/managers in Slovenia and Hungary. The analysis within and across cases revealed that the majority of participating SMEs were not digitally ready but still managed to overcome various challenges by adopting or intensifying the use of digital technology. The usefulness of these technologies convinced them to engage more in digital transformation. Although they dealt with similar challenges, their response differed depending on the size and sector. This study contributes to current research by providing a more comprehensive understanding of SMEs' COVID-19 related challenges, their responses to these challenges, and future digital transformation objectives, specifically, their future efforts towards a higher level of digital maturity.

**Keywords:** digitalization, SME, digital transformation, COVID-19 challenges, case study

A cikk áttekintést ad arról, hogy a KKV-k milyen utat jártak be a COVID-19 járvány alatt a digitális átalakulás terén, valamint, hogy a tanulságokat hogyan használták fel a jövőbeli, digitális átalakítási célkitűzéseik meghatározására. A szerzők a többszörös esettanulmány-tervezés (multiple case study design) módszertana alapján 13 szlovén, illetve magyar KKV cégtulajdonosával/menedzserével készítettek féligstrukturált interjúkat. Az esetek egységes, összehasonlító vizsgálata feltárta, hogy a KKV-k többsége nem volt ugyan felkészülve a digitális technológiák használatára, azonban ezek bevezetésével, intenzívebb használatával sikerült leküzdeniük a különböző kihívásokat, illetve a jövőben is ezen az úton terveznek haladni. A vállalatok reakciója a hasonló kihívások ellenére iparágtól és vállalatmérettől függően eltért. A cikk két ország vonatkozásában, átfogóan mutatja be, hogy a KKV-k hogyan látták a digitális technológia szerepét a kihívások legyőzésében és ez hogyan befolyásolta azokat a jövőbeli célokat, erőfeszítéseket, amelyek egy magasabb digitális érettségi szint eléréséhez vezethetnek.

**Kulcsszavak:** digitalizáció, kis- és középvállalat, digitális átalakulás, COVID-19 kihívások, esettanulmány

#### Funding/Finanszírozás:

The authors did not receive any grant or institutional support in relation with the preparation of the study. A szerzők a tanulmány elkészítésével összefüggésben nem részesültek pályázati vagy intézményi támogatásban.

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The article was received: 19. 07. 2023, revised: 03. 11. 2023, 15. 03. 2024 and 11. 04. 2024, accepted: 08. 05. 2024.

A cikk beérkezett: 2023. 07. 19-én, javítva: 2023. 11. 03-án, 2024. 03. 15-én és 2024. 04. 11-én, elfogadva: 2024. 05. 08-án.

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One of the important drivers of business productivity and competitiveness is accelerated digital transformation (Llopis-Albert, Rubio & Valero, 2021). Digital transformation is more than just a technological shift. It can be broadly defined as “a fundamental change process, enabled by the innovative use of digital technologies accompanied by the strategic leverage of key resources and capabilities, aiming to radically improve a business and redefine its value proposition for its stakeholders” (Gong & Ribiere, 2021, p. 12). Intensive and innovative use of digital technology brings opportunities to reduce operating costs, increase work efficiency, strengthen innovation capacity, improve consumer engagement, and provide new opportunities to expand the business to a new market (Ko et al., 2022).

In 2020, during the COVID-19 pandemic, many enterprises experienced supply chain disruptions, declining demand for their products and services, a shortage of inventory, decreased development investment, and government-ordered closures (Mishra & Singh, 2023). However, the enterprises were not affected by the COVID-19 pandemic equally; the hospitality and tourism industries were influenced most severely (Fernandes, 2020). Furthermore, larger enterprises were better able to withstand the challenges posed by COVID-19 as they tend to have access to more resources and have more technological, managerial, and human capabilities. In this respect, SMEs are much more vulnerable (Martin, Romero & Wegner, 2019; Pelletier & Cloutier, 2019). However, due to their small size and structure, SMEs can be much more flexible than larger enterprises. Nevertheless, it takes longer for SMEs to return their business to their state before the crisis (Jeansson & Bredmar, 2019). This vulnerability became apparent after the global crisis in 2008 when SMEs experienced a sudden drop in demand and found themselves in financial difficulties due to lower incomes (OECD, 2009). The effect of the COVID-19 was similar to the 2008 global crisis. According to Juergensen, Guimón & Narula (2020), 71% of Italian SMEs were directly affected by the crisis, while 50% of German SMEs expected longer adverse effects.

Many SMEs responded to the COVID-19 pandemic by making more use of digital technologies (Fehér et al., 2022) as they found that digital technologies enable business continuity even in times of crisis by supporting their key activities such as sales and marketing (Penco, Profumo, Serravalle & Viassone, 2022). In particular, smaller enterprises have begun to use digital technologies that they did not perceive as essential for their business before the crisis, thus allowing them to continue operating even during the lockdowns (Barile & Secundo, 2022). Digital technologies have been used for interaction among employees, with customers, and suppliers, and for work from home, etc. (Alvarez-Torres & Schiuma, 2022). In some cases, digital technologies have even influenced the change in SMEs’ value propositions and business models (Priyono, Morin & Putri, 2020). Unfortunately, some micro and small enterprises had not taken advantage of digital technology as their business only operated in per-

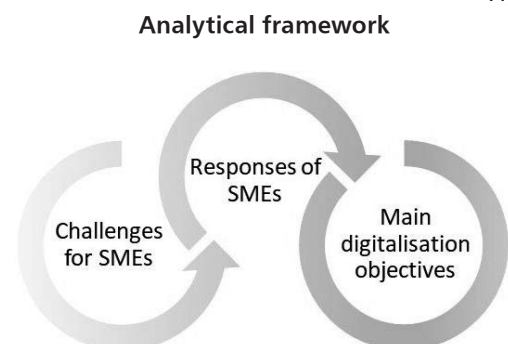
son or did not have the necessary digital infrastructure and skills (Klein & Todesco, 2021).

Digitalization among SMEs is generally lower than that of large enterprises (OECD, 2021). This is not only related to their lack of financial resources, digital skills, and digital competencies but also to their less clear ambitions for digital transformation (Barann, Hermann, Cordes, Chasin & Becker, 2019; Marolt, Zimmermann & Pucihar, 2022). To foster the uptake and use of digital technologies among SMEs various initiatives exist at European and national levels. These initiatives can be divided into financial (tax reduction, financial support), technological (upgrading safety), and human (skills development) (Stamatopoulos et al., 2022). Furthermore, national SME organizations, such as the Chambers of Crafts and Small Businesses, Chambers of Commerce, and digital innovations hubs share know-how on the various aspects of digitalisation with SMEs

In recent years several studies (Humphries, Neilson & Ulyssea, 2020; Klein & Todesco, 2021; Priyono et al., 2020; Mishra & Singh, 2023) have focused on the challenges posed by COVID-19 and how SMEs respond to these challenges. Even though the advancements in digital technologies provide unprecedented opportunities for SMEs, little is known about how they adopt and leverage digital technologies to cope with the consequences of COVID-19 (Winarsih, Indriastuti & Fuad, 2021). Furthermore, the findings are fragmented, neglecting the Eastern European perspective. In addition, although micro enterprises account for over 90% of the total business population in the European Union (OECD, 2021), they are usually overlooked in these studies.

The research aimed to provide insight into what challenges Slovenian and Hungarian SMEs faced during the COVID-19 crisis, how SMEs reacted to these challenges from digitalization and non-digitalization perspectives to ensure business continuity and planned to continue their digital transformation journey. Our analytical framework was built on three pillars presented by Figure 1.

Figure 1



Source: own compilation

Researchers investigated these aspects separately or in pairs but not within a framework (see in Section 2). The bibliometric analysis of 135 papers with the same focus also showed that technology was considered more as a barrier than as part of a sustainable business strategy

(Sharma, Kraus, Talan, Srivastava & Theodoraki, 2023). Based on the 13 cases this article provides a deeper understanding of how SMEs in different type of sector and countries responded to the challenges that emerged with the COVID-19 pandemic and how this reflects in their future digital transformation endeavours. With insights from a more Eastern European perspective and taking into consideration the micro-enterprise point of view, we shed some light on aspects of the topic that have not yet been extensively explored.

## Theoretical background

### COVID-19 and SME challenges

According to the recent literature, SMEs faced various challenges during the crisis caused by COVID-19. The most prominent issue of environmental turbulence, considered in the literature was related to supply chain disruptions (Mishra & Singh, 2023). The fragility of the global supply chains (e.g., delays in delivery, inability of orders fulfilment, excess orders, obstacles in procurement, and difficulties with maintaining inventory) to small businesses are mentioned and analysed in recent literature (Hossain, Akhter & Sultana, 2022; Pratama, Santoso & Mustaniroh, 2021; Semerádová, Weinlich & Svermová, 2022). Hossain et al. (2022) discussed several reasons for supply chain disruptions, e.g., restrictions on goods carrier movements, stricter commodity inspections, air-flight control, and the significant drop in ocean freight demand. Another environmental turbulence refers to how customers responded to the COVID-19 situation. Hossain et al. (2022) listed the prolonged periods of lockdown, movement control, and social and physical distancing as reasons for changes in shopping and consumption patterns. Pratama et al. (2021) observed that customers have begun to stock up on essential commodities and, simultaneously, cut on consumption of non-essential goods and services. Also, a growing body of literature is related to environmental turbulence and how government restrictions have challenged SMEs during the COVID-19 pandemic. Barragan-Quintero, Pareti & Ovalle-Osuna (2021) described how government measures have affected the operations of small enterprises.

The lack of resources is another challenge, and it is mentioned mainly from two aspects in the literature: limited access to capital and lack of human resources (Hossain et al., 2022). Cash flow shortage was the biggest challenge in the survival of SMEs during the pandemic (Hossain et al., 2022; Klein & Todesco, 2021). Besides the decline in cash flow, SMEs also encountered problems with access to government support (Humphries et al., 2020; OECD, 2020). Concerning the lack of human resources, Humphries et al. (2020) and Klein & Todesco (2021) concluded that skill gaps and labour shortages were among the main challenges faced by SMEs during the COVID-19 pandemic.

Various digital technology-related challenges of SMEs are also reported in the literature (Klein & Todesco, 2021; Priyono et al., 2020). While SMEs have access to various digital tools that can support their busi-

ness functions, like cloud applications, and mobile apps or payment solutions, they struggle with their limited resources and digital knowledge gaps that slow down their digitalization (Dethine, Enjolras & Monticolo, 2020). This is exacerbated that SMEs do not properly map their business needs to information technology (IT) needs and there seems to be a strategic misalignment of their business objectives (Pelletier & Cloutier, 2019). Additionally, SMEs are more vulnerable in the context of the IT skills gap and the growing complexity of information ecosystem (OECD, 2021).

### SME responses to COVID-19

Business continuity (business survival) has been widely addressed in recent literature. It can be said that traditional business models were challenged during pandemic times (Semerádová et al., 2022). Adam & Alarifi (2021) advocated that innovation practices are key for the business survival of SMEs. Abed (2021) added that the role of technology in business continuity and business survival is crucial, based on his study of COVID-19 crisis.

External financial support schemes – such as loan guarantees, grants and subsidies, deferred payments, and incentives to commercial banks to expand lending for SMEs were offered during COVID-19 situation (Hossain et al., 2022). Adam & Alarifi (2021) analysed the effectiveness of external financial support on business survival and found that external financial support schemes have a strengthening, moderating impact on business survival. However, one issue, regarding the effectiveness of financial support is the SMEs capability to apply for these grants and subsidies. Khlystova, Kalyuzhnova & Belitski (2022) further emphasized that support policies might have had a very narrow focus and excluded certain sectors or sizes of SMEs.

To better adapt to the changes posed by COVID-19, SMEs also responded by making changes in their organisation. They have digitalized various organizational functions to adapt to COVID-19 situation (Priyono et al., 2020). Fletcher & Griffiths (2020) highlighted the importance of digital maturity as those enterprises are more flexible, hence able to implement the necessary changes more successfully. Furthermore, they have reorganised and digitalized their work to manage productivity and improve team communication, especially during severe COVID-19 restrictions. Technology is an essential facilitator for the organization of remote work (Barabaschi, Barbieri, Cantoni, Platoni & Virtuani, 2022), but the adoption of work from home requires changes in leadership style and change of mindset of the enterprise as a whole (Stoker, Garretsen & Lammers, 2022). To improve productivity, managers must communicate business objectives and regularly meet employees to engage them and receive feedback (Barabaschi et al., 2022).

Supply chains were also affected by the lockdowns and restrictions caused by the Covid-19 pandemic. Marconatto, Teixeira, Peixoto & Faccin (2022) emphasized the importance of supplier and customer diversification before and during the COVID-19 pandemic. In the context of cus-

customer relations, Penco et al. (2022) investigated how entrepreneurial orientation (innovativeness, proactiveness, risk-taking, competitiveness) can influence the adaptation to situations forced by external stimuli e.g., COVID-19 pandemic. They observed that all enterprises turned to digital transformation as a reactive or proactive response. In the context of supplier relations, Ramanathan, Aluko & Ramanathan (2021) suggested that to mitigate supply chain disruption, SMEs need to collaborate with other small businesses in the supply chain to meet the demand and look for alternative business opportunities.

### SMEs' digital transformation objectives

Digital transformation plays a crucial role in responding to the challenges of the COVID-19 pandemic. It is unclear what the state of the economy and society will be after this crisis as new digital technologies have been introduced to businesses (Akpan, Soopramanien & Kwak, 2020). The lessons and experiences could influence SME business continuity and resilience (Bai, Quayson & Sarkis, 2021). Unfortunately, SMEs face many challenges when dealing with digitalization. Although many SMEs are keen to adopt new digital technologies, they often lack clear digital transformation objectives aligned with their business needs and investment capabilities. Investment in digital infrastructure (hardware and software) alone is not enough to enhance the digital capabilities, or the business performance of enterprises (Matarazzo, Penco, Profumo & Quaglia, 2021). ICT savviness of employees (Priyono et al., 2020;) and adequate ICT skills that drive innovation (Alam et al., 2022) are critical requirements for successful ICT investments and digitalization projects (Endrodi-Kovács & Stukovszky, 2021).

### Methodology

A qualitative research approach was used to gain insights into the phenomenon under study (Yin, 2009) as limited literature has been published on this specific topic (Myers & Newman, 2007). Hence, to explore the challenges, responses, and future goals of digital transformation, a multiple case study was conducted. Moreover, as the purpose of the study was also to explore whether there are certain patterns in the digital transformation journey of SMEs, case studies are more appropriate than quantitative approaches (Doern, Williams & Vorley, 2018).

Yin (2009) suggests a case study protocol as an important component in asserting the reliability of the case study research. The Case study protocol is used as the main guideline for conducting case studies involving multiple researchers from different countries participating in the research (Malmqvist, Hellberg, Möllås, Rose & Shevlin, 2019), in this case researchers from Hungary and Slovenia. The Case study protocol defines the focus of the case study, the means of data collection, the case selection criteria, the questions and the report's structure, and the analysis of the results. The protocol serves as a guideline for researchers to collect data, especially in multiple-case studies systematically.

### Case study design

First, an interview instrument was developed according to the theoretical considerations. The semi-structured questionnaire was developed to capture the SME background, COVID-19 challenges, COVID-19 digital and non-digital response, and the main future digital transformation objectives. The researchers from both countries met for three sessions, extensively discussing the clarity and order of the questions (see general interview questions in the Appendix). The final version of the interview instrument was translated into Slovenian and Hungarian. The interview guideline was developed with the interview instrument to inform the interviewer on how to prepare and conduct the interviews.

Then the SMEs sample was determined. The sample included relevant cases from micro, small, and medium-sized enterprises as defined by the European Union based on (1) number of employees and/or (2) turnover or balance sheet total (in million euros). In Slovenia and Hungary, the manufacturing and service sector enterprises from different industries that are not primarily ICT oriented and had successfully adapted their business during the COVID-19 crisis were considered. At least six cases were selected per country, with at least one SME from the manufacturing sector and one SME from the service sector per SME size (micro, small and medium-sized enterprises). Annex 2 in the Appendix provides details on the SME selection criteria.

### Data collection

Only researchers who participated in the case study design were involved in the data collection. Upon scheduling an appointment for an interview, the researcher informed the interviewee about the topic and sent them an invitation letter and an outline of questions in advance. Each researcher had to prepare for the interview. This included going through the questionnaire again and collecting available information about the SME under study. The following sources were of particular interest: (1) enterprise websites; (2) annual reports; (3) other material available online about the enterprise. Based on the interview guideline, the semi-structured interviews were conducted with high-level SME decision-makers via online collaboration tools or in person where possible. The interviews were conducted between May and August 2021 and involved 13 SMEs from both countries, following Miles & Huberman's (1994) recommendation not to exceed 15 cases as this may complicate the analysis. The presentation of the participating SMEs can be found in Annex 3 in the Appendix.

The interviews were audio taped, and the researchers also took notes on observations during the interviews. Immediately after the interview, a clean verbatim transcript was made based on the audio file. Participants were encouraged to provide feedback on the transcript of their interview. The interview transcript, the material collected before the interview, and the researcher's notes made in Slovenian or Hungarian helped the researcher involved in the case to prepare a comprehensive report in English. This approach allowed us to have a better overview of all the cases and a cross-case analysis.



## Data analysis

Since the reports were written in English and the rest of the text was either in Slovenian or Hungarian, two researchers from each country participated in the coding process. A mixed procedure of deductive-inductive content analysis was used. Based on theory and previous research, the categories and subcategories were determined in advance. First, the researchers carefully reviewed all the reports and then met to discuss whether the reports contained text passages relevant to the defined categories and to create a coding scheme. Based on their initial impressions, the researchers decided to carefully read the material written in their mother tongue (transcripts, other available material) to minimise the possibility of researcher bias in writing the report. Then they met again and updated the coding scheme by adding coding rules if there were problems in delineating between categories. Then two researchers from each country carefully read the case narratives and started coding based on the coding scheme. After a week, they met again to discuss new codes that emerged inductively from the data. Several interactions and modifications occurred before the coding scheme was finalised.

Two case narratives were selected to test the coding scheme, one Slovenian, coded by two Slovenian researchers, and one Hungarian, coded by two Hungarian researchers. To ensure objectivity and accuracy in coding, each pair of researchers worked independently on the same case and then compared and discussed their classifications. Once the pair had reached a coding consistency the coding scheme was applied by one researcher from the pair to all case narratives from the respective country. The coding results were then quantified in the form of tables for each country and finally merged from both countries to compare and interpret the data.

## Findings

### Challenges posed by COVID-19

SMEs have experienced different challenges during the pandemic time. The challenges are detailed in Table 1, where the number of asterisks indicates the number of SMEs.

First, the SMEs challenges related to environmental turbulence were identified. Several SMEs had to close temporarily in the first wave of COVID-19 pandemic. When they could open again, they faced additional challenges. Among others, they had issues with keeping the proper physical distance between the customers. Insurance-Brk spent too much time on cleaning and disinfection. Issues with closed borders, travelling restrictions, and managing the related administration caused additional problems for manufacturing SMEs. Fruit-and-Veg highlighted difficulties in importing seasonal workers, while Food-Supl stressed problems in procurement from neighbouring countries. Furthermore, Food-Supl severely struggled from supply chain interruptions by its European partner's Asian subcontractor due to closed borders, while delays in procurement of materials and raw ingredients were less severe in the case of Alu-Treat, and Choco. Gate-and-Parking experienced slowdown and failures in their partner processes due to the home-office administration. In the case of Fruit-and-Veg the closed borders resulted in wasted/spoiled food and additional costs as the food had to be disposed of in accordance with the legislation. Fruit-and-Veg experienced an increase in online sales during lockdown, but it decreased after the lockdown when customers returned to their routine and started shopping in supermarkets again. Reverse-Vending experienced that environmental awareness for bottled drinks was intensified by the pandemic. Furthermore, some products or services were more required than before, for example, health-related products to boost the immune system at Food-Supl and caskets at Wood-Proc. Loss of customers affected fewer SMEs. For instance, Fashion pointed out that the demand for elegant clothes decreased due to the pandemic.

Second, the findings show that COVID-19 increased SMEs' vulnerability due to the lack of resources. For example, Choco reported financial reserves available to cover salaries for only two months as their revenue had decreased significantly while the Reverse-Vending reported an additional financial burden, as they needed to increase salaries to avoid employee churn. The lack of human capital was also found to be a challenge for SMEs.

Table 1

Challenges posed by COVID-19

Code	Sub-code	Number of SMEs compared by			
		Type of sector		Country	
		Manufacturing	Service	Slovenia	Hungary
Environment turbulence	Government regulations and guidelines	***	****	****	***
	Fragility of the supply chain	***	**	****	*
	Changes in customer buying pattern	*****	*****	*****	*****
	Loss of customers	**	**	*	****
Lack of resources	Financial	***	****	**	****
	Human capital	*	**	**	**
Digital technology issues	Lack of digital skills & knowledge	**	**	**	**
	Inadequate digital technology	*	**	**	*
	Underutilization of digital technology	*	***	***	*

Source: own compilation

The reasons were various for SMEs, including employee's absence due to illness or quarantine, seasonal workers could not come back after they went home, or employees leaving as they were not feeling valued during the lockdown.

Third, we observed that SMEs had problems with digital technology use. Several SMEs have admitted the lack of digital skills and knowledge. For example, Reverse-Vending reported a lack of digital skills in managing online interactions, while Choco in the areas of digital marketing and cybersecurity and Fruit-and-Veg in IT skills in general. SMEs were quite specific about concerns regarding inadequate digital technologies. Choco mentioned an outdated webstore, while Fruit-and-Veg the need for a new ERP system as the existing one does not meet their needs anymore. The underutilization of digital technology was also noticeable in the daily operations of the SMEs. For example, decision-making in Beauty is still based mainly on intuition, despite having their software for data analytics and data collection from the webstore, salon customers, and social media. Similarly, Food-Supl has all the necessary digital technologies in place but noticed the insufficient use of the digital technologies for reporting and monitoring their operations. At Fashion, the communication with partners took place in person or by phone before the pandemic.

The Slovenian interviewees mentioned additionally maintaining employees' perception of being valued during lockdown was one of the main challenges for Beauty

salon and Fruit & vegetable distributor managers. Food supplement producer had difficulties in directing employees' attention toward the generation of new and useful ideas. Even though they have had regular online meetings they noticed the decline in the innovativeness of their employees during the time they worked from home. Two SMEs noticed reduced employee enthusiasm during an uncertain, unprecedented period. Motivating employees for learning was also difficult for Fruit & vegetable distributor who reported that even with pre-paid registration fees the employees were not willing to take a digital marketing course.

Lack of financial resources was more prevalent in micro-enterprises than in larger SMEs. The changes in customer buying patterns affected both. The other challenges mainly concerned the larger SMEs. When comparing SMEs by country and sector type, we also encountered some differences in the way they experienced different challenges. The first difference relates to environmental turbulence. Here we only noticed differences between countries. We found that supply chain problems were related to the international movement of goods. Slovenian SMEs saw themselves at risk mainly because they relied on a just-in-time inventory system. In addition, the shortage of raw materials led to increased competition for scarce resources. Hungarian SMEs, on the other hand, were not as affected by the supply chain fragility but struggled with the loss of customers to a greater extent. Customers left three SMEs due to the issues in the automotive sector.

Table 2

Types of SMEs response to COVID-19

Code	Sub-code	Number of SMEs compared by			
		Type of sector		Country	
		Manufacturing	Service	Slovenia	Hungary
Internal operational changes	Adaptation of processes that were not possible to execute at home	***	**	****	*
	Work from home	*****	****	*****	****
	Work in a more agile way, employees self-organizing	***	*	**	**
	Implementation of technological innovations (non-digital)	*	*	**	-
	Change of internal business processes (digital, except for remote work)	****	*	**	***
	Management support (culture, motivation, ...)	***	-	*	**
Digitalization of customer touchpoints	Intensify digital marketing campaign	***	***	****	**
	Intensify communication via social media (Facebook, ...)	***	***	****	**
	Establish/intensify online sales (web store, specific websites, ...)	**	***	****	*
	Intensify communication via online communication channels (Zoom, Teams)	***	**	*	****
Non-digital changes in supplier relations	New/additional suppliers (also partnership with a competitor for effective order delivery)	**	***	****	*
	New ways of collaborating with existing partners	*	-	*	-
Changes in value proposition	Entering new market segment (addressing new market opportunities)	*	****	****	*
	New/optimized offerings	***	****	****	***
Take advantage of government support	Applying for government assistance programs	***	***	****	**
	Asking for additional support from various government bodies	**	**	**	**

Source: own compilation

The demand decreased for spare parts produced by CNC, moulded plastic components, and car or travel insurances. Another difference concerns human resources. According to the results, it was more pronounced in the service sector. While the SMEs in the service sector faced prolonged closures or restrictions on their operations, their employees felt useless. In addition, businesses that relied on international or seasonal labour faced challenges due to travel restrictions and the unavailability of foreign labour. Insufficient use of digital technology is also a challenge where differences were identified. While in Slovenian service SMEs pandemic served as a catalyst for digital transformation, Hungarian service SMEs were satisfied with the digital solutions already implemented. In addition, management related challenges were found in Slovenian SMEs.

### Responses to COVID-19

Even though the SMEs dealt with different combinations of the above-identified challenges, they tried their best to continue their business. Their responses are detailed in Table 2, where the number of asterisks indicates the number of SMEs.

First, we identified several internal operational changes that enabled SMEs' continuous work. This includes setting up a working environment that was adapted to the COVID-19 restrictions by either adapting the existing working environment in the premises of SMEs or enabling work from home. SMEs also reported more agile ways of working to react to changes in customer behaviour as well as enhance communication or collaboration among employees or partners. For instance, Reverse-Vending reported changes in organizational structure, resulting in a less hierarchical organisation, to simplified and more effective communication. Another response that needs to be mentioned is the role of management support. Even though Food-Supl engaged employees in regular meetings, a decrease in creativity and innovative thinking was noticed which resulted in a hybrid mix of remote and on-site work arrangements as soon as it was possible. Digital technology was not used by SMEs just for establishing remote work but also to change other internal business processes. For example, CNC-Proc has intensified the use of SharePoint and Reverse-Vending has started to use a collaborative version of project management software to promote collaboration. Implementation of technological (non-digital) innovations of organizational functions was also evident. For instance, Choco upgraded its production process and integrated energy-saving equipment.

Second, we encountered the digitalization of customer touchpoints as another response to challenges situation emerged from customers' side. According to our findings, SMEs have predominantly focused on customer relations as they are of crucial importance in SME digitalization and due to drastic changes in customer buying behaviour. By intensifying the use of digital technology, SMEs have started to promote their brand more extensively online, were able to sell their products/services online, and intensify online communication via social media and other

online communication channels. For example, Fashion started to advertise the enterprise via social media daily, Beauty started to engage its customers by posting live videos, and Therapist offered live individual or group online training for end customers. As a response to Covid-19 related challenges, two SMEs have managed to establish a webstore and the other three intensified online sales via their existing webstore.

Third, we discovered that the digitalization of the supply chain was not needed as it was already at a satisfactory level and thus was not drastically affected by the COVID-19 situation. Nevertheless, other, non-digital responses were evident in relations with suppliers, including searching for an alternative source of supply and collaboration with other enterprises to meet the demand. For instance, Food-Supl ran out of jars, and they were not able to order them from a supplier from Italy. Therefore, they found a new supplier who was able to deliver very similar jars and inform customers that their products would be packaged differently but with the same content. On the other hand, Alu-Treat had a lot of problems finding additional suppliers. Therefore, they bought the missing material from competitors and vice versa.

Fourth, we encountered changes in the value proposition. SMEs have either entered a new market segment or introduced new/optimized existing offerings. For example, Fashion has started to sell face masks and medical clothing while Therapist started to offer online counselling services that help enterprises to improve the mental and physical health and well-being of their employees. On the other hand, Food-Supl and Wood-Proc only changed their offering. For instance, Food-Supl developed a new line of food supplements designed to treat Covid-19 symptoms (vitamin D and C, etc.).

Finally, some small and medium-sized SMEs have taken advantage of government support, mainly to cope with the lack of resources. Two different government supports were identified. Besides applying for financial government support, SMEs have also asked for non-financial government support. For example, Fruit-and-Veg and Food-Supl have asked the Chamber of Commerce to speed up customs procedures at the borders.

Looking from the country and sector perspectives we encountered several differences in the response of SMEs to the COVID-19 situation. First, there are differences in the internal operational changes they have made. Slovenian SMEs reorganised their operation with prolonged work hours, newly created employee groups, and investing in production technology. Hungarian SMEs were more focused on reorganizing non-production processes such as planning, development, etc. Some operational changes were more pronounced in production SMEs. For example, production SMEs gave their employees more autonomy in managing their work schedules and tasks and enabled them to communicate more effectively across functions. They have also digitalized their internal processes to better support their day-to-day activities and the management also provided better support. This indicates that the nature of on-premises work required from produc-

tion SMEs more adaptability of their internal processes. The digitalisation of the customer touchpoints is another response where we found differences. While Slovenian SMEs have intensified their online marketing, Hungarian SMEs have started to use online communication channels to interact and provide their services through these channels. Dysfunctionalities of the automotive sector spilt over the life of three SMEs, so they were pushed to acquire new customers and make contracts with them online due to governmental regulations. Slovenian SMEs have sought new suppliers and partners to a greater extent which makes sense as the vulnerability of the supply chain was more evident in this group of SMEs. Slovenian SMEs have also entered new markets to survive and attract new customers. This also explains why they did not highlight the loss of customers as a challenge. SMEs in both countries also reacted differently to government support. This was expected as each country took its approach to providing support for SMEs. Surprisingly, none of micro enterprises was able to apply for government support.

**Main digital transformation objectives**

Based on experiences during the pandemic, SMEs have also acknowledged opportunities for digital transformation in the future as highlighted in Table 3 (the number of asterisks indicates the number of SMEs).

product or service experience in line with customers' needs while Hungarian SMEs are lagging in this respect. However micro enterprises struggled to raise the financial resources, majority of examined micro enterprises wanted to increase its spending in digital technology and more than half of them aimed to improve digital skills as well. Despite their small size, they want to go one step further in digitalisation.

**Discussion**

Our research findings show that Slovenian and Hungarian SMEs face similar challenges as the rest of SMEs in other parts of Europe. Our findings support Barragan-Quintero et al. (2021) by highlighting the difficulties in complying with ever-changing government regulations. Furthermore, our findings provide additional support for challenges related to the fragility of the supply chain highlighted by Hossain et al. (2022). Moreover, our findings in relation to changes in customer buying behaviour mirror the examples mentioned by Pratama et al. (2021). As in the literature, we also found that the lack of financial resources (Hossain et al., 2022; Klein & Todesco, 2021) and the lack of human capital (Humphries et al., 2020; Klein & Todesco, 2021) remain important challenges for SMEs survival. We also observed that SMEs had problems with

Table 3

SMEs main digital transformation objectives

Code	Sub-code	Number of SMEs compared by			
		Type of sector		Country	
		Manufacturing	Service	Slovenia	Hungary
Digital transformation objectives	Increase spending on digital technology	*****	*****	*****	*****
	Improve digital skills	*****	*****	*****	****
	Explore possibilities for improved value proposition	***	****	*****	*
	Foster digital culture	**	***	***	**

Source: own compilation

According to our findings, several SMEs are planning to increase spending on digital technology and improvement of digital skills. For instance, Beauty is planning to invest in the digitalization of supply chain processes, Fruit-and-Veg identified the need for a new ERP system, while Fashion wants to extend their monitoring processes. All SMEs that are planning to invest in new digital technology also pointed out the need to continuously develop digital skills as they are required to leverage digital technology to a greater extent in the future. For example, Beauty pointed out that openness for data-driven decision-making needs additional data analytics skills, Gate-and-Parking aims to improve managerial digital skills.

When identifying differences in SMEs future digital transformation objectives we observed the major difference between Slovenian and Hungarian SMEs in exploring opportunities to improve the value proposition. It seems that Slovenian SMEs see the potential in digitalising products or services and consider offering a richer

digital technology use (Klein & Todesco, 2021; Priyono et al., 2020), mainly because of their limited digital skills, inadequate use of digital technology, and the use of inappropriate digital technology.

The above-mentioned challenges triggered a number of responses. These include creating a work environment adapted to the COVID-19 restrictions by either adapting the existing work environment in the premises of SMEs or enabling work from home (Barabaschi et al., 2022) resulting in a hybrid mix of remote and on-site working arrangements (Faulds & Raju, 2021; Pataki-Bittó & Kapusy, 2021). The digitalization of customer touchpoints is another response to drastic changes in customer buying behaviour (Franco, Godinho & Rodrigues, 2021). SMEs have started to increasingly promote their brand online, were able to sell their products/services online and intensify online communication via social media and other online communication channels, which has also been emphasised in the recent literature (Barragan-Quintero et



al., 2021; Penco et al., 2022). Due to the change in customer buying behaviour SMEs have changed their value proposition by either entering a new market segment or introducing new/optimised existing offerings. To cope with the lack of resources, our findings further emphasize the importance of government support offered to SMEs (Anwar, Tajeddini & Ullah, 2020; Wang, Goh, Sornette, Wang, & Yang, 2021).

During COVID-19 situation the participating SMEs were pushed to make several changes that they probably would not have made otherwise. For most participating SMEs the lessons learned and experiences gained during the COVID-19 situation have influenced their future digitalization endeavours. Nevertheless, they all agree that the pace of their digital transformation is slowing down. This slowdown is worrying and requires new approaches to boost progress. In this context it is crucial to highlight heterogeneity of SMEs which should be taken into account by policymakers and other stakeholders when developing strategies, initiatives, and solutions. Our findings underscore the significance of considering factors such as size, sector, and digital maturity. Micro-enterprises constitute a substantial segment of the business landscape, yet their distinct characteristics and challenges often receive less attention. This study points out that the assumption that policies and strategies designed for small and medium-sized enterprises are universally applicable to micro-enterprises may not be accurate. The findings of the comparison between manufacturing and service SMEs reveal a lack of insight into the supply chain among manufacturing SMEs. To avoid disruptions in the flow of goods the use of digital technology to improve inventory tracking should be one of the priorities when promoting digital transformation in this sector. Regarding digital maturity, less digitally mature SMEs could benefit from accessible training programs, financial incentives, and simplified regulations to encourage essential digital adoption. In contrast, more digitally advanced SMEs could thrive with the creation of an innovation-friendly ecosystem to accelerate the adoption of advanced technologies.

## Conclusion

This article provides a deeper understanding of how SMEs' response to the challenges of the COVID-19 pandemic is impacting their future digital transformation efforts. By analysing SMEs using the more complex framework, our study reveals that while SMEs have taken some steps towards digitalisation during COVID-19 and expressed their willingness to invest further, they do not intend to do as intensively as during COVID-19. Therefore, our findings not only highlight the importance of implementing tailored strategies and support measures for SMEs but also the need to consider other specificities such as size, industry, and digital maturity to accelerate the digitalisation process.

Furthermore, we found that the unexpected events have created a very uncertain environment for most SMEs. The way SMEs responded to the uncertainty depended on their organisational readiness, reflected in

managerial support, accessible financial resources, and skilled employees. Unfortunately, SMEs have shortcomings in all of these areas. Their response also depended on the level of their familiarity with digital technology. More digitally mature enterprises were quicker to implement the necessary changes. Due to the various restrictions related to COVID-19, the digital response prevailed over the non-digital response. In terms of digital response, two general digitalisation patterns were observed. The majority of SMEs focus on the digitalisation of customer relations by increasingly using digital channels and setting up e-commerce platforms to improve customer accessibility. In addition, these SMEs have also digitalised some internal business processes, mainly by introducing cloud-based collaboration platforms and setting up digital document management systems for a seamless exchange of documents and information across departments. Only more digitally mature SMEs have taken more concrete steps by automating repetitive and time-consuming tasks with digital tools and software or have started to collect and analyse data to make more informed decisions.

Given the complexity of the phenomena under the research, we shed some light only from the perspective of the 13 SMEs. As the participating SMEs do not represent all industries and sectors, further research can be conducted to extend these findings. In addition, to increase data coverage and validity, the range of the interviews can be expanded to different job positions in enterprises. Even though the insights from two countries are provided, and some general digitalization patterns are identified, the findings from other countries are needed to understand better SME practices that may lead to better future resilience. Finally, the generalizability of the identified SMEs' digital transformation journey patterns during the pandemic should be tested.

## References

- Abed, S.S. (2021). A literature review exploring the role of technology in business survival during the Covid-19 lockdowns. *International Journal of Organizational Analysis*, 30(5), 1045–1062.  
<https://doi.org/10.1108/ijoa-11-2020-2501>
- Adam, N.A., & Alarifi, G. (2021). Innovation practices for survival of small and medium enterprises (SMEs) in the COVID-19 times: the role of external support. *Journal of Innovation and Entrepreneurship*, 10(1), 1–22.  
<https://doi.org/10.1186/s13731-021-00156-6>
- Akpan, I.J., Soopramanien, D., & Kwak, D.H. (2020). Cutting-edge technologies for small business and innovation in the era of COVID-19 global health pandemic. *Journal of Small Business & Entrepreneurship*, 33(6), 607–617.  
<https://doi.org/10.1080/08276331.2020.1799294>
- Alam, K., Ali, M.A., Erdiaw-Kwasie, M.O., Murray, P.A., & Wiesner, R. (2022). Digital Transformation among SMEs: Does Gender Matter? *Sustainability (Switzerland)*, 14(1), 535.  
<https://doi.org/10.3390/SU14010535/S1>

- Alvarez-Torres, F.J., & Schiuma, G. (2022). Measuring the impact of remote working adaptation on employees' well-being during COVID-19: insights for innovation management environments. *European Journal of Innovation Management*, 27(2), 608–627. <https://doi.org/10.1108/EJIM-05-2022-0244>
- Anwar, M., Tajeddini, K., & Ullah, R. (2020). Entrepreneurial finance and new venture success - the moderating role of government support. *Business Strategy & Development*, 3(4), 408–421. <https://doi.org/10.1002/BSO2.105>
- Bai, C., Quayson, M., & Sarkis, J. (2021). COVID-19 pandemic digitization lessons for sustainable development of micro-and small- enterprises. *Sustainable Production and Consumption*, 27, 1989–2001. <https://doi.org/10.1016/J.SPC.2021.04.035>
- Barabaschi, B., Barbieri, L., Cantoni, F., Platoni, S., & Virtuani, R. (2022). Remote working in Italian SMEs during COVID-19. Learning challenges of a new work organization. *Journal of Workplace Learning*, 34(6), 497–512. <https://doi.org/10.1108/JWL-10-2021-0132/FULL/PDF>
- Barann, B., Hermann, A., Cordes, A.K., Chasin, F., & Becker, J. (2019). Supporting digital transformation in small and medium-sized enterprises: a procedure model involving publicly funded support units. In *Proceedings of the Annual Hawaii International Conference on System Sciences* (pp. 4977–4986). HICSS. <https://doi.org/10.24251/HICSS.2019.598>
- Barile, D., Secundo, G.D.V., & Del Vecchio, P. (2022). Food 4.0 for competing during the COVID-19 pandemic: experimenting digitalization in family firms. *European Journal of Innovation Management*, 27(4), 1381–1402. <https://doi.org/10.1108/EJIM-07-2022-0373>
- Barragan-Quintero, R.V., Pareti, S., & Ovalle-Osuna, O.O. (2021). The impact of digitalization in the Latin American wine industry during the Covid-19 Pandemic. In *2021 IEEE International Conference on Technology and Entrepreneurship (ICTE)* (pp. 1–6), Kaunas, Lithuania. <https://doi.org/10.1109/ICTE51655.2021.9584612>
- Dethine, B., Enjolras, M., & Monticolo, D. (2020). Digitalization and SMEs' export management: impacts on resources and capabilities. *Technology Innovation Management Review*, 10(4), 18–34. <https://doi.org/10.22215/TIMREVIEW/1344>
- Doern, R., Williams, N., & Vorley, T. (2018). Special issue on entrepreneurship and crises: business as usual? An introduction and review of the literature. *Entrepreneurship & Regional Development*, 31(5–6), 400–412. <https://doi.org/10.1080/08985626.2018.1541590>
- Endrodi-Kovács, V., & Stukovszky, T. (2021). The adoption of industry 4.0 and digitalisation of Hungarian SMEs. *Society and Economy*, 44(1), 138–158. <https://doi.org/10.1556/204.2021.00024>
- Faulds, D.J., & Raju, P.S. (2021). The work-from-home trend: An interview with Brian Kropp“. *Business Horizons*, 64(1), 29–35. <https://doi.org/10.1016/J.BUSHOR.2020.10.005>
- Fehér, P., Kő, A., Kovács, T., Óri, D., Szabó, I., Szabó, Z., & Varga, K. (2022). The impact of the COVID-19 pandemic on the digitalisation practices of Hungarian companies. In *41 St International Conference on Organizational Science Development* (pp. 217–228), University of Maribor.
- Fernandes, N. (2020). Economic effects of coronavirus outbreak (COVID-19) on the world economy. *SSRN Electronic Journal*. <https://doi.org/10.2139/SSRN.3557504>
- Fletcher, G., & Griffiths, M. (2020). Digital transformation during a lockdown. *International Journal of Information Management*, 55, 102185. <https://doi.org/10.1016/j.ijinfomgt.2020.102185>
- Franco, M., Godinho, L., & Rodrigues, M. (2021). Exploring the influence of digital entrepreneurship on SME digitalization and management. *Small Enterprise Research*, 28(3), 269–292. <https://doi.org/10.1080/13215906.2021.1938651>
- Gong, C., & Ribiere, V. (2021). Developing a unified definition of digital transformation. *Technovation*, 102, 102217. <https://doi.org/10.1016/J.TECHNOVATION.2020.102217>
- Hossain, M.R., Akhter, F., & Sultana, M.M. (2022). SMEs in Covid-19 crisis and combating strategies: a systematic literature review (SLR) and a case from emerging economy. *Operations Research Perspectives*, 9, 100222. <https://doi.org/10.1016/J.ORP.2022.100222>
- Humphries, J.E., Neilson, C., & Ulysea, G. (2020). The Evolving Impacts of COVID-19 on Small Businesses Since the CARES Act. *SSRN Electronic Journal*. <https://doi.org/10.2139/SSRN.3584745>
- Jeansson, J., & Bredmar, K. (2019). Digital Transformation of SMEs: Capturing Complexity. In A. Pucihar, M. Kljajić Borštnar, R. Bons, J. Seitz, H. Cripps, & D. Vidmar (Eds.), *32nd Bled eConference. Humanizing technology for a sustainable society* (pp. 523–541). University of Maribor Press.
- Juergensen, J., Guimón, J., & Narula, R. (2020). European SMEs amidst the COVID-19 crisis: assessing impact and policy responses. *Journal of Industrial and Business Economics*, 47(3), 499–510. <https://doi.org/10.1007/S40812-020-00169-4/TABLES/2>
- Khlystova, O., Kalyuzhnova, Y., & Belitski, M. (2022). The impact of the COVID-19 pandemic on the creative industries: A literature review and future research agenda. *Journal of Business Research*, 139, 1192–1210. <https://doi.org/10.1016/j.jbusres.2021.09.062>
- Klein, V.B., & Todesco, J.L. (2021). COVID-19 crisis and SMEs responses: The role of digital transformation. *Knowledge and Process Management*, 28(2), 117–133. <https://doi.org/10.1002/KPM.1660>
- Ko, A., Fehér, P., Kovacs, T., Mitev, A., & Szabó, Z. (2022). Influencing factors of digital transformation: management or IT is the driving force? *International Journal of Innovation Science*, 14(1), 1–20. <https://doi.org/10.1108/IJIS-01-2021-0007>

- Llopis-Albert, C., Rubio, F., & Valero, F. (2021). Impact of digital transformation on the automotive industry. *Technological Forecasting and Social Change, 162*, 120343. <https://doi.org/10.1016/J.TECHFORE.2020.120343>
- Malmqvist, J., Hellberg, K., Möllås, G., Rose, R., & Shevlin, M. (2019). Conducting the pilot study: a neglected part of the research process? methodological findings supporting the importance of piloting in qualitative research studies. *International Journal of Qualitative Methods, 18*. <https://doi.org/10.1177/1609406919878341>
- Marconatto, D.A.B., Teixeira, E.G., Peixoto, G.A., & Faccin, K. (2022). Weathering the storm: what successful SMEs are doing to beat the pandemic. *Management Decision, 60*(5), 1369–1386. <https://doi.org/10.1108/MD-11-2020-1507>
- Marolt, M., Zimmermann, H.D., & Pucihar, A. (2022). Social media use and business performance in SMEs: the mediating roles of relational social commerce capability and competitive advantage. *Sustainability, 14*(22), 15029. <https://doi.org/10.3390/SU142215029>
- Martin, D., Romero, I., & Wegner, D. (2019). Individual, organizational, and institutional determinants of formal and informal inter-firm cooperation in SMEs. *Journal of Small Business Management, 57*(4), 1698–1711. <https://doi.org/10.1111/JSBM.12445>
- Matarazzo, M., Penco, L., Profumo, G., & Quaglia, R. (2021). Digital transformation and customer value creation in Made in Italy SMEs: A dynamic capabilities perspective. *Journal of Business Research, 123*, 642–656. <https://doi.org/10.1016/J.JBUSRES.2020.10.033>
- Mishra, R., & Singh, R.K. (2023). A systematic literature review on supply chain resilience in SMEs: Learnings from COVID-19 pandemic. *International Journal of Quality & Reliability Management, 40*(5), 1172–1202. <https://doi.org/10.1108/IJQRM-03-2022-0108>
- Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook*. SAGE Publications Inc.
- Myers, M.D., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organization, 17*(1), 2–26. <https://doi.org/10.1016/j.infoandorg.2006.11.001>
- OECD. (2009). *The Impact of the Global Crisis on SME and Entrepreneurship Financing and Policy Responses*. Centre for Entrepreneurship, SMEs and Local Development Contribution to the OECD Strategic Response to the Financial and Economic Crisis. OECD.
- OECD. (2020). *Coronavirus (COVID-19): SME policy responses*. OECD Publishing. <https://www.oecd.org/coronavirus/policy-responses/coronavirus-covid-19-sme-policy-responses-04440101/>
- OECD. (2021). *The Digital Transformation of SMEs*. OECD Publishing. <https://doi.org/10.1787/bdb9256a-en>
- Pataki-Bittó, F., & Kapusy, K. (2021). Work environment transformation in the post COVID-19 based on work values of the future workforce. *Journal of Corporate Real Estate, 23*(3), 151–169. <https://doi.org/10.1108/JCRE-08-2020-0031/FULL/PDF>
- Pelletier, C., & Cloutier, L.M. (2019). Conceptualising digital transformation in SMEs: an ecosystemic perspective. *Journal of Small Business and Enterprise Development, 26*(6/7), 855–876. <https://doi.org/10.1108/JSBED-05-2019-0144>
- Penco, L., Profumo, G., Serravalle, F., & Viassone, M. (2022). Has COVID-19 pushed digitalisation in SMEs? The role of entrepreneurial orientation. *Journal of Small Business and Enterprise Development, 30*(2), 311–341. <https://doi.org/10.1108/JSBED-10-2021-0423>
- Pratama, V., Santoso, I., & Mustaniroh, S.A. (2021). Development strategy of SMEs in the new normal era of coronavirus disease 2019 (COVID-19): A literature review. *IOP Conference Series: Earth and Environmental Science, 733*, 12058. <https://doi.org/10.1088/1755-1315/733/1/012058>
- Priyono, A., Moin, A., & Putri, V.N.A.O. (2020). Identifying digital transformation paths in the business model of SMEs during the COVID-19 pandemic. *Journal of Open Innovation: Technology, Market, and Complexity, 6*(4), 104. <https://doi.org/10.3390/JOITMC6040104>
- Ramanathan, U., Aluko, O., & Ramanathan, R. (2021). Supply chain resilience and business responses to disruptions of the COVID-19 pandemic“. *Benchmarking: An International Journal, 29*(7), 2275–2290. <https://doi.org/10.1108/BIJ-01-2021-0023/FULL/PDF>
- Sharma, G.D., Kraus, S., Talan, A., Srivastava, M., & Theodoraki, C. (2023). Navigating the storm: The SME way of tackling the pandemic crisis. *Small Business Economics, 63*, 221–241. <https://doi.org/10.1007/s1187-023-00810-1>
- Semerádová, T., Weinlich, P., & Švermová, P. (2022). Evaluative framework for digital competitiveness. In Semerádová, T., & Weinlich, P. (Eds.), *Achieving Business Competitiveness in a Digital Environment. Contributions to Management Science* (pp. 27–55). Cham. [https://doi.org/10.1007/978-3-030-93131-5\\_2](https://doi.org/10.1007/978-3-030-93131-5_2)
- Stamatopoulos, T., Thalassinou, E.I., Malindretos, J., Ruppeika-Apoga, R., Bule, L., & Petrovska, K. (2022). Digital transformation of small and medium enterprises: aspects of public support. *Journal of Risk and Financial Management, 15*(2), 45. <https://doi.org/10.3390/JRFM15020045>
- Stoker, J.I., Garretsen, H., & Lammers, J. (2022). Leading and working from home in times of COVID-19: on the perceived changes in leadership behaviors. *Journal of Leadership and Organizational Studies, 29*(2), 208–218. <https://doi.org/10.1177/15480518211007452>
- Wang, S.S., Goh, J.R., Sornette, D., Wang, H., & Yang, E.Y. (2021). Government support for SMEs in re-



sponse to COVID-19: theoretical model using Wang transform. *China Finance Review International*, 11(3), 406–433.

<https://doi.org/10.1108/CFRI-05-2021-0088/FULL/PDF>

Winarsih, Indriastuti, M., & Fuad, K. (2021). Impact of Covid-19 on Digital Transformation and Sustainability in Small and Medium Enterprises (SMEs): A Concep-

tual Framework. In L. Barolli, A. Poniszewska-Maranda, & T. Enokido (Eds.), *Complex, Intelligent and Software Intensive Systems* (pp. 471–476). Springer International Publishing.

[https://doi.org/10.1007/978-3-030-50454-0\\_48](https://doi.org/10.1007/978-3-030-50454-0_48)

Yin, R.K. (2009). *Case Study Research: Design and Methods* (4th ed.). SAGE Publications.

## Appendix

Annex 1

Main interview questions

1. How and why did the Covid-19 pandemic affect the performance of the company?
2. What were your biggest digitalization challenges posed by COVID-19 pandemic?
  - a. Which IT did you mis or underutilise in your company?
  - b. What digital knowledge and skills have you found lacking your company?
  - c. To what extent did you have problems keeping track of customers behaviour patterns?
  - d. How did you deal with limited access to capital?
  - e. To what extent have you been aware of government assistance programs?
3. How did COVID-19 pandemic accelerate the digitalisation of your business?
  - a. To what extent did you switch to working at home – remote work - during the pandemic COVID-19?
  - b. How has the COVID-19 pandemic changed the way your business engages and interacts with customers?
  - c. How has the COVID-19 intensified online sales (via social media, special websites ...)?
  - d. How has the COVID-19 pandemic triggered a race for new strategic partnerships to adapt to supply and demand?
  - e. To what extent did you intensify data monitoring and analysis during COVID-19?
4. Based on your experience during COVID-19, what are your main business digitalization objectives?
  - a. How do you think increased spending on digital technology can facilitate the digitalisation of your business?
  - b. How do you think digital skills and knowledge can facilitate the digitalisation of your company?
  - c. How do you think new organisational structures and management styles can enhance digitalization of your company?
  - d. How do you think digital technologies can enhance and improve the value proposition of your business offering?

Annex 2

### Required SME selection criteria

SME size	Slovenia	Hungary
Micro enterprise (<10)	manufacturing industry $\geq 1$ and service industry $\geq 1$	manufacturing industry $\geq 1$ and service industry $\geq 1$
Small enterprise (10-49)	manufacturing industry $\geq 1$ and service industry $\geq 1$	manufacturing industry $\geq 1$ and service industry $\geq 1$
Medium-sized enterprise (50-249)	manufacturing industry $\geq 1$ and service industry $\geq 1$	manufacturing industry $\geq 1$ and service industry $\geq 1$
$\Sigma$	$\geq 6$	$\geq 6$

Source: own compilation

Annex 3

### Overview of SMEs

ID*	Case SME	Employee number	Annual sales	Founded	Target market	Customer segment	Industry
S1	Beauty (Beauty salon)	20-25	616.717,26	2012	Local and national	B2C and B2B	service
S2	Fruit-and-Veg (Fruit & vegetable distributor)	125	29.595.751,00	1990	Local and national	B2B and B2G	service
S3	Choco (Chocolateria)	9	403.781,82	1992	Local and national	B2C, B2B, and B2G	manu-facturing
S4	Food-Supl (Food supplement producer)	71	14.517.436,00	1954	Local, national, and global	B2B and B2C	manu-facturing
S5	Alu-Treat (Aluminium surface treatment provider)	16	725.433,40	1993	Local, national and EU level	B2B	manu-facturing
S6	Therapist (Therapeutic training provider)	0	100.221,64	2016	Local	B2C	service
H1	Insurance-Brk (Insurance broker)	5	364.122	1994	Local and national	B2B, B2C	service
H2	Reverse-Vending (Manufacturer of reverse vending machine units)	16	1.628.861	2006	Local, national and global	B2B	manu-facturing
H3	Gate-and-Parking (Gate and parking & central vacuum technology services)	12	923.650	1995	Local and national	B2B, B2C	service
H4	Wood-Proc (Wood panel processing)	6	364.192	2000	Local and national	B2B	manu-facturing
H5	Plastic-Inject (Plastic injection moulding)	248	21.704.504	1985	Local, national and international	B2B	manu-facturing
H6	Fashion (Clothing service provider)	58	593.423	1996	Local, national and international	B2C	service
H7	CNC-Proc (CNC metal processing)	7	572.043	2010	Local, national and international	B2B	manu-facturing

Source: own compilation



# WHAT IS SUCCESS? – CONCEPTS AND PERSPECTIVES IN THE HUNGARIAN STARTUP CONTEXT

## MI A SIKER? KONCEPCIÓK ÉS NÉZŐPONTOK A MAGYARORSZÁGI STARTUPOK KONTEXTUSÁBAN

Despite the prominent academic interest in the existing startup literature, neither the founders' perspectives on success nor its media representation have received adequate investigation. This paper presents an exploratory comparative analysis of startup success in Hungary from the founders' perspectives and its media representation, based on a media content analysis of Forbes articles (n=128) and qualitative interviews with startup founders (n=22). The results showed that strong state dominance and less careful project selection resulted in divergent narratives in the media and in the interviews with founders. In Forbes, capital attraction was found to be the key indicator of success, with real performance validated mainly by international investors, which also reinforced the construction of startup culture as a global form. In contrast, the perception of capital attraction was more ambiguous among the founders, for whom real performance was often justified by the market rather than the investor.

**Keywords:** startup success, startup culture, startup entrepreneurship, entrepreneurial success, media representation

Bár a siker a tudományos startup szakirodalom kiemelt témája, sem az alapítók sikerrel kapcsolatos nézőpontja, sem a startup-siker médiareprezentációjának vizsgálata nem kapott eddig fókuszot. A tanulmány a magyarországi startup-siker feltáró vizsgálatára vállalkozik az alapítók szemszögének és a siker médiareprezentációjának összehasonlító elemzésével, Forbes-cikkek (n=128) és startup-alapítókkal készített kvalitatív interjúk (n=22) alapján. Az eredmények azt mutatják, hogy az erős állami dominancia és a kevésbé gondos projektkiválasztás eredményeképpen a médiában és az alapítókkal készített interjúkban talált sikernarratívák eltérnek egymástól. A Forbesban a tőkevonzó képesség bizonyult a siker leghangsúlyosabb mutatójának. A teljesítményt, és ezen keresztül a sikert leginkább neves nemzetközi befektetők döntései igazolták, ami egyúttal a startup-kultúra globális formaként való konstrukcióját is megerősítette. Ezzel szemben a tőkevonzó képesség és a befektetői bizalom elnyerésének megítélése a startup-alapítók elbeszéléseiben jóval ambivalensebb volt, a valós teljesítmény pedig gyakran inkább a piac, mint a befektetői döntés igazolta.

**Kulcsszavak:** startup-siker, startup-kultúra, startup-vállalkozás, vállalkozói siker, médiareprezentáció

### Funding/Finanszírozás:

This publication is associated with the Budapest LAB – Office for Entrepreneurship Development of the Budapest Business University. Project no. TKP2021-NKTA-44 has been implemented with the support provided by the Ministry of Innovation and Technology of Hungary from the National Research, Development and Innovation Fund, financed under the Tématerületi Kiválósági Program 2021 (TKP2021-NKTA) funding scheme. The authors would like to thank Vivien Csákány and Áron Szennay for their contribution in conducting the interviews.

A tanulmány a Budapest LAB – a Budapesti Gazdasági Egyetem Vállalkozásfejlesztési Irodája segítségével készült. A TKP2021-NKTA-44 számú projekt a Magyar Innovációs és Technológiai Minisztérium támogatásával valósult meg a Nemzeti Kutatási, Fejlesztési és Innovációs Alapból, a Tématerületi Kiválósági Program 2021 (TKP2021-NKTA) támogatási program keretében. A szerzők köszönetet mondanak Csákány Viviennek és Szennay Áronnak az interjúk elkészítésében nyújtott közreműködéséért.

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The article was received: 19. 01. 2024, revised: 15. 04. 2024 and 02. 05. 2024, accepted: 03.05. 2024.

A cikk beérkezett: 2024. 01. 19-én, javítva: 2024. 04. 15-én és 2024. 05. 02-án, elfogadva: 2024. 05. 03-án.

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Entrepreneurial success can be evaluated by examining the extent to which a venture met the goals and needs of its various stakeholders, such as investors, employees, customers, the society at large as well as the entrepreneurs themselves (Brockner, Higgins & Law, 2004). This paper explores a specific type of entrepreneurial success – i.e. startup success – from two perspectives: as represented in the media, and as perceived by the entrepreneurs – the startup founders – themselves.

Startup success has been a prominent concern of academic interest in the existing literature due to the many positive impacts successful startups have had on the economy, such as through job creation, productivity growth and more (Reisdorfer-Leite, Marcos de Oliveira, Rubek, Szejka & Canciglieri, 2020), accompanied by the fact that they belong to the most vulnerable group of small and medium-sized enterprises (SMEs) (Durda & Ključnikov, 2019). Studies addressing this topic are typically concerned with exploring the reasons behind success (Chakraborty, Ilavarasan & Edirippulige, 2023; Santisteban & Mauricio, 2017), treating the definition, perception and interpretation of success as trivial subjects.

On the one hand, the concept of startup success is deeply embedded in startup culture, which Koskinen (2023) conceptualises as a global form. However, local startup cultures are underpinned by physical and material practicalities, the influence of which should not be overlooked. Thus, the construction of local startup cultures, and the meaning of startup success, are formed by the decontextualized ideals and practices of Silicon Valley, but are also situated in local socio-economic circumstances.

This paper draws on the mixed research methodology approach of media content analysis as well as qualitative interviewing to study startup success from the two approaches mentioned above. Additionally, the current research seeks to examine whether the local circumstances shape the concept of startup success in Hungary, and if yes, in what way. By answering these research questions, this paper contributes to the literature on both entrepreneurial success and startup culture.

This paper consists of three parts. First, we review the interpretation of startup success in the existing scholarly literature, present the concept of startup culture as a global form and the socio-economic context of Hungary. Second, we offer an explanation of the twofold method used, namely the media content analysis and the qualitative interview methodology. The third part presents the findings of the research. Finally, we end our paper by presenting our conclusion, the limitations of our study, possible future research directions and the practical implications of our findings.

## Literature review

The scope of this paper does not allow for an in-depth discussion of the many different definitions of the term ‘startup’ in the literature (for an overview, see Santisteban, Mauricio & Cachay, 2021; Skawińska & Zalewski, 2020). In this study, ‘startup’ is used to refer to a specific type

of business that is less than ten years old, based on an innovative idea and a replicable, scalable business model and aimed at rapid growth and international expansion (Bormans, Privitera, Novo Devani & Arrami, 2021, p. 5).

## Startup success in the academic literature

Success is usually a dependent variable in empirical startup research examining the factors behind startup success. In these studies, the ability to attract investors and ensure the continuous flow of funds emerged as a key factor behind success (Kim, Kim & Jeon, 2018), and often as the indicator of success itself, based on which success as a dependent variable is measured (Banerji & Reimer, 2019; Díaz-Santamaría & Bulchand-Gidumal, 2021; Gloor, Colladon, Grippa, Hadley & Woerner, 2020; Okrah, Nepp & Agbozo, 2018; Prohorovs, Bistrova & Ten, 2019; Ratzinger, Amess, Greenman & Mosey, 2018; Sharchilev, Roizner, Romyantsev, Ozornin, Serdyukov & de Rijke, 2018; Zhang, 2011). For a few authors, financing is coupled with another important success indicator such as consistency with innovation (Okrah et al., 2018) or achievement of significant revenue (Díaz-Santamaría & Bulchand-Giduman, 2021). Conceptualising startup success based solely on market performance (Ko & An, 2019) occurs much less frequently in the literature.

The assessment of success also depends on the life cycle of the firm. Success factors can vastly vary depending on the stage of a startup’s lifecycle (Dvalidze & Markopoulos, 2020; Lovrinevic, 2022; Pecze, 2022). In the initial phase, success means survival (Csákné Filep, Radácsi & Tímár, 2020; Petru, Pavlák & Polák 2019), while in the later phases of the lifecycle, success means dynamic and rapid growth (Sevilla-Bernardo, Sanchez-Robles & Herrador-Alcaide, 2022), which can be measured through growth of revenue, sales volume or the number of employees (Al Sahaf & Al Tahoo, 2021; Csákné Filep et al., 2020; Sevilla-Bernardo et al., 2022).

There are several startup life cycle theories that have followed the evolution of the startup definition. As success is most frequently measured by the ability to attract capital, we used a funding-based approach in this study. Funding-based life cycle theories were featured in the work of Paschen (2017), who presented three stages: 1) the ‘pre-startup’ phase, 2) the startup phase and 3) the growth phase. Gosztonyi, Csákné Filep and Zsigmond-Heinczinger (2022) applied Paschen’s model to semi-peripheral countries and distinguished four investment stages: the pre-seed stage (corresponding to Paschen’s pre-startup stage), the seed stage (corresponding to the original model’s startup stage), the Series-A stage (corresponding to the very beginning of the growth stage) and finally the Series-B stage (corresponding to the beginning of the growth stage). This transformation fits Paschen’s theory with the Hungarian startup ecosystem, which differs in both volume and size from the startup ecosystems of leading countries (Radácsi & Csákné Filep, 2021).

In Hungary, startups are an emerging topic in entrepreneurship research. Previous studies have focused on the characteristics and challenges of Hungarian startup

founders and the ecosystem in which they operated (Jáki, Molnár & Kádár 2019), and some have investigated female startup founders specifically (Kézai & Szombathelyi, 2020; 2021). Other studies have looked at the economic conditions (Havas, Jánoskúti, Matécsa & Vecsernyés, 2023) and the area of financing (Lovas & Rába, 2013; Karsai, 2022). These research also studied the factors behind startup success (Csákné Filep et al., 2020; Magos & Németh, 2014), although the founders' perspectives on the actual definition of success has been largely neglected. Furthermore, the media representation of startups and entrepreneurship in general is an under-researched area in Hungary. We could not find any study analysing startup representation in the Hungarian media, and the academic knowledge on the media representation of entrepreneurship in general is also limited (Szerb & Kocsis-Kisantal, 2008; Virágh & Szepesi, 2022).

### Startup culture as a global form

The definition of startup success can be considered an element of startup culture, which Koskinen (2023) conceptualises as a global form in a threefold design: as a form of governance, as the cultural circuit of digital capitalism and as a distinct form of economic activity defined by the symbiotic nature of venture capital and startups. The concept of global form aims to draw attention to the shared features and global dynamics of local startup cultures. Silicon Valley – the cradle of startup entrepreneurship – is often seen as an ideal and serves as a figurative template for startup cultures across the world. The Silicon Valley culture saw the amalgamation of the spirit of capitalism with the liberal, counterculture spirit of the 1960s and 1970s. Although public spending and active governmental participation were historically key to establishing Silicon Valley as a paradise of technology and innovation (Mazzucato, 2014), the state is currently an absent player, and its role in the creation of the current status of Silicon Valley is largely forgotten. Startup culture as a global form includes tropes such as companies built in a bottom-up approach, visionary leadership, aggressive growth, innovative disruption and the concept of 'unicorn', denoting a startup company valued over \$1 billion. The relationship between the figurative template of the Silicon Valley and local startup settings involves a diverse circulation of meanings, for example, via mainstream and startup-related media outlets, which thus play a fundamental role in representing and reinforcing the above tropes and practices of startup entrepreneurship, promoting startup culture as a global form (Koskinen, 2023).

### The Hungarian economic context and previous research results

Our paper focuses on the startup context of Hungary, where the low cultural support for entrepreneurship is evidence of Central and Eastern European countries' socialist heritage (Szerb & Trumbull, 2016), although economic success or failure can be traced in large part to the performance of its entrepreneurs (McMillan & Woodruff, 2003). As a transitional economy, the development of institutions

supporting the startup ecosystem by providing mentoring, technical assistance and capital started with a considerable delay compared to Western countries, which has prompted the creation of state-funded programmes focusing mainly on the supply side of the industry (Becky-Nagy & Fazekas, 2017).

Before 2008, private equity investment in Hungary was predominantly provided by foreign, regional and global funds. By 2010, the global financial and economic crisis, as well as the resulting decline in the allocation of private equity funds globally, had dried up the resources available to Hungarian businesses. Moreover, Hungarian private equity investment had previously been dominated by buy-outs rather than investments in startups (Becky-Nagy & Fazekas, 2017). State intervention in startups and innovative enterprises may be justified by several characteristics (Lovas & Rába, 2013) that have been reinforced by the economic environment. According to Radácsi and Csákné Filep (2021), startup financing can be considered favourable in Hungary since the initial lack of funding does not lead to the failure of promising teams. On the other hand, as Karsai (2022) points out, the state's role in the region's venture capital funds, including EU transfers, is exceptionally extensive. Business incubation institutions are mainly run by the public administration, a situation which attracted serious criticism from researchers. Strong government domination coupled with high rates of capital abundance in the 2010s led to less careful project selection, resulting in the emergence of rent-seeking organisations alongside promising businesses in the Hungarian startup ecosystem (Karsai, 2020).

### Methodology

Mixed research methods have been employed to explore how startup success is constructed in Hungary, using media content analysis on the one hand and qualitative interviews on the other.

### Media content analysis

A combination of quantitative and qualitative media content analysis (Krippendorff, 2018; Macnamara, 2005) was conducted on 128 Forbes articles presenting successful startups and startup founders between the 1<sup>st</sup> of January 2020 and the 30<sup>th</sup> of June 2023.

According to Macnamara (2005), typical sampling methods for media content analysis include systematic random sampling, quota sampling, stratified composite sampling and purposive sampling. In our case, purposive sampling method was used, wherein articles from key media rather than less important and less relevant media in the sample were selected. We opted for Forbes because it is a global magazine likely participating in the circulation of global startup culture tropes, and because of its unique position in the Hungarian media market as probably the most prestigious and influential business magazine in the country, especially regarding startups. Forbes Hungary has created the list of 'the hottest Hungarian startups' based on the assessment of its editorial board and

external experts every two years since 2019. Furthermore, Forbes is the exclusive media partner of the Hungarian Startup Report (Startup Hungary, 2022; 2023). Its particular importance is further underlined by the fact that our interviewees mentioned it multiple times as a key referential point.

The articles were selected from forbes.hu by using the Hungarian equivalent of tags: #success (#siker), #success story (#sikersztori) and #successful person (#sikerember). First, we created a pool of articles featuring any of these three tags. Then, we selected those which were business-oriented, i.e. they presented not only a person but a firm as well (articles about successful athletes and artists were excluded). A further selection criterion required the featured firm to be labelled a startup. Articles with the tag #hottest startup (#legforróbb startup) have been added to the sample, including the lists of the 'hottest startups' for the years 2021 and 2023. In case the online article was not a full article but only a preview or section of the printed one, the original printed article was looked up and considered as the subject of analysis instead of the shorter online version.

The final sample consisted of 128 online and print articles. Based on the selection method specified above, we can assume that the sample represents startups Forbes identified as successful and chose to present to its readers as a success story to aspire to.

Throughout the coding process, we sought to identify the indicators of success, the factors through which the image of a successful startup was constructed in the articles. For the first 70 articles, an inductive, grounded theory approach was followed (Strauss & Corbin, 1997), wherein instead of a predefined list of codes, the codes were developed from the data. This was enough to reach the point of saturation (Bryman, 2012), and thus, the coding scheme was considered final and the remaining articles were coded accordingly in a deductive way (Neuendorf, 2017). The positioning of mentions was taken into consideration: mentions in titles and leads were coded separately, as they carry greater importance and impact (Macnamara, 2005). Additionally, the nationality of the featured startup founders was coded to ensure the possibility of analysing these articles separately.

The above coding was used for quantitative content analysis to show the most frequent success indicators in the articles. However, the quantitative description of the text does not give a complete picture. Therefore, we supplemented it with qualitative analysis for the most common success indicators to understand the deeper meaning of the text and the likely interpretations of the audience (Macnamara, 2005).

### Qualitative interviews

Besides media analysis, 22 semi-structured in-depth online interviews were conducted with Hungarian startup founders between April 2021 and July 2023. As startup founders are a relatively small and hard-to-reach population, a snowball sample selection strategy was followed to recruit respondents (Bryman, 2012; Silverman, 2008).

The sample includes startup founders who had been actively building their firms, at least for one but no more than seven years at the time of the interview, with one exception who had recently decided to cease operations. Based on the categorisation of Gosztonyi et al. (2022), the startups were between seed and Series-B stage at the time of the interviews. We decided to omit pre-seed phase startups because they would only be able to speak of desires, while their real experiences would be fairly limited. The industries represented were delivery services, packing and shipping, e-mobility, industrial digitalisation, leisure and entertainment, financial technology, agricultural technology and smart food. Despite our efforts to build a diverse sample, the respondents were relatively young and highly educated. The average age of respondents was 30.8, ranging from 21 to 49 years. All respondents had a higher education degree or at least one higher education degree in progress. In this regard, the sample follows Hungarian trends with the dominance of higher education and younger age groups among startup founders (Jáki et al., 2019). Regarding gender, we managed to reach a balanced sample by recruiting an equal number of men and women.

The interview guide included open-ended questions about indicators of success. We asked the respondents about other startups they perceived to be successful and about how they rated their own business in this respect. This was coupled with specific questions about their lived experiences of success, such as moments when respondents felt successful in their startup, as well as questions about their past and current goals and motivations, to gain a more nuanced picture of indicators of success. With the interviews, we intended to explore both the organisational and personal (Dej, 2010), or business-oriented and person-oriented (Gorgievski et al., 2011) dimensions of subjective startup success.

However, in the present study, we only focus on the organisational and business-oriented dimension of success and do not address the indicators that are purely personal and not directly related to the performance of the firm, which have been explored in depth in another study (Virágh et al., 2024). Our effort to build a diverse sample also served the purpose of exploring all possible aspects and detecting gendered patterns in the perception of success. In that paper, we concluded that although there are gendered differences in the perception of success, this is only true for the person-oriented dimensions and that the business-oriented success dimensions were perceived very similarly by both men and women. Thus, although our qualitative sample contains equal proportions of men and women, which does not reflect the gender ratio seen in business startups, we can assume that this does not result in a fundamental bias in the results. Nevertheless, the relatively high proportion of women in the sample has been taken into account when analysing and drawing conclusions.

The interviews were conducted for 30–60 minutes, recorded with the respondents' permission, transcribed verbatim and anonymised. For the qualitative analysis, we followed the grounded theory approach (Corbin & Strauss,



1990; Strauss & Corbin, 1997) and looked for emerging patterns and themes. Learnings are illustrated by quotes from the interviews. Startup founders were coded S1 to S22 to maintain anonymity.

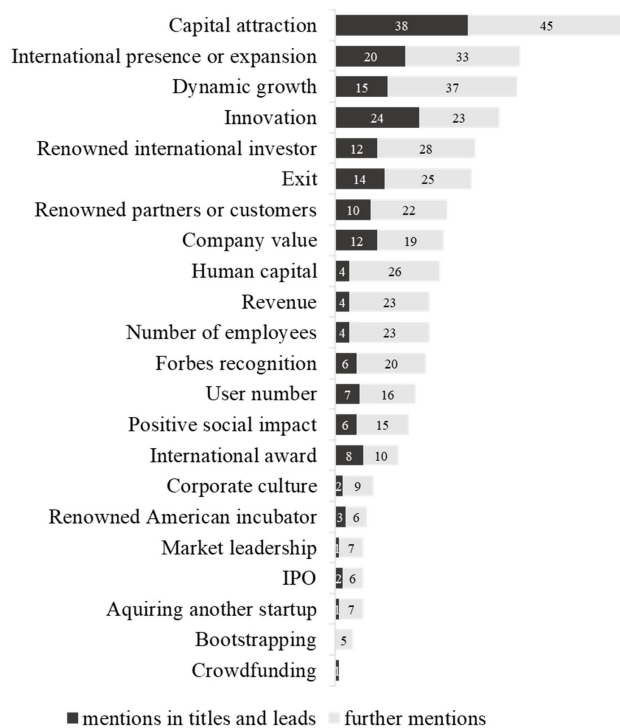
## Results and analysis

### Results of the media content analysis

The majority of the articles in our sample were on startups in Hungary. Twelve articles can be categorised as summaries giving an overview of the Hungarian startup ecosystem or its most successful members, while 99 featured a specific Hungarian startup. The remaining 17 articles featured foreign startups, mainly operating in a neighbouring country such as Slovakia, Croatia or Romania. Forbes' concept of startups is probably best illustrated by the definition: 'with a world-changing idea and venture capital through rapid growth to exit' (Gólya, 2021a, p. 59). This short phrase captures the five most important aspects of startups as interpreted by Forbes, namely internationality, innovation, capital attraction, dynamic growth and finally the exit, which were also the most frequently occurring success indicators of startups in the sample (see Figure 1).

Figure 1

#### Occurrences of success indicators in Forbes articles featuring Hungarian startups (n=111)



Source: authors' construction

A lucrative exit is considered to be the ultimate success a startup founder is working for. Although it occurs less frequently than other key success indicators, this is only due to the fact that exits are relatively rare compared to other events, such as closing an investment round. Investment rounds are suggested as the best indicator of being on

the right path, and venture capital attraction is by far the most frequently occurring success indicator in the examined articles while alternative funding options such as bootstrapping and crowdfunding are at the very bottom with the fewest occurrences (see Figure 1). Article titles such as *Albert László Barabási's medtech startup receives 250 million dollar investment* (Sándor, 2020), *Hottest Hungarian startup Bitrise receives almost 20 billion HUF investment* (Zsiborás, 2021b), *Big guns invest 10 million euros into the Hungarian fintech startup* (Zsiborás, 2021a) and *One of the hottest Hungarian startups receives historical investment* (Gólya, 2022) show how capital attraction is constructed not only as a necessary enabler of startup success but also a considerable and newsworthy success story in itself.

The size of success is further enhanced by the size of the investment and by the reputation of the investor, as well as the number of other possible investors. The bigger the circle of interested venture capital funds, the higher the attracted capital, and the more renowned the investor, the bigger the success. A truly successful investment round is recognisable by a renowned international venture capital fund with a portfolio of promising startups and a track record of already accomplished exits.

*This is a historical success: Hungarian startup has never been close to such a huge investment on this level. [...] The round is led by the same Institutional Venture Partners (IVP) which used to invest in Netflix, Twitter, Uber, Snapchat, Slack, and the new Romanian success story Uipath. The American investment firm has made 131 IPOs until now. (Gólya, 2022)*

Dynamic growth, the third most frequently occurring success indicator, can be measured in multiple ways: investment rounds, number of employees or measures more related to market success such as user number or revenue. Market success is often represented not (or not only) by user numbers but by listing some of the names of well-known partners and customers to show success by association. Additionally, international presence and expansion are also a form of growth and a key indicator of startup success.

*They experienced enormous growth in the last year. They hired 140+ employees (majority of them in the Budapest office), tripled their revenue again, acquired new customers like Revolut - the world's largest neobank - Nubank, Patreon, Afterpay or Mollie, and besides the offices in London and Budapest they opened new centres in Jakarta and Austin. (Gólya, 2022)*

Innovation, meaning a disruptive business idea, is the fourth most frequently occurring success indicator. Mentions such as renowned international investors, renowned partners or customers and international awards can be considered as external recognition of success.

Additionally, the recognition by Forbes itself (such as putting a startup founder team on the cover page or placing them into the list of the hottest startups) appears to be an indicator of success as well. This can be seen in the article about Hungarian startup Seon being selected for the Emerging Unicorn Board of the American technological news site Techcrunch:

*Hungarian Seon is estimated to be worth 500 million dollars and on the right track to double it based on the comprehensive data of Crunchbase. The Hungarian company became a member of a very prestigious club. [...] The online fraud prevention startup has attracted 94 million dollars (32.5 billion HUF) in a Series B round (10 million dollars in the previous round). At that time, we discussed their amazing growth besides their vision. They also made it to Forbes' hottest startups list. (Zsiborás, 2022a)*

Overall, it seems that startup narratives in Forbes are first and foremost conveying the global standards of successful startups and promoting startup culture as a global form (Koskinen, 2023). True success means achieving Silicon Valley ideals and beating the Silicon Valley benchmarks. This is shown not only by the high importance of foreign VCs, customers and partners but also by the company value indicator, where unicorn status is the expectation for Hungarian startups as well. There are only a few exceptions to this dominant narrative, one of them being the interview with the Hungarian CTO of a Boston-based unicorn. When the interviewer raised the issue that, 'even the exits of the top Hungarian startups are stagnating around \$100 million, and that counts as an enormous success already', the interviewee replied that he would rather have a hundred \$100 million startups than a unicorn because it would be more beneficial to the startup ecosystem (Gólya, 2021b).

Articles exploring and evaluating the Hungarian startup ecosystem typically complain that the country has managed to produce only one unicorn (Logmein) so far, which means that 'apart from Logmein there were no other real success stories in the last 10-15 years' (Gólya, 2021c) and that 'we are not only lagging behind in the number of unicorns. In the past five years dozens of startups from this region got international big gun VCs invested in them, while here only ten startups managed to achieve this' (Biás, 2022). This focus on international investors and foreign recognition is also driven by the well-founded perception that during the years of capital abundance, it was relatively easy to get financing (Becskey-Nagy & Fazekas, 2017), though heavy state domination in the Hungarian startup ecosystem raised doubts about the fairness of project selection (Karsai, 2020). This leads to Forbes' perception that real success, which is both hard to achieve and most probably based on real performance, is attracting an internationally listed investor.

*The fact that state-dominated VCs are responsible for the majority of financing of local startups results in an unhealthy and biased situation. Besides bureaucratic burdens and constraints which are inconsistent with the operation of a startup, it is also a problem that forced investments resulted in undeserving companies - which are not ready yet, and which are not matching the expectations of market-based VCs - receiving investments. (Zsiborás, 2022b)*

## Results of the interviews

### The ladder of success

When asked about the status of their startup, the majority of the interviewed founders considered their startup as successful; two respondents did not consider their startups to be successful at all, and one of them had already decided to close his venture. Multiple respondents considered success to be forthcoming and answered that their startup is 'not there yet' (S11; S13), that they 'see the potential, but it is still too small to be called successful' (S15) or that they are currently 'in a phase when this changes every day' (S14), indicating that startup success is a multistage, uncertain and volatile construction heavily dependent on the startup lifecycle itself.

In this regard, startup success can be conceptualised as a ladder: the higher the startup is on the ladder of success, the more confidently the founder can talk about being successful. From this perspective, the only place where startup success is indisputable is at the top of the ladder, namely after a financially successful exit has been accomplished. This was most visible in the interview where the respondent justified her choice of successful startup example by saying that, 'it has exited already' (S15). Or as another respondent phrased it, 'startups which are successful are usually not startups anymore, only used to be once' (S20). Besides the exit, the unicorn status is another possible aspirational endgame for the startup's journey, but only one respondent in our sample had such high ambitions, and even he was unsure whether it was a realistic goal for them.

*I don't know if reaching the unicorn status is realistic or not, but this one billion EUR company value, I am not sure how quickly we could reach this, but this is my goal. [...] being a unicorn, that is the very top for a startup I think. (S4)*

Below the 'very top' of the ladder, success means being on the right track. There are certain signs for this, such as dynamic growth of various key performance indicators (KPIs) or reaching necessary milestones. Several factors are crucial to reach a successful exit. These are rungs the startup has to reach to climb on the ladder of startup success. Accomplishing these are not only necessary enablers of ultimate startup success but can be considered as indicators of success in themselves – if success is interpreted in the broad sense. Such crucial success factors include building and managing a capable team, attracting invest-

tors and achieving internationalisation and success in the market (building a consumer base and having market validation for the product).

*I think success has these stages. [...] So, if you have plans, and those plans get fulfilled [...] these are small successes which will lead to a successful start-up. [...] I think success is always just for a moment in time, I think it is not like you reach success and then you are fine. There are small and bigger successes on the way, of course getting investment is also a success. But it can be a lot of things, managing a project, good feedback from a customer – these all add to a startup's feeling of success. (S3)*

### The role of external validation

Based on the above, startup success in the broad sense means the promise of future success, as narrowly conceptualised, and thus it is inevitably volatile and highly uncertain. This uncertainty can be reduced, and credibility can be enhanced by hard numbers, such as the fulfilment of pre-defined key performance indicators.

*We have been doubling all our key parameters for six years in a row already, so I think we can say we are successful. Not only revenue, but other KPIs as well like the number of visitors. I think the minimum requirement for a startup is to double its KPIs every year. (S7)*

Another way to reduce uncertainty is to have external signs of recognition. Simply put, the startup is successful if many others think it is (or is going to be) successful. Employees who give their labour, investors who provide the capital, partners who engage in a business relationship with the startup and customers who are willing to pay for it can all be considered external signs of positive feedback and recognition and thus indicators of success (in the broad sense) or predictors of future success (in the narrow sense).

*I think they are successful because [...] they always find the best people, and this shows that they are doing something well if these people are willing to help them. (S4)*

*Of course, the investment is very important feedback for the team. [...] If an independent organization gives us 130 million HUF to develop, it must mean we are doing something well. (S15)*

*I would say [it is success] that these large companies started to take us seriously as potential partners. (S21)*

Publicity, especially publicity in Forbes, also fits into this pattern as it works as validation and an indicator of success. Furthermore, it shows the influence of Forbes on the

construction of startup success and more broadly on narratives about the Hungarian startup ecosystem.

*They [are successful because they] grew a lot in a very short time, they even got into Forbes magazine. (S11)*

*They are a pretty successful startup. [...] Considering their team, but also their investment rounds, and they are also called the hottest startup, which definitely means that they are doing something really well. (S12)*

*Getting on the cover page of Forbes is a milestone for anyone in the business world. (S20)*

### The ambiguity around capital attraction

As pointed out before, and as evident in the quote above, capital attraction and accomplished investment rounds are considered success by many. However, it is also important to note that the relationship between capital attraction and success is not as straightforward as it is in Forbes and involves some controversy. Several respondents had the solid opinion that capital attraction is 'a means and not an end' (S17), and thus cannot be considered success in itself.

*Capital attraction itself is not something to celebrate. [...] Capital is needed for the firm to operate, it is the necessary evil for things to work out, but not an element of success for me. (S18)*

The critique around the construction of capital attraction as a key element of startup success is again built on the experiences of the effects of capital abundance, state-dominated institutions and a less careful project selection, based on which multiple startup founders formed the opinion that capital attraction cannot be considered success at all because it was simply too easy in recent years.

*What [the investor] did, they gave a lot of money, even 100 million HUF to startups which did not even have a customer [...] The investor should be there for the startup to develop, to reach the next level, and not to keep the startup founder. (S4)*

*In the beginning, I thought success is to have an investor, and we did everything to achieve this. We have been chasing investment, and we shouldn't have, at least not in the first year, without a single paying customer. [...] it brought a lot of conflicts, it took up enormous time and energy, I regret it already, but anyway, we are already there. And I realised that – especially on the current market – getting an investment is no big deal. With a mediocre plan you can receive 15 million HUF, that is not success. (S14)*

These experiences create a hierarchy of success indicators, where capital attraction is clearly at the very bottom

as a necessary element but often not one to be proud of and should even be avoided if there is the option. Under this approach, ‘real success’ is validated by the market and measured by hard numbers and pre-defined KPIs. Real success is demonstrated in ‘fierce market competition’ (S10), which is seen as an objective measure of success as opposed to the subjective evaluation of incubator and startup programme judges. Further, this approach has a clear preference for the order of success indicators: the startup must first have some kind of market validation and market success, and capital attraction can only follow.

*For a startup to reach success the foundation has to be laid first. You can lay the foundation right if you can solve problems creatively and when you are subjected to real market conditions. You should get an investment after you prove yourself under these circumstances. But if you begin conveniently with having financial and human resources and everything, you can spend it quite easily and go bankrupt. And you miss the necessary steps, the opportunity to learn how to create that money. So, I would say, start with creating revenue, not with investment. (S22)*

This approach opposes the ruling narrative of startup success, and even the respondents explicitly articulate that their answer is ‘not the average answer’ (S5), thus deviating from the assumed mainstream regarding ‘what startups are usually about’ (S10).

*They are an inspiring startup because [...] they have a well-performing business model as well, they are functioning as a firm [...] I think that until your startup proves itself on the market – even though this is not what startups are usually about – you cannot consider it successful [...] For me success means to prove yourself in fierce market competition. (S10)*

*I think it is essential to reach a certain attraction, revenue, market, and customer base without any investor, and start to talk to the VCs only then. So, aim for a real market value and attract an investor after that. I guess this is not the average answer you are looking for, but I see it this way, startups who do that can be successful. (S5)*

Furthermore, in some cases, real success means not including any investor at all and going as long as possible (even until the exit) bootstrapping.

*What I liked about their story is that they went completely bootstrapping, and sold it at the end for 3-4 or 5 hundred million euros, and they did not have to give up any piece of the company to any investor or business angel, so they reached the exit via bootstrapping [...] without any external resource, they could create a successful thing the market needed, I can really look up to this. (S5)*

## Discussion

The results show that the narratives in Forbes reflect the decontextualized ideals and practices of Silicon Valley, promoting startup culture as a global form (Koskinen, 2023). Success here is the fulfilment of the startup promise ‘with a world-changing idea and venture capital through rapid growth to exit’ (Gólya, 2021a, p. 59). The ‘world’ is an important element here as it captures the level of ambition required that a truly successful startup should strive for. According to Forbes, true success means catching up with global standards – for example, achieving unicorn status – and becoming a member of an elite global club. Just as in the academic startup literature (Banerji & Reimer, 2019; Díaz-Santamaría & Bulchand-Gidumal, 2021; Gloor et al., 2020; Okrah et al., 2018; Sharchilev et al., 2018), venture capital was the most common indicator of success in the Forbes articles. However, not all investments are considered equal: the success rate of an investment round can be further increased by the number of interested investors, the size of the final investment round and the reputation of the investor. Renowned international investors, and similarly, renowned international partners and customers, are a sign of the startup’s embeddedness in global networks and thus carry the hope and promise of future unicorn status or a possible exit of significant size.

Startup success from the founders’ perspective partly resembled the Forbes narrative: dynamic growth (of revenue, KPIs and employee number), success on the market, international presence and expansion, the ability to attract investments and the lucrative exit were among the most frequently considered indicators of success. This was particularly true when evaluating other startups, where respondents typically cited Forbes magazine companies as examples of successful startups. This illustrates the power and influence of Forbes in shaping the narrative of startup success in Hungary. Recognition from Forbes magazine – such as being on the cover or being on the list of the ‘hottest startups’ – is seen as a clear indicator of success.

The results show that Forbes has a major impact on how successful other startups are perceived but has limited impact on founders’ own lived experiences and perceptions of success. There is a significant gap between the global construct of startup success and the local socio-economic reality in which our respondents operate. For instance, only one startup founder in the sample was ambitious enough to mention the goal of achieving unicorn status, while this did not come up at all in the other interviews. Another example is the ambiguous relationship with investment as a marker of success. Although in many cases respondents saw the closing of the investment round both as a necessary step for future success and an indicator of success in itself, several respondents took a more critical approach towards venture capital. There were cases where the raising of capital – the most prominent indicator of success in Forbes magazine and a typical milestone on the ideal startup journey



– was seen in hindsight as a mistake. In this narrative, proving oneself in ‘real market conditions’ was the true and ultimate success. The viewpoint that capital attraction should not be framed as success but at most a necessity, and the related opinion that market-based success is more valuable and objective than VC funding, are not unique but are neither marginal: one third of our sample shared them. Moreover, their strong presence in the sample is not due to the overrepresentation of women: in fact, more male (five) than female (two) startup founders expressed this opinion.

The preference for market-based indicators over capital attraction in the hierarchy of success indicators may be surprising in the startup context as it is more akin to the success indicators of a traditional SME, and respondents who expressed such a preference strongly felt that their view contradicted the prevailing narrative about the success of startups. The reason for this can be found in the local socio-economic conditions of the Hungarian startup ecosystem, namely that strong government dominance in the 2010s, coupled with high rates of capital abundance and forced investments, led to less careful project selection. Consequently, access to finance was relatively easy and doubts were raised about the emergence of rent-seeking organisations (Becsky-Nagy & Fazekas, 2017; Karsai, 2020). These circumstances influenced both the Forbes narrative and the founders’ perceptions, albeit in different ways: for Forbes, the perceived unreliability of local investor decisions reinforced the global narrative of startup success and the primacy of foreign investors as the only true and reliable validator of real and ‘objective’ startup success. On the other hand, from the founders’ perspective, it seems that for a significant part of our sample, this resulted in a more market-driven, SME-like approach, leading to a widening of the gap in the understanding of startup success between the two groups.

## Conclusion

This study examined the success of startups from two perspectives: how startup success is perceived and experienced by the startup founders themselves, and how it is constructed by the business media, specifically the Forbes magazine in Hungary. The results show that there are significant differences between the media representation of startup success and the founders’ perspective. Forbes reflected the decontextualized ideals and practices of Silicon Valley, promoting startup culture as a global form. Nevertheless, this narrative seems to have a limited impact on the lived experiences and perceptions of startup founders, despite Forbes’ unique position in the media space and its undoubted standing as a key reference point for startup founders. The local socio-economic context, namely strong state dominance in the Hungarian startup ecosystem, has influenced the success narratives of both groups, pushing them further apart: Forbes reinforces the global perspective and the role of foreign investors, while founders value creating a more market-oriented, SME-like approach to success.

## Practical implications

Given the significant differences between the media studied and startup founders’ perceptions of startup success, it is important to note that what we call the ‘SME-like’ view of success may look at the goal of becoming a unicorn as one that startup founders in the early stages of building their businesses, let alone young people who are only thinking about becoming entrepreneurs, imagine as too distant. Maintaining the motivation of startup founders who may not succeed in developing their startup into a unicorn but who can build a thriving SME – equally important for the national economy – could prove empowering if the supporting actors in the ecosystem (including the media) consider helping founders in setting intermediate and alternative goals that are more achievable for them. This would be particularly important in light of the very low entrepreneurial aspirations of young Hungarians. According to the Global University Entrepreneurial Spirit Students’ Survey (GUESSS), the majority of Hungarian students (74.4%) want to work as employees after graduation. Although this figure is much more favourable five years later (Gubik & Farkas, 2023), entrepreneurial propensity is still an issue with national economic impact.

## Limitations and future research directions

Our study has several limitations. Although Forbes is the most relevant startup-related media outlet in Hungary, media content analysis based solely on Forbes cannot provide the entire picture of media representation of startup success in Hungary. Likewise, our qualitative interview sample had some limitations as both founders of pre-seed stage startups and startups that have already exited were missing. The exclusion of pre-seed stage startups was a conscious decision as their experience of startup success is quite limited and likely to be incorporated into the narratives of more mature startups. However, their unique perspective and challenges are worth studying further to help shed light on the initial aspirations and motivations that drive entrepreneurs at the beginning of their ventures. Furthermore, the startup lifecycle model used in our analysis does not include a ‘post-series B’ phase, but the exclusion of startup founders who have already experienced a successful exit from the sample means that we did not study the insights of entrepreneurs who have already reached the exit, the last significant milestone. Studying startup success from the perspective of former startup founders who have already accomplished a successful exit would be a potentially fruitful line of research for the future.

## References

- Al Sahaf, M., & Al Tahoo, L. (2021). Examining the key success factors for startups in the Kingdom of Bahrain. *International Journal of Business Ethics and Governance*, 4(2), 9–49.  
<https://doi.org/10.51325/ijbeg.v4i2.65>

- Banerji, D., & Reimer, T. (2019). Startup founders and their LinkedIn connections: Are well-connected entrepreneurs more successful? *Computers in Human Behavior*, 90, 46–52. <https://doi.org/10.1016/j.chb.2018.08.033>
- Becsky-Nagy, P., & Fazekas, B. (2017). Résen van-e az állam? Az állami szerepvállalás hatása a kockázati tőke keresleti oldalára. *Közgazdasági Szemle*, 64(május), 507–527. <https://doi.org/10.18414/KSZ.2017.5.507>
- Biás, Cs. (2022, January 26). *Az unikornishoz vezető út... mivel is van kikövezve? [The road to become a unicorn is paved with...what exactly?]*. Forbes.hu. <https://forbes.hu/uzlet/az-unikornishoz-vezeto-ut-mivel-is-van-kikovezve/>
- Bormans, J., Privitera, M., Novo Devani, K.R., & Arrami, R. (2021). *European Startup Monitor 2020/2021*. European Startup Network. <https://ketmarket.eu/knowledgebase/the-european-startup-monitor-2020-2021/>
- Brockner, J., Higgins, E.T., & Low, M.B. (2004). Regulatory focus theory and the entrepreneurial process. *Journal of Business Venturing*, 19(2), 203–220. [https://doi.org/10.1016/S0883-9026\(03\)00007-7](https://doi.org/10.1016/S0883-9026(03)00007-7)
- Bryman, A. (2012). *Social research methods* (4<sup>th</sup> ed.). Oxford University Press.
- Chakraborty, I., Ilavarasan, P.V., & Edirippulige, S. (2023). Critical success factors of startups in the e-health domain. *Health Policy and Technology*, 12, 100773. <https://doi.org/10.1016/j.hlpt.2023.100773>
- Corbin, J.M., & Strauss, A. (1990). *Basics of qualitative research – Grounded theory procedures and techniques*. Sage Publications.
- Csákné Filep, J., Radácsi, L., & Timár, G. (2020). A magyar startup-vállalkozások túlélését és növekedését befolyásoló tényezők–szakértői interjúk tapasztalatai [Influencing factors of survival and growth at the Hungarian start-ups. Experiences of expert interviews]. *Vezetéstudomány/Budapest Management Review*, 51(1), 16–31. <https://doi.org/10.14267/VEZTUD.2020.01.02>
- Dej, D. (2010). Defining and measuring entrepreneurial success. In M. Lukes & M. Laguna (Eds.), *Entrepreneurship: A psychological approach* (pp. 89–102). Oeconomica Publishers Prague.
- Díaz-Santamaría, C., & Bulchand-Gidumal, J. (2021). Econometric estimation of the factors that influence startup success. *Sustainability*, 13(4), 2242. <https://doi.org/10.3390/su13042242>
- Durda, L., & Ključnikov, A. (2019). Social networks in entrepreneurial startups development. *Economics & Sociology*, 12(3), 192–208. <https://doi.org/10.14254/2071-789X.2019/12-3/13>
- Dvalidze, N., & Markopoulos, E. (2020). Understanding the nature of entrepreneurial leadership in the startups across the stages of the startup lifecycle. In J.I. Kantola & S. Nazir (Eds.), *Advances in human factors, business management and leadership*, 961, 281–292. Springer International Publishing. [https://doi.org/10.1007/978-3-030-20154-8\\_26](https://doi.org/10.1007/978-3-030-20154-8_26)
- Gloor, P.A., Colladon, A.F., Grippa, F., Hadley, B.M., & Woerner, S. (2020). The impact of social media presence and board member composition on new venture success: Evidences from VC-backed US startups. *Technological Forecasting and Social Change*, 157, 120098. <https://doi.org/10.1016/j.techfore.2020.120098>
- Gólya, Á. (2021a). Csak szülessen meg az első magyar unikornis [Let the first Hungarian unicorn be born]. *Forbes*, 9(4), 59–62. <https://magazin.forbes.hu/2021-aprilis/csak-szulesse-meg-az-elso-magyar-unikornis>
- Gólya, Á. (2021b, October 16). *Tőzsdére azért mennénk, hogy aki valaha nekünk dolgozott, házat tudjon venni. Ez fontos – exkluzív interjú Lakatos Dáviddal [We would do the IPO so that people who used to work for us can buy a house. This is important – Exclusive interview with Dávid Lakatos]*. Forbes.hu. <https://forbes.hu/napi-cimlap/budapest-iroda-formlabs-boston-startup/>
- Gólya, Á. (2021c, November 12). *Világsiker, ami nem csak itthonról az. Eddig egy volt, mitől jön a következő? [Visible global success outside of Hungary. We have had one so far. When can we expect the next one?]*. Forbes.hu. <https://forbes.hu/uzlet/vilagsiker-ami-nem-csak-itthonrol-az-eddig-egy-volt-mitol-jon-a-kovetkezo/>
- Gólya Á. (2022, April 19). *Exkluzív: történelmi jelentőségű befektetést kapott az egyik legforróbb magyar startup [Exclusive: One of the hottest Hungarian startups receives historical investment]*. Forbes.hu. <https://forbes.hu/uzlet/magyar-startup-nagy-uzlet-befektetes-seon/>
- Gorgievski, M.J., Ascalon, M.E., & Stephan, U. (2011). Small business owners' success criteria, a values approach to personal differences. *Journal of Small Business Management*, 49(2), 207–232. <https://doi.org/10.1111/j.1540-627X.2011.00322.x>
- Gosztonyi, M., Csákné Filep, J., & Zsigmond-Heinczinger, S. (2022). Comparison of applicability of startup life cycle theories based on natural language processing. *Eastern European Economics*, 60(6), 511–539. <https://doi.org/10.1080/00128775.2022.2111312>
- Havas, A., Jánoskúti, L., Matécsa, M., & Vecsernyés, T. (2023). Startup-ökoszisztéma: Javaslatok a magyarországi startup környezet fejlesztésére. [Startup ecosystem: proposals for improving the startup environment in Hungary.] *Hitelintézési Szemle*, 22(3), 5–25. <https://doi.org/10.25201/HSZ.22.3.5>
- Jáki, E., Molnár, E.M., & Kádár, B. (2019). Characteristics and challenges of the Hungarian startup ecosystem. *Vezetéstudomány/Budapest Management Review*, 50(5), 2–12. <https://doi.org/10.14267/VEZTUD.2019.05.01>
- Karsai, J. (2020). Propped up by the government: The recent evolution of the early-stage equity finance market in Hungary. In D. Klonowski (Ed.), *Entrepreneurial finance in emerging markets: Exploring tools, techniques, and innovative technologies* (pp. 251–267). Palgrave Macmillan. [https://doi.org/10.1007/978-3-030-46220-8\\_16](https://doi.org/10.1007/978-3-030-46220-8_16)

- Karsai, J. (2022). A kelet-közép-európai startupok romló kilátásai a nemzetközi kockázati-tőke-piacon. *Közgazdasági Szemle*, 69(9), 1009–1030. <https://doi.org/10.18414/KSZ.2022.9.1009>
- Kézai, P. K., & Szombathelyi, M. K. (2020). Nők a startup-vállalkozások világában Magyarországon [Women in the world of startup entrepreneurs in Hungary]. *Vezetéstudomány/Budapest Management Review*, 51(10), 51–62. <https://doi.org/10.14267/VEZTUD.2020.10.05>
- Kézai, P.K., & Szombathelyi, M.K. (2021). Factors effecting female startappers in Hungary. *Economics & Sociology*, 14(4), 186–203. <https://doi.org/10.14254/2071-789X.2021/14-4/11>
- Kim, B., Kim, H., & Jeon, Y. (2018). Critical success factors of a design startup business. *Sustainability*, 10(9), 2981. <https://doi.org/10.3390/su10092981>
- Ko, C.R., & An, J.I. (2019). Success factors of student startups in Korea: From employment measures to market success. *Asian Journal of Innovation and Policy*, 8(1), 97–121.
- Koskinen, H. (2023). Outlining startup culture as a global form. *Journal of Cultural Economy*, 16(6), 812–828. <https://doi.org/10.1080/17530350.2023.2216215>
- Krippendorff, K. (2018). *Content analysis: An introduction to its methodology*. Sage Publications. [https://books.google.com/books?hl=hu&lr=&id=nE1aDwAAQ-BAJ&oi=fnd&pg=PP1&dq=The+Content+Analysis+Guidebook&ots=y\\_71-qdL9y&sig=SxUPfwx-NI0gMIW4qnUg2cEhIhp4](https://books.google.com/books?hl=hu&lr=&id=nE1aDwAAQ-BAJ&oi=fnd&pg=PP1&dq=The+Content+Analysis+Guidebook&ots=y_71-qdL9y&sig=SxUPfwx-NI0gMIW4qnUg2cEhIhp4)
- Lovas, A., & Rába, V. (2013). Állami szerepvállalás a start-up vállalatok finanszírozásában. [The role of state in the funding of startups]. *Hitelintézet Szemle*, 12(5), 353–370.
- Lovrinevic, M. (2022). Early-stage vs. growth-stage startups: Examining the differences in the perception of factors instrumental to success. *ECMLG 2022 18th European Conference on Management, Leadership and Governance*, 18(24), 4.
- Macnamara, J.R. (2005). Media content analysis: Its uses, benefits and best practice methodology. *Asia Pacific Public Relations Journal*, 6(1), 1–34.
- Magos, A., & Németh, G. (2014). Vállalkozói kultúra fejlesztés nagyban. In M. Lukovics & B. Zuti (Eds.), *A területi fejlődés dilemmái. 2014-2020 című konferencia előadás anyagai* (pp. 359–368). Szegedi Tudományegyetem Gazdaságtudományi Kar.
- Mazzucato, M. (2014). *The entrepreneurial state. Debunking public vs. private sector myths*. Anthem Press.
- McMillan, J., & Woodruff, C. (2003). The central role of entrepreneurs in transition economies. *Journal of Economic Perspectives*, 16(3), 153–170. <https://doi.org/10.1257/089533002760278767>
- Neuendorf, K.A. (2017). *The content analysis guidebook*. Sage. [https://books.google.com/books?hl=hu&lr=&id=nMA5DQAAQBAJ&oi=fnd&pg=PP1&dq=The+Content+Analysis+Guidebook&ots=pIL-rz6dr7r&sig=cegBzFyD8GdBpJKW9xni-DmL\\_LO](https://books.google.com/books?hl=hu&lr=&id=nMA5DQAAQBAJ&oi=fnd&pg=PP1&dq=The+Content+Analysis+Guidebook&ots=pIL-rz6dr7r&sig=cegBzFyD8GdBpJKW9xni-DmL_LO)
- Okrah, J., Nepp, A., & Agbozo, E. (2018). Exploring the factors of startup success and growth. *The Business & Management Review*, 9(3), 229–237.
- Paschen, J. (2017). Choose wisely: Crowdfunding through the stages of the startup life cycle. *Business Horizons*, 60(2), 179–188. <https://doi.org/10.1016/j.bushor.2016.11.003>
- Pecze, K. (2022). Siker koncepciók a szakirodalom tükrében [Concepts of success in the literature]. *BGE Budapest LAB Working Paper Series*, 2022(21). <https://budapestlab.hu/wp-content/uploads/2022/09/Working-Paper-Series-21-2022.pdf>
- Petru, N., Pavlák, M., & Polák, J. (2019). Factors impacting startup sustainability in the Czech Republic. *Innovative Marketing*, 15(3), 1–15. [https://doi.org/10.21511/im.15\(3\).2019.01](https://doi.org/10.21511/im.15(3).2019.01)
- Prohorovs, A., Bistrova, J., & Ten, D. (2019). Startup success factors in the capital attraction stage: Founders' perspective. *Journal of East-West Business*, 25(1), 26–51. <https://doi.org/10.1080/10669868.2018.1503211>
- Radácsi, L., & Csákné Filep, J. (2021). Survival and growth of Hungarian start-ups. *Entrepreneurship and Sustainability Issues*, 4, 262. [https://doi.org/10.9770/jesi.2021.8.4\(15\)](https://doi.org/10.9770/jesi.2021.8.4(15))
- Ratzinger, D., Amess, K., Greenman, A., & Mosey, S. (2018). The impact of digital start-up founders' higher education on reaching equity investment milestones. *The Journal of Technology Transfer*, 43, 760–778. <https://doi.org/10.1007/s10961-017-9627-3>
- Reisdorfer-Leite, B., Marcos de Oliveira, M., Rudek, M., Szejka, A.L., & Canciglieri Junior, O. (2020). Startup definition proposal using product lifecycle management. *IFIP International Conference on Product Lifecycle Management*, 426–435. [https://doi.org/10.1007/978-3-030-62807-9\\_34](https://doi.org/10.1007/978-3-030-62807-9_34)
- S Gubik, A., & Farkas, S. (2023). Egyetemi hallgatók és vállalkozás – Hol állunk és hová tartunk? [University students and entrepreneurship—Where are we and where are we going?]. *Multidiszciplináris Kihívások, Sokszerű Válaszok: Gazdálkodás- és Szervezéstudományi Folyóirat*, 2, 170–199. <https://doi.org/10.33565/MKSV.2023.02.07>
- Sándor, K. (2020, June 3). *25 millió dolláros befektetést kapott Barabási Albert-László gyógyszerkutató cége. [Albert László Barabási's medtech startup receives 250 million dollar investment]*. Forbes.hu. <https://forbes.hu/uzlet/25-millio-dollaros-befektetest-kapott-barabasi-albert-laszlo-gyogyszerkutato-cege/>
- Santisteban, J., & Mauricio, D. (2017). Systematic literature review of critical success factors of information technology startups. *Academy of Entrepreneurship Journal*, 23(2), 1–23. <https://www.abacademies.org/articles/systematic-literature-review-of-critical-success-factors-of-information-technology-startups-6638.html>
- Santisteban, J., Mauricio, D., & Cachay, O. (2021). Critical success factors for technology-based startups. *International Journal of Entrepreneurship and Small Business*, 42(4), 397. <https://doi.org/10.1504/IJESB.2021.114266>



- Sevilla-Bernardo, J., Sanchez-Robles, B., & Herrador-Alcaide, T. C. (2022). Success factors of startups in research literature within the entrepreneurial ecosystem. *Administrative Sciences, 12*(3), 102. <https://doi.org/10.3390/admsci12030102>
- Sharchilev, B., Roizner, M., Rummyantsev, A., Ozornin, D., Serdyukov, P., & de Rijke, M. (2018). Web-based startup success prediction. In *Proceedings of the 27th ACM International Conference on Information and Knowledge Management* (pp. 2283–2291). ACM. <https://doi.org/10.1145/3269206.3272011>
- Silverman, D. (2008). *Doing qualitative research: A practical handbook*. Sage.
- Skawińska, E., & Zalewski, R. I. (2020). Success factors of startups in the EU—A comparative study. *Sustainability, 12*(19), 8200. <https://doi.org/10.3390/su12198200>
- Startup Hungary. (2021). *Hungarian Startup Report 2021*. Startup Hungary. [https://cdn.prod.website-files.com/64805b4f2e801cea6a10cdb8/64cbcb3bd4a2df7ca14b6011\\_Startup\\_Hungary-Hungarian-Startup-Report-2021.pdf](https://cdn.prod.website-files.com/64805b4f2e801cea6a10cdb8/64cbcb3bd4a2df7ca14b6011_Startup_Hungary-Hungarian-Startup-Report-2021.pdf)
- Startup Hungary. (2023). *Hungarian Startup Report 2022*. Startup Hungary. [https://cdn.prod.website-files.com/64805b4f2e801cea6a10cdb8/64cbcb002cf79be4856fbded\\_Startup\\_Hungary\\_startup\\_riport\\_2022.pdf](https://cdn.prod.website-files.com/64805b4f2e801cea6a10cdb8/64cbcb002cf79be4856fbded_Startup_Hungary_startup_riport_2022.pdf)
- Strauss, A., & Corbin, J. M. (1997). *Grounded theory in practice*. Sage Publications.
- Szerb, L., & Kocsis-Kisantal, O. (2008). Vállalkozói kultúra Magyarországon két napilap tükrében [Corporate culture in Hungary seen through two daily newspapers]. *Közgazdasági Szemle, 55*(3), 243–261. <https://epa.oszk.hu/00000/00017/00146/pdf/04mhszerb-kocsis-kisantal.pdf>
- Szerb, L., & Trumbull, W. N. (2016). The development of entrepreneurship in the European transition countries: Is transition complete? *Strategic Change, 25*(2), 109–129. <https://doi.org/10.1002/jsc.2051>
- Virágh, E.A., & Szepesi, B. (2022). Vállalkozók reprezentációja a főáramú online médiában Magyarországon [Representation of entrepreneurs in the mainstream online media in Hungary]. *Szociológiai Szemle, 32*(3), 24–56. <https://doi.org/10.51624/SzocSzemle.2022.3.2>
- Virágh, E.A., Tímár, G., & Pecze, K. (2024). Startup success from the founder's perspective. *Society and Economy*. <https://doi.org/10.1556/204.2023.00029>
- Zhang, J. (2011). The advantage of experienced start-up founders in venture capital acquisition: Evidence from serial entrepreneurs. *Small Business Economics, 36*, 187–208. <https://doi.org/10.1007/s11187-009-9216-4>
- Zsiborás, G. (2021a, March 17). *Exkluzív: 10 millió euróval szállnak be nagyágyúk a magyar fintech startupba* [Exclusive: Big guns invest 10 million euros into the Hungarian fintech startup]. Forbes.hu. <https://forbes.hu/uzlet/exkluziv-10-millio-euroval-szallnak-be-nagyagyuk-a-magyar-fintech-startupba/>
- Zsiborás, G. (2021b, November 23). *Exkluzív: közel 20 milliárd forintos befektetést kap a legforróbb magyar startup, a Bitrise* [Exclusive: Hottest Hungarian startup Bitrise receives almost 20 billion HUF investment]. Forbes.hu. <https://forbes.hu/uzlet/exkluziv-befektetes-series-c-bitrise-mobile-devops/>
- Zsiborás, G. (2022a, September 5). *500 millió dollárt érhet, igazi elitklubba került egy magyar startup*. [Hungarian startup became a member of a real elite club, can be worth 500 million dollars]. Forbes.hu. <https://forbes.hu/uzlet/500-millio-dollart-erhet-igazi-elitklubba-kerult-egy-magyar-startup/>
- Zsiborás, G. (2022b, August 19). *Tíz éve jobban állt a magyar startup-ökoszisztéma, mint ma – interjú*. [The Hungarian startup ecosystem looked better ten years ago than today – Interview]. Forbes.hu. <https://forbes.hu/interju/startup-hungary-bias-csongor-interju/>



# DEVELOPING EFFECTIVE R&D MODELS IN HIGHER EDUCATION – CRITERIA AND STRUCTURED APPROACHES

## A HATÉKONY K+F MODELLEK KIDOLGOZÁSA A FELSŐOKTATÁSBAN – KRITÉRIUMOK ÉS STRUKTURÁLT MEGKÖZELÍTÉSEK

This study provides a comprehensive framework for analysing and developing research and development (R&D) models in higher education. Despite the evolution of R&D management practices, there remains a lack of clearly defined models that ensure long-term flexibility and effective management within rapidly changing environments. Drawing on existing literature, this paper proposes criteria and structured approaches for higher education institutions (HEIs) to manage and facilitate R&D activities. By focusing on key dimensions such as mission alignment, research strategy, innovation strategy, and intellectual capital management, this study aims to offer practical guidelines to enhance the competitiveness and societal impact of HEIs. The goal is to move beyond general recommendations and provide a detailed criteria checklist to guide the development of effective R&D models.

**Keywords:** R&D model, higher education, framework development, innovation strategy, institutional competitiveness

A tanulmány célja, hogy átfogó keretrendszert nyújtson a kutatás-fejlesztési (K+F) modellek elemzéséhez és fejlesztéséhez a felsőoktatásban. Annak ellenére, hogy a K+F menedzsmentgyakorlatok fejlődtek, továbbra sincsenek egyértelműen meghatározott modellek, amelyek biztosítják a hosszú távú rugalmasságot és a hatékony menedzsmentet a gyorsan változó környezetben. A rendelkezésre álló szakirodalomra támaszkodva ez a tanulmány olyan kritériumokat és strukturált megközelítéseket javasol, amelyek segítik a felsőoktatási intézményeket (HEI-k) a K+F tevékenységek irányításában és elősegítésében. A tanulmány olyan kulcsfontosságú dimenziókra összpontosít, mint a misszióval való összhang, a kutatási stratégia, az innovációs stratégia és a szellemi tőke menedzsmentje, célja pedig gyakorlati útmutatások nyújtása, amelyek növelhetik a HEI-k versenyképességét és társadalmi hatását. A cél az általános ajánlások túllépése és részletes kritériumlisták biztosítása a hatékony K+F modellek fejlesztésének irányítására.

**Kulcsszavak:** K+F modell, felsőoktatás, keretrendszer-fejlesztés, innovációs stratégia, intézményi versenyképesség

### Funding/Finanszírozás:

The authors did not receive any grant or institutional support in relation with the preparation of the study. A szerzők a tanulmány elkészítésével összefüggésben nem részesültek pályázati vagy intézményi támogatásban.

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The article was received: 10. 03. 2024, revised: 11. 05. 2024, 23. 05. 2024, 28. 07. 2024 and 23. 09. 2024, accepted: 23. 09. 2024.

A cikk beérkezett: 2024. 03. 10-én, javítva: 2024. 05. 11-én, 2024. 05. 23-án, 2024. 07. 28-án és 2024. 09. 23-án, elfogadva: 2024. 09. 23-án.

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As academic institutions evolve into innovation hubs, the importance of research and development (R&D) models in higher education has become increasingly prominent (Radović et al., 2023). Higher education institutions (HEIs) play an important role in driving the growing demand for groundbreaking research, technological innovation and economic development. An example is the Massachusetts Institute of Technology (MIT), which is renowned for its innovative R&D collaboration approach with industry and government, highlighting the significant effect of collaborative efforts in advancing real-world solutions (Khan et al., 2022). In this study, R&D models are theoretical constructs for organising R&D activities within HEIs, while R&D strategies refer to the actual methods and strategies used to implement these models. This study explores the structured frameworks used by HEIs to manage and promote R&D, including research management organisational structures and ecosystem models which illustrate the interactions and connections between HEIs and industry, government and the community. The main goal of this paper is to explore how these models can innovate and function collaboratively.

The nature of HEIs which combine knowledge creation with real-world applications highlights the dual task of universities in academic advancement and practical solutions (McDonnell-Naughton, 2022). The functions of creating new technologies, cultivating critical thinking and stimulating economic growth through innovation and entrepreneurship make HEIs key players in addressing global challenges (Stolze et al., 2022).

The OECD's Oslo Manual and Frascati Manual have provided important guidance for the global interpretation of R&D and innovation. The Frascati Manual was developed in 1963 and has been regularly updated (OECD, 1980, 1993, 2002, 2015). It standardises R&D statistics and emphasises the inclusion of humanities and social sciences (OECD, 2015). Since 1992, the Oslo Manual has expanded from technological innovation to broader organisational and marketing innovation, emphasising the role of the public sector (OECD, 2005, 2018). These manuals provide research and innovation strategies for HEIs. The Frascati Manual aligns R&D activities with international standards and strengthens global cooperation, while the Oslo Manual guides technology transfer offices to commercialise research through various channels.

Building on the foundational works of scholars such as Bushaway (2003), Connell (2005) and the OECD (2005), this paper acknowledges that university research frameworks and management strategies are well documented but finds an observable deficiency in the existing literature regarding the particular models which HEIs may adopt. This paper seeks to address this deficit by proposing a set of criteria and structured approaches which may be employed in the development and analysis of R&D models which are specifically tailored to the distinctive requirements of HEIs.

This review critically analyses Bushaway's (2003) insights on university research operations management and Connell's (2005) and the OECD's (2005) extensive

assessments of university research management challenges and strategies, providing a solid foundation for elucidating the structure of higher education R&D. Despite these foundational contributions, this paper argues that the rapid changes in the global research landscape, coupled with new technological and interdisciplinary challenges, necessitate further development of existing R&D models.

## Research questions

To achieve the goal of improving the adaptability and applicability of R&D in diverse higher education settings, this paper aims to draw practical insights and recommendations from the literature. The research questions of this paper are as follows:

1. What are the essential criteria for developing effective R&D models in higher education?
2. How can these criteria be applied to create structured frameworks for managing R&D activities in HEIs?
3. What practical guidelines can be derived from existing literature to assist HEIs in developing and implementing these frameworks?

These questions are intended to stimulate empirical research that tests the theoretical constructs proposed in this paper, thereby increasing our understanding and enhancing the implementation of R&D models in higher education.

## Methodology

This study utilised a systematic literature review with bibliometric and thematic analysis. The SLR followed Petticrew and Roberts' (2006) methodology to find, assess and combine relevant studies on R&D models in higher education.

Table 1

### The quality rules of the study

<b>• Inclusion Criteria:</b>	<b>• Exclusion Criteria:</b>
<ul style="list-style-type: none"> <li>• Studies published in peer-reviewed journals.</li> <li>• Articles focused on R&amp;D models in higher education.</li> <li>• Publications written in English.</li> <li>• Empirical research providing data on higher education R&amp;D activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Studies not related to higher education R&amp;D.</li> <li>• Non-peer-reviewed articles.</li> <li>• Publications not written in English.</li> <li>• Duplicates and articles lacking empirical data.</li> </ul>

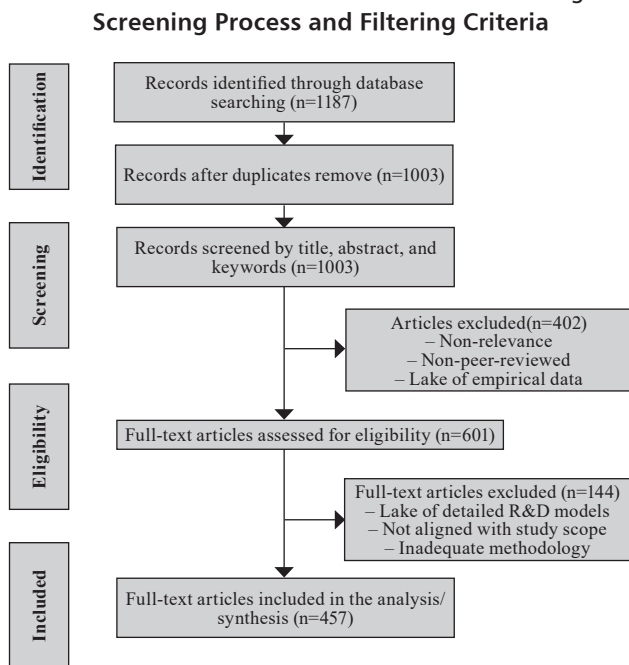
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A literature search was conducted on major academic databases including JSTOR, Scopus and Web of Science. The search used keywords including 'R&D models of higher education', 'innovation in higher education institutions', 'technology transfer', 'innovation management', 'university-industry collaboration', 'intellectual property management in academia' and 'R&D models'. Additionally,

Vos Viewer (Van & Waltman, 2010) was used to create and show bibliometric networks. This facilitated exploring the relationships between key terms and themes in the literature. To ensure the studies in this review are relevant and of high quality, the following rules were followed (Table 1).

A systematic literature review (SLR) was conducted to identify relevant studies and included the steps shown in Figure 1.

Figure 1



Source: own compilation

This study employed a two-step coding process consisting of open coding and axial coding to systematically analyse the literature on R&D models in higher education. Each article was examined separately, focusing on the method, results and conclusions sections. Using the

EFQM Facilitator Framework and the EUA Institutional Assessment Report Format, the relevant sections of each article were assessed and marked as either ‘R&D Model (R&DM)’ or ‘Practical Suggestions (PS)’ based on the established themes. During the open coding phase, key concepts were identified and sections labelled according to recurring themes, capturing a wide range of relevant insights without pre-imposing categories. Within the axial coding phase, these open codes were organised into broader categories, exploring relationships between themes and were grouped into higher-level constructs, such as ‘innovation strategy’ and ‘research management’. These were later categorised under the broader concept of ‘Effective R&D Models’. This approach ensured that the data were systematically coded and provided a clear framework for understanding key themes in the literature, which are summarised in Table 2 for further analysis.

This study does not promise to identify and compare multiple existing models. Instead, it provides a framework for developing such models. It examines key dimensions including mission alignment, research strategy, innovation strategy, intellectual capital management and so on. This helps institutions design and implement effective R&D models. This approach improves how R&D is managed and also ensures that R&D is aligned with the institution’s overall mission and goals. This increases R&D’s effect on academic excellence and societal development.

### Research and development management in higher education institutions

Managing R&D in higher education is complex. Prior research reveals that effective evaluation is important. This includes calculating return on investment (Aziz & Tran, 2022), conducting performance evaluations (Jalaliyoon & Taherdoost, 2012) and monitoring through performance indicators (Tijssen, 2011).

A bibliometric analysis was conducted using VoSViewer to reveal the relationships between key terms.

Table 2

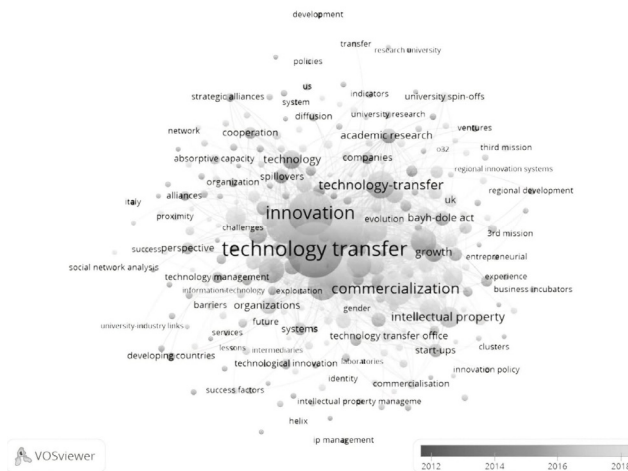
#### Key Themes and Findings Based on EFQM Enablers

EFQM Enablers	Key Themes and Findings	Connection to University R&D
Leadership	Incorporation of sustainability into core values and objectives, along with active stakeholder engagement.	University Mission: Aligns sustainability and core values with the mission. Research Management: Coordinates research activities with institutional goals.
Strategy	Development of integrated quality systems, process integration, future stakeholder needs.	Research Strategy: Aligns research agenda with quality systems and stakeholder needs. Innovation Strategy: Integrates innovation into strategic objectives.
People	Policies for personnel management, fostering engagement and accountability and individual development plans.	Research Strategy: Ensures motivated and aligned researchers. Research Management: Enhances research efficiency and success.
Partnerships and Resources	Sustainable partnerships, resource efficiency, technology use.	Innovation Strategy: Drives innovation through partnerships. Research Funding: Secures and manages funding efficiently.
Processes, Products and Services	Process approach, measurement systems, stakeholder feedback.	Research Management: Ensures efficient management and continuous improvement. Research Funding: Monitors funding utilisation and accountability.

Source: own compilation

The keywords were selected to fit the research focus. The terms appeared in at least 10 publications from 2000 to 2023. This approach identified the main trends and points of discussion on R&D models.

Figure 2  
Bibliographic map (WOS) in technology transfer field till 2023 - Keyword co-occurrence



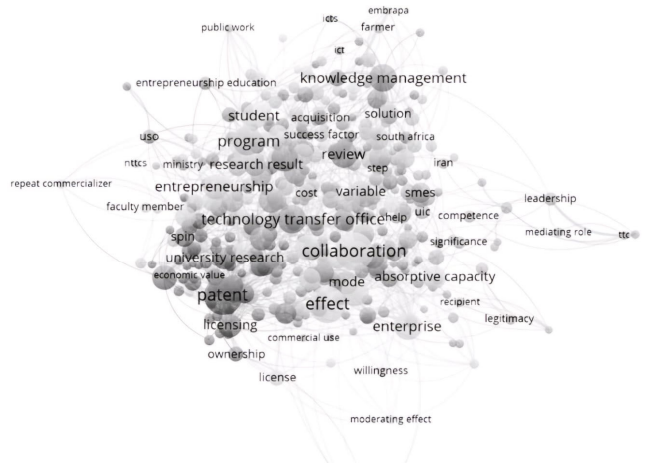
Source: own compilation

Figure 2 presents a comprehensive overview of the technology transfer process, encapsulating the broad spectrum of activities and interactions involved. The central nodes for 'technology transfer', 'innovation', 'commercialisation' and 'intellectual property' indicate these as foundational concepts in the field. Their proximity underscores the core process in HEIs, translating academic research into marketable products or services. Terms like 'technology transfer offices', 'start-ups' and 'intellectual property management' are shifting from blue to yellow, indicating their growing importance in recent discussions and the maturation of HEIs' infrastructure to support these activities. Nodes such as 'university-industry linkages', 'strategic alliances' and 'collaborations' emphasise the crucial role of academia-industry collaboration in effective technology transfer. Links with 'regional development' and 'regional innovation systems' highlight HEIs' contribution to socio-economic growth. The emergence of terms like 'gender' and 'developing countries' reflects the diversification of research, considering broader socio-economic factors and inclusiveness. Furthermore, it demonstrates that technology transfer in HEIs is not linear, but rather a multifaceted process influenced by many things, including policy, collaboration and the economic situation. It is also affected by new ideas and benefits associated with them, as well as partnerships with other organisations.

The university administrative system is important for ensuring research and management offices collaborate with other departments. Using information and communication technology can increase efficiency by making systems easier to use (Krishnaveni & Meenakumari, 2010). Successful R&D projects depend

on cooperation and support from all stakeholders (Pinto & Slevin, 1989). Technology can make research and management activities more efficient but can also complicate them. The literature reveals that planning and evaluation are important (Łącka & Brzezicki, 2020; Qin & Du, 2018), but increasing R&D efficiency remains difficult. More research is needed on how HEIs manage their R&D. Examining factors such as the university mission, research strategy, innovation strategy and intellectual property management can help identify better ways of doing things. These studies demonstrate that structured management can improve R&D efficiency and effectiveness, helping to achieve institutional goals and better results.

Figure 3  
Text map (WOS) in research and development in technology transfer in HEIs till 2023



Source: own compilation

Figure 3 shows the main topics related to technology transfer in HEIs. Terms like 'technology transfer', 'patent', 'spin' and 'licensing' are associated with legality and commercialisation. Patenting and licensing are part of technology transfer. Intellectual property is important in transferring research to industry. Clusters featuring 'entrepreneurship', 'spinouts' and 'university research' show how entrepreneurship can create economic value from academic research.

The term 'collaboration' is linked to 'enterprise', 'effect' and 'absorptive capacity'. It shows that partnerships between HEIs and businesses are important for effective technology transfer. References to 'students' and 'entrepreneurship education' show that HEIs can help create future innovators and entrepreneurs. The map shows regions like South Africa, which highlights the focus on regional contexts.

This analysis reveals that technology transfer in HEIs is complex and involves R&D, intellectual property (IP) management, entrepreneurship and collaboration. These factors, along with educational programmes, regional factors and entrepreneurial mindsets, are all important for successful technology transfer.

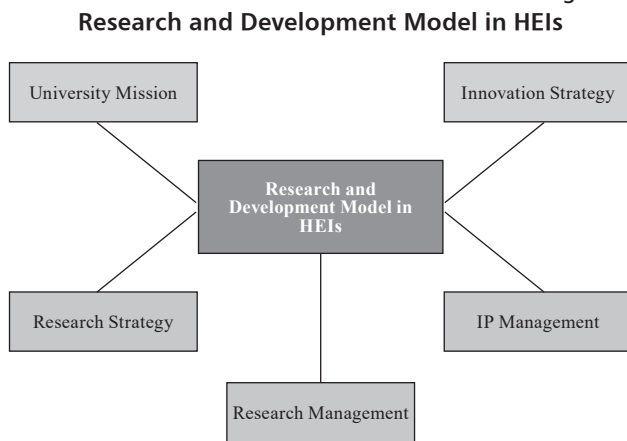


## Synthesis of thematic analysis and visual representation

Figures 4–15 were created by reading and coding relevant literature, then analysing it thematically and using mind mapping. These figures show the main ideas and results, giving a complete picture of the changing R&D models in this paper.

In higher education, R&D is a key part of turning academic research into commercial products (Etzkowitz & Leydesdorff, 2000). This change from theory to practice requires a strong and complete system, as shown in Figure 4.

Figure 4



Source: own compilation

A university's mission statement outlines the institution's purpose and objectives. An institution's mission is linked to its R&D. Knowing a university's goals helps to plan academic work and achieve social benefits. Their mission guides all other activities, ensuring they fit with the wider institutional ethos (Clark, 1998; Rana et al., 2022).

The research strategy is based on the university's mission and plans how to improve research and development. It helps determine how to utilise resources, select research topics and work with other groups inside and outside the university. This means that the R&D efforts are in line with the university's overall goals and can have a significant effect (Geuna & Muscio, 2009; Rasli et al., 2022).

Innovation strategy in HEIs must incorporate how research can be used to create new solutions. This means identifying ways to use research to create new products or services and ensuring these ideas are put into practice (Solievich, 2022).

Effective research management involves controlling budgets, managing staff and sharing technology. Good management is key to using resources well and moving research into practice (Namara, 2023).

Management of intellectual property is a valuable asset for HEIs. It is often created through R&D. Institutions must have good policies to protect and manage their intellectual property. This helps them benefit from their work while respecting the rights of the researchers involved (Siegel et al., 2003, Ravi & Janodia, 2022).

For HEIs, the journey from research to impact is complex. It requires a coordinated strategy which aligns with the institution's mission and considers all aspects.

## University mission

A university mission incorporates the changing values of a university by exploring the underlying mechanisms of the university's social influence (Carl & Menter, 2021). A sound university mission enables the development of a research strategy which focuses on the institution's mission and its overall goals. It also encourages the development of innovative strategies to help remain competitive in a rapidly changing world.

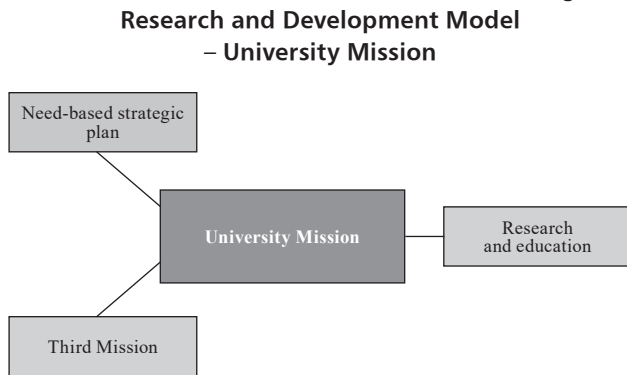
Research and education have always been the two main tasks of HEIs. However, higher education has been given a third mission. This so-called 'third mission' is transforming the academic value of HEIs into the value of actively contributing to society (Zomer & Benneworth, 2011). The 'third mission' thus refers to the social, entrepreneurial and innovative activities which universities undertake in addition to their educational and research activities, which aims to transfer knowledge and technology from academic institutions to society in order to solve real-world problems. While the process of commercialising technology transfer can be income-generating and potentially very lucrative, the resulting start-ups, spin-offs, incubators, etc., can further support technology transfer and thus enhance an HEI's reputation. While the benefits of commercialisation can be a great incentive for both stakeholders and technology owners, the aim of pursuing a 'third mission' is to make a valuable contribution to society (Mars & Burd, 2013; Tien et al., 2022). Technology transfer centres help experts, inventors, staff and students in HEIs to create and develop ideas for technology transfer. As a result, there is a growing consensus to increase the social value of technology transfer.

The definition of 'third mission' (TM) is also guided by references to S3 strategies of Europe 2020, which aims to promote smart, sustainable and inclusive growth in Europe and its regions. Despite widespread recognition by universities, governments, industry and society that TM is increasingly important, the concept of TM remains ambiguous. Indeed, it has been defined in various ways, covering a wide range of models, dimensions, functions and activities, all of which have led to extensive debate among scholars and policy makers. There is no doubt that the growing body of research and interest in TM is reflected in the increasing government pressure on universities to add TMs to their programme syllabuses, labelled 'contribution to society' (Compagnucci & Spigarelli, 2020).

Thus, the mission of universities has changed from maintaining their two major tasks of education and research to also contributing to society. Within this process, technology transfer or knowledge transfer has played an important role. Universities must maintain continuous innovation and output in order to continuously contribute more technology and knowledge to society. Before universities plan how to better contribute to society, they must

have a needs-based strategic plan. This means committing to funding, human resources, research capabilities and partnerships (Tumwebaze Alicon, 2022), as shown in the Figure 5.

Figure 5



Source: own compilation

### Research strategy

A research strategy is the foundational step in effective research management. It should identify key research themes which align with the institution’s mission and the broader national and global higher education landscape. This strategy should i) outline the policy environment, ii) include a SWOT analysis to identify strengths, weaknesses, opportunities and threats, and iii) establish clear priorities and objectives. While this process was traditionally informal, it is now recognised as a crucial element of good governance and management (Mittelmeier & Yang, 2022).

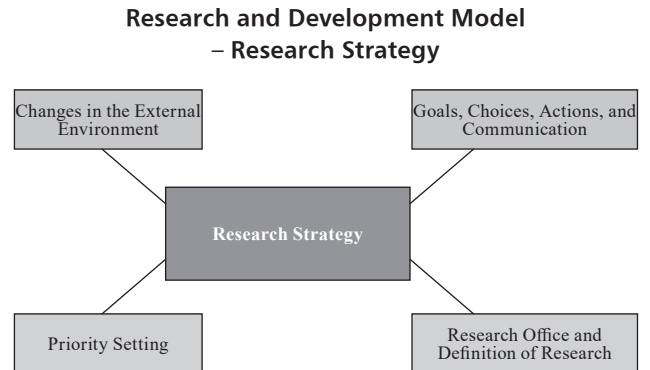
A research office plays a central role in this increasingly professionalised approach to research management, offering support to researchers and performing audit functions for both its institution and government agencies. A technology transfer office (TTO), often a newer and separate unit, is typically responsible for the commercialisation of intellectual property, including patents, licensing and company formation. This paper contends that integrating the TTO with the research office would better align research efforts with external demands, enhancing the overall impact and relevance of research activities.

Changes in the external environment, such as policy, support the transformation of university research from personal pursuits to academic careers requiring management. With research management and research offices playing an important role, it is increasingly important how a university defines its research strategy, sets priorities, and responds to emerging challenges (Hazelkorn & Herlitschka, 2010).

The reasons for developing research strategies vary between universities, but also have commonalities, such as external pressures, increased competition and budget cuts, and a desire for quality. Thus, there is a need for a more coherent approach and institutional support for dialogue with external partners. The increasing differentiation of sciences also creates a need to increase opportunities for

interdisciplinary research. Likewise, traditionally organised universities struggle to meet the ‘grand challenges’ of modern society. Goals, choices, actions and communication are intermingled in the strategic plans of European universities (Gunnarsson, 2012) as shown in Figure 6.

Figure 6



Source: own compilation

### Innovation strategy

Schumpeter (1934) defined innovation as launching a new product or service, using new methods, opening a new market, or creating or destroying a monopoly organisation. He referred to innovation as new combination of things or operations. Innovation is both a process (Thompson, 1965) and an outcome (Barnett, 1953), encompassing new ideas, technology or practices (Van De Ven, 1986)).

An innovation strategy is an essential part of any organisation looking to drive innovation and achieve long-term success. By outlining the goals and priorities of an organisation’s innovation activities, an innovation strategy helps the organization focus its efforts and resources to achieve those goals (Gulamov et al., 2022). One of the primary benefits of an innovation strategy is that it promotes alignment within an organisation. With a clear plan in place, different departments and teams can work together to achieve common goals rather than pursue individual priorities, this is about communication and collaboration in the organisation. This alignment helps maximise the effects of an organisation’s innovation efforts and can lead to better results. Another important benefit of an innovation strategy is that it prevents organisations from becoming complacent. As new technologies and competitors continue to enter the market, organisations must stay ahead of their competitors and innovate. By directing an organisation’s innovation efforts toward its goals, an innovation strategy can help ensure that an organisation remains competitive, maintains its position and continues to drive long-term growth and success (Mohamed Hashim et al., 2022).

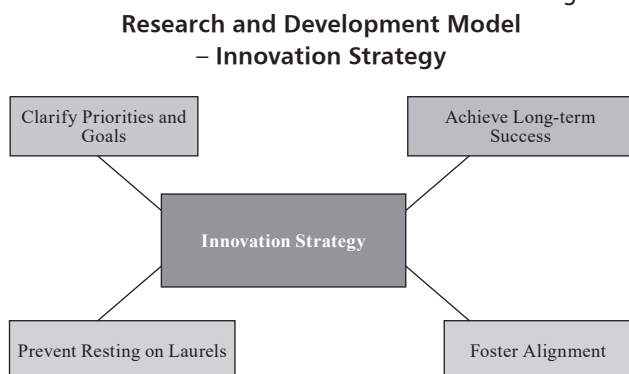
The specific approach to innovation in higher education will depend on the mission, goals and needs of the individual university. Nevertheless, a university’s innovation strategy may typically encompass the following elements:

- The fostering of interdisciplinary collaboration between faculty, students and researchers is a key strategy for driving innovation and promoting creative thinking (Bromham et al., 2016).
- The formation of new collaborative relationships with businesses and organisations represents a core objective, with the aim of accelerating the transition of research and innovation from the laboratory to the market (Ankrah et al., 2015).
- To drive innovation in the university's focus areas, investment must be made in R&D initiatives (Bozeman et al., 2013).
- The provision of support for commercialisation and entrepreneurship initiatives for students, faculty and researchers (Hayter et al., 2017) represents a key objective.
- The cultivation of an environment conducive to innovation and creativity within the university community (Jackson, 2011).

While the specific concerns and core issues of a university's innovation strategy may vary, some common concerns include the following:

- Guaranteeing that innovation activities are aligned with the university's mission and objectives is of the utmost importance (Cantwell & Kauppinen, 2014).
- The attraction and retention of top talent is of paramount importance for the advancement of innovation within the university (Franzoni et al., 2012).
- The securing of funding and resources for innovation initiatives is a further key issue (Geuna & Muscio, 2009).
- The promotion of collaboration and partnerships between academia, business and government is recommended to enhance the impact of innovation activities (Perkmann et al., 2013).
- The construction of a framework for commercialising and transferring innovations to the market is advised (Siegel & Wright, 2015).
- These elements and concerns are intended to provide a general overview and may vary considerably depending on the specific needs and goals of a university, as illustrated in Figure 7.

Figure 7



Source: own compilation

This framework helps universities identify and focus on the most important factors involved in creating a good environment for innovation. Each part of the checklist involves a different aspect of the university's innovation system, from working with different subjects to acquiring the funding and resources needed.

The alignment of these strategic elements with the broader goals of a university's innovation strategy is inextricably linked to the institution's mission and objectives. For example, the promotion of interdisciplinary collaboration (Bromham et al., 2016) is designed to eliminate internal barriers within a university, thereby facilitating the generation of new ideas and applications. Moreover, the establishment of collaborative relationships with industry partners (Ankrah et al., 2015) and a focus on the commercialisation of academic research (Hayter et al., 2017; Siegel & Wright, 2015) are crucial for the transformation of academic insights into marketable innovations. These initiatives not only advance the university's mission but also significantly contribute to the broader economic development of a region.

## Research management

Mico University (2019) defines research management as the coordination and optimisation of research activities and outcomes in research-focused organisations. It operates between the professional and academic domains to maximise research impacts by integrating the efforts of diverse constituencies. This requires support functions at distinct phases of the research process, including funding, proposal assistance, research execution and impact assessment (OECD, 2005).

Effective communication and the optimal tools and processes are key to successful research management. Research management is not the job of one person or institution. The approach must involve different people at different levels of the research system. Those involved include researchers, funding organisations, research institutions and government agencies (Mico University, 2019). A clear structure in research management is important for getting everyone involved and working together to optimise research.

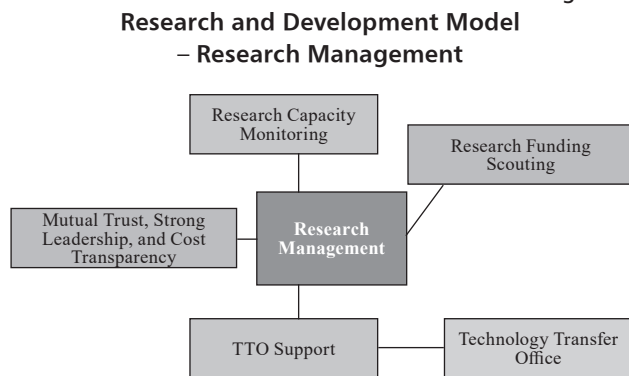
To produce high-quality, impactful research, institutions frequently focus their efforts on monitoring their research capacity. This entails assessing the capabilities, expertise and infrastructure present within an institution to ensure that the available resources are aligned with the research goals. Such monitoring facilitates the identification of areas of strength and enables the determination of where further investment or development may be required (Hicks, 2012).

Securing research funding is important. Because research grants are competitive and funding is important for research, institutions seek funding opportunities. This means understanding new research trends, matching strengths with funding priorities and knowing about traditional and new funding sources (Geuna & Nesta, 2006).

An effective research management strategy requires support from TTOs. These help ensure that new ideas from research labs are used in the real world. They also help protect intellectual property, develop commercialisation strategies and form industry partnerships, making it easier to turn research into useful products (Siegel et al., 2004).

Effective research management hinges on three key factors: mutual trust, robust leadership and cost transparency. By fostering trust, research environments can be created which encourage collaboration and ensure all stakeholders work together toward common goals. Strong leadership provides direction, motivation and clarity, guiding research activities towards meaningful outcomes. Transparency, especially regarding costs, ensures accountability and efficient resource allocation, which are vital in the often resource-constrained research landscape. Effective oversight requires a balance of capacity monitoring, proactive funding strategies, efficient technology transfer mechanisms, and a foundation of trust, leadership and transparency. Figure 8 illustrates this complex landscape and the interconnected elements that are essential for successful research management.

Figure 8



Source: own compilation

### Research funding

The allocation of financial resources to research is a crucial aspect of the operations of a university. It enables the institution to engage in novel research endeavours and contribute to the advancement of society. The manner in which a university is regulated influences the avenues through which it can obtain research funding and enhance its operational efficiency. To illustrate, if universities can access data and information with ease and apply for funding in promptly, they are better positioned to utilise their resources in more efficacious manners and pursue new projects in more expedient ways. Colleges and universities frequently undergo operational changes when they receive external funding and endeavour to enhance their efficiency. It is imperative that higher education systems are efficient. It is also possible for universities to collaborate in order to reduce expenditures. Generally, universities concentrate their efforts on optimising processes, enhancing pedagogical practices and

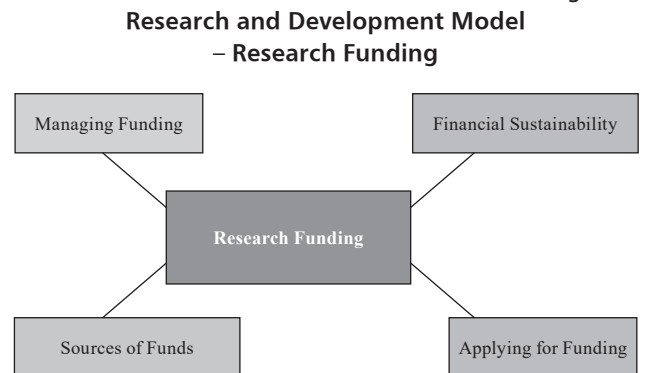
developing their workforce to enhance efficiency and provide greater value for money.

The extent to which a university is decentralised has a significant effect on its ability to operate effectively and secure funding for research. Universities which are afforded greater autonomy in decision-making are better positioned to respond to the needs and opportunities of their respective communities, and to utilise resources in a more efficacious manner. Centralised universities may encounter difficulties in adapting to novel environments and responding to emerging research demands.

Collaboration is also a crucial factor in securing research funding and enhancing efficiency. This can be achieved through utilising government funding, which encourages institutions to either collaborate or compete with one another. For such collaborations to be effective, they must be founded upon trust, strong leadership, transparency and open communication.

The securing of research funding and the enhancement of efficiency also necessitates cost transparency and the implementation of evidence-based decision-making processes. This may entail the allocation of funding in accordance with research outcomes, as well as more effective methods for monitoring and documenting research expenditure. By focusing on these pivotal elements, academic institutions can optimise the management of their resources, facilitate the undertaking of novel research initiatives and drive meaningful advancement. The process of obtaining and managing research funds is inherently complex and is shown in Figure 9.

Figure 9



Source: own compilation

This section explains where research funding can be obtained. Many studies have examined where research funding originates. These include government agencies, non-government organisations, private companies and charities (Hottenrott & Lawson, 2017). Additionally, there has also been greater focus on international funding, where countries work together to fund projects which interest them (Wagner et al., 2019).

Applying for research funding is competitive and complex. Research proposals must meet the funding body's objectives, show impact and use a sound methodology. Additionally, research is often interdisciplinary, so pro-



posals should be accessible to a wide audience (Bozeman & Boardman, 2014).

Once funding is acquired, it must be managed well. This means that finances must be managed openly, with regular reports and funds used for their intended purposes. Prior research has shown that research funding should be managed more efficiently and with fewer administrative costs (Hicks, 2012).

Ensuring research projects are financially sustainable has become more important. Laudel & Gläser (2014) examined the challenges researchers face in acquiring funding. They stated that it is important to get funding from different sources, to use funds from research to fund additional research, and to build strong networks to ensure funds are always available.

### IP management

Managing intellectual property is important for innovation. It helps protect and generate income from R&D. An IP policy helps researchers, innovators and institutions manage and protect their intellectual property. Teixeira and Ferreira (2019) stated that the best-performing institutions have good IP management systems. How many and what quality and quantity of intellectual property rights does an organisation have? This is an important indicator of how well they innovate and compete. Intellectual property rights are important in the global economy and affect society as a whole (Grimaldi et al., 2021).

IP management helps research, development and innovation and involves ensuring that research projects are optimally conducted. The following are parts of managing IP: These elements include IP policies, IP scouting, IP protection, IP valorisation and training tools. The most successful institutions have good IP management. The quantity and quality of IP rights reveal how well an organisation is doing in terms of innovation and competition (Teixeira & Ferreira, 2019). In this period of economic globalisation, IP has increasingly become the core element of strategic resource utilisation and have a strong influence and effect on society at large.

The detailed focus on IP management within the R&D framework of HEIs is intentional, reflecting its critical role in safeguarding and commercialising research findings. The emphasis is due to the increasing importance of IP in a globalised academic environment where effective IP management is pivotal for fostering innovation and ensuring competitive advantages. To provide a balanced perspective, additional sub-chapters detail specific aspects of IP management.

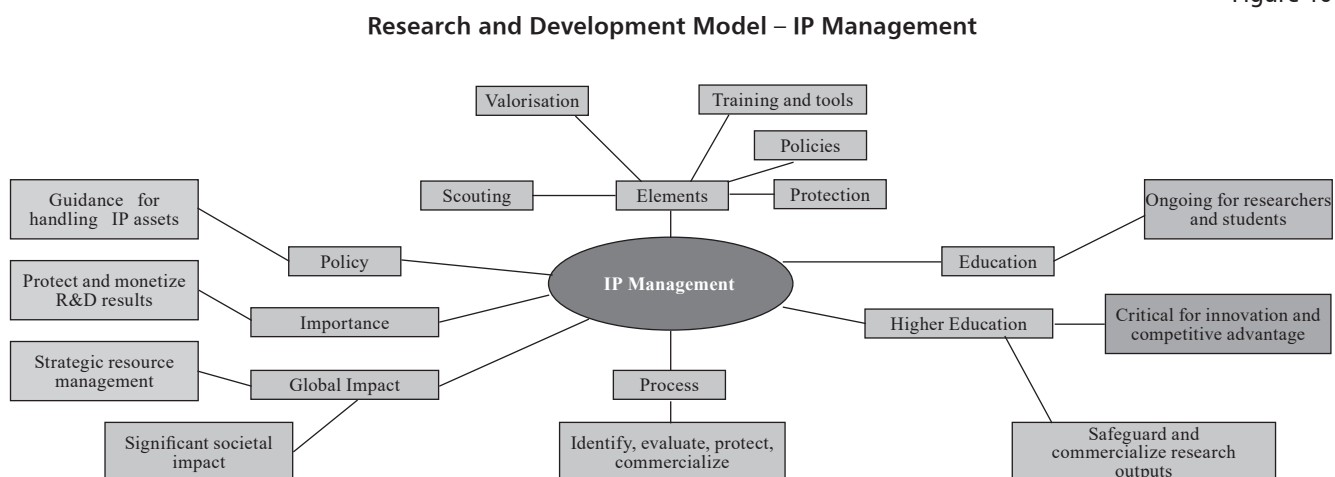
All HEIs are concerned with the creation and dissemination of knowledge. The challenge for university IP managers, policy makers and heads of academic departments is to discern the value of such knowledge and develop policies that best realise its value. Once an institution has determined its overall business model, it must structure an IP policy that complements that model and delivers maximum benefits, then implement it appropriately across its disciplinary portfolio.

IP management in HEIs is a nuanced process which ensures the protection and optimal utilisation of research outputs. Prior researches (Siegel & Wright, 2015; Perkmann et al., 2021, Mohamed Hashim et al., 2022) emphasised a series of interconnected stages which HEIs undertake for effective IP management. First, the institution identifies potential IP from research outputs. Once identified, the IP undergoes a thorough evaluation for its commercial or societal potential. If deemed viable, the institution then proceeds to protect the IP, typically through patents, copyrights or trademarks. With protection in place, the HEI can then strategies on commercialisation or licensing opportunities, often in partnership with industry or through TTOs. Throughout this process, ongoing IP education for researchers and students is crucial to ensure the sustained creation and protection of valuable IP. This process is illustrated in Figure 10.

### Policies

Technology-driven innovation dominates all areas of society, especially human life, and creates a business economy based on ‘knowledge generation’. IP is an intangible

Figure 10



Source: own compilation

asset of HEIs and is often more valuable than any tangible asset. Additionally, IP policies are high-level principles, guidelines and rules associated with the mentioned fields. Trommter (2008) mentioned that universities should be aware of the identification, protection, management, use and benefits associated with IP rights and formulate corresponding policies to guide operational behaviour. The core purpose of an IP policy is to provide a framework to declare and protect the rights of universities and university staff (Rooksby, 2020). Another goal to provide guidelines for industry, government and other communities to make use of universities' IP for national and global interests (Holgersson & Santen, 2018). Therefore, promoting the transfer of technology produced by universities fosters university innovation and creativity, as well as local and national economic growth. Based on the continuous development of technological explosions, 'knowledge assets', various institutions and stakeholders have become the triggers of IP policy formulation (Busch, 2023).

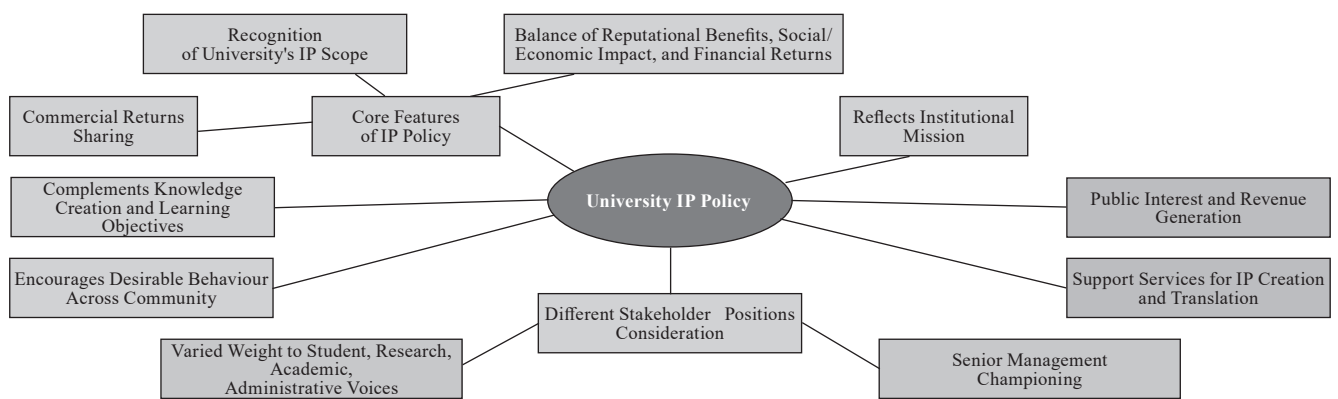
important for senior management to champion a policy to give it the respect it warrants, different institutions may give varying weights to the voices of the student, research, academic or administrative communities in their policies, again suggesting a 'one size fits all' method does not apply. When developing a set of policies, the agency must ensure that it encourages desirable behaviour in every part of its community (Figure 11).

### Patenting

Many universities' research results remain a long way from the market. This is often the case with university-patented technologies. Universities must assess how close any IP is to the market and develop appropriate strategies. For example, cold selling a research opportunity to a business can be challenging. However, the benefit of patented technologies is that they effectively express research results in the form of products which can be commercial-

Figure 11

Research and Development Model – IP policies



Source: own compilation

A university IP policy should reflect the mission of the institution. IP policies must complement the core objectives of knowledge creation, scholarship and learning. It is the institution's responsibility to develop policies and support services which create the best possible environment for the creation of IP and its transformation into practical use, but in a manner which is in the public interest and that generates revenue for the originating institution, students and researchers. The core features of an IP policy should be:

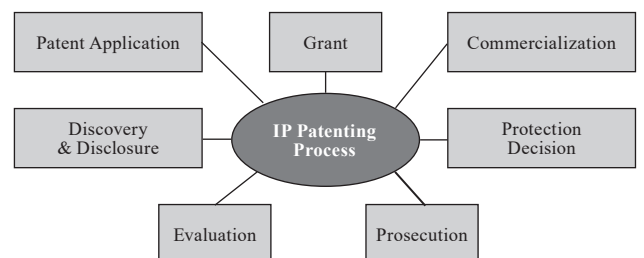
- Arrangements to share any commercial returns from the commercialisation of IP, thereby providing appropriate benefits to the IP originator.
- Recognition of the scope of the university's IP activities; and
- Balancing reputational benefits, positive social and economic impacts, and financial returns from IP-related work.

Those drafting IP policies should ensure it reflects the positions of various stakeholders in academia. While it is

used. Alternatively, they can enable universities to express complex scientific activities in a language which companies can understand. This then creates an avenue to open a dialogue with companies, which could lead to companies investing in research relationships through licensing deals as part of an overall deal. However, universities should view their IP strategy as part of their research strategy rather than as a revenue strategy.

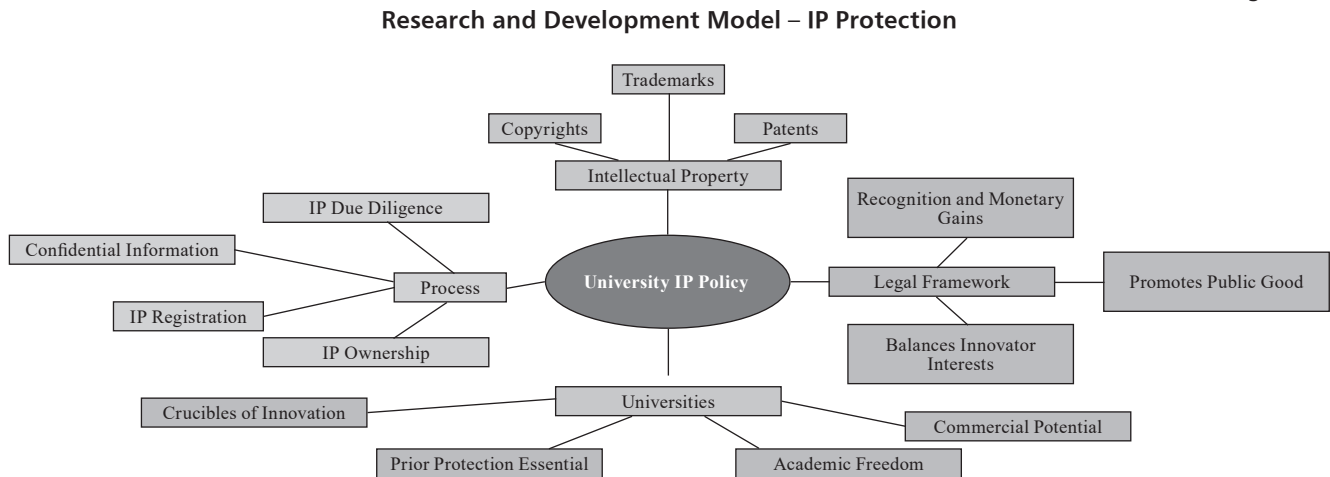
Figure 12

Research and Development Model – Patenting



Source: own compilation

Figure 13



Source: own compilation

The patenting process for university research results generally involves a sequence of actions, beginning with the discovery of potentially patentable research results and eventual reaching the protection of its IP. Drawing from literatures, the process can be summarised as follows:

- *Discovery & Disclosure*: Researchers realise they have potentially patentable results and disclose these to the university's TTO or equivalent body (Conti et al., 2013).
- *Evaluation*: The TTO assesses the patentability of the discovery and its potential commercial value (Soranzo et al., 2017).
- *Protection Decision*: If the invention is deemed patentable and has potential value, a decision to proceed with the patenting process is made (Siegel et al., 2015).
- *Patent Application*: The TTO, often with the help of external patent attorneys, drafts and submits a patent application to the patent office (Grimaldi et al., 2015).
- *Prosecution*: This step involves correspondence with the patent office to clarify, adjust or defend the patent claims (Knight, 2013).
- *Grant*: If successful, the patent application results in a granted patent, giving the university rights to the invention for a set period, usually 20 years (Tahmooresnejad & Beaudry, 2018).
- *Commercialisation*: The university, often through the TTO, seeks to commercialise the patent, either through licensing agreements, creating spin-off companies, or other avenues (Perkmann et al., 2013) (Figure 12).

## Protection

IP, an amalgamation of patents, copyrights and trademarks, provides creators and inventors with legal avenues to earn recognition or income. This legal framework balances the innovator's interests against the larger public

good, creating a conducive environment for creativity and innovation to thrive. Given the intangible nature of these assets, it is imperative they receive protection akin to tangible assets (Lemley, 2015).

Universities, as crucibles of innovation, recognise the value of IP protection. While academic freedom to publish remains paramount, there is an understanding that prior protection of IP related to research is essential before any publication, especially if there is potential commercial utility (Conti et al., 2013)

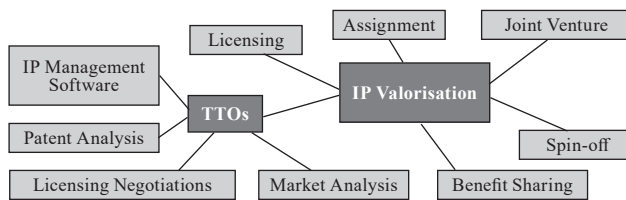
The process of IP protection is multifaceted and can be delineated into the following processes: IP due diligence, IP ownership, confidential information, IP registration (Figure 13).

## Valorisation

IP valorisation refers to the process of converting the results of R&D into commercial assets or societal value. The goal of IP valorisation is to ensure that the results of the research are not just published in academic journals, but also put to practical use for the benefit of society (Siegel et al., 2003). There are several ways to valorise IP, including licensing, assignments, spin-offs, joint ventures, etc. Licensing involves when a third party uses IP in exchange for a fee. Assignment is the giving of the IP to another entity. A spin-off is a new company based on the IP. A joint venture is a partnership to develop and sell the IP. IP ownership and incentives vary by country. Some countries let universities own the IP created by their researchers. In others, the researchers retain ownership. Some countries offer tax incentives or other financial incentives to companies which invest in R&D. The term 'benefit sharing' refers to the distribution of advantages derived from IP. There are three principal models for the distribution of benefits: profit sharing, royalty-based models and equity-based models. The principles of benefit sharing are fairness, transparency and inclusiveness.

Figure 14

## Research and Development Model – IP Valorisation



Source: own compilation

IP can be valued in publicly and privately funded research projects. In cases of publicly funded research, a funding agency retains ownership of the IP and seeks to generate revenue from it. In cases of privately funded research, the company providing the funding will own the IP. TTOs provide researchers with assistance in the commercialisation of their innovations. They also facilitate connections between researchers and industry partners, licensing partners and investors. TTOs assist in the creation and negotiation of agreements pertaining to the protection and utilisation of IP. The IP valorisation process involves numerous individuals, including researchers, TTOs, industry partners, licensing partners, investors and legal advisors. Tools employed in IP valorisation include market analysis, patent analysis, licensing negotiations and software for managing IP. These tools assist in determining the optimal means of generating revenue from IP (Figure 14).

## Discussion

This research demonstrates how technology transfer operates within the context of higher education and how it facilitates the development of novel ideas and societal advancement. This discussion focuses on how university research, innovation policies and IP management contribute to technology transfer.

It is essential that the missions of universities and the goals of technology transfer are aligned. HEIs must demonstrate their commitment to technology transfer, as this informs the decision-making process regarding research focuses. A university's innovation strategy must support the discovery, protection and commercialisation of its IP.

TTOs provide invaluable assistance in navigating the intricate landscape of IP management. TTOs facilitate the commercialisation of innovations by researchers and play a pivotal role in facilitating technology transfer. Currently, the role of these entities is undergoing a transformation. Their role extends beyond the mere protection of IP, as they facilitate the development of entrepreneurial initiatives and the formation of industry partnerships.

The processes of commercialisation and IP management present significant challenges. The process of commercialising research findings is fraught with difficulty. It is incumbent upon HEIs to develop more efficacious IP management methods which are tailored to the specific needs of diverse individuals. To optimise the commercial

potential of research findings, it is also essential to consider various IP valorisation strategies, including licensing, spin-offs and joint ventures. Yet, academic freedom and commercial interests must be balanced. Thus, the traditional way of sharing knowledge must be balanced with the need to generate income from technology. This balance ensures that HEIs can continue doing their primary work of teaching and research. IP protection must be managed to protect academic freedom and make research results available for commercial use.

While IP is a way to sell and apply research, it does not cover all possible results. If we focus solely on traditional commercial outputs like patents and licensing, other ways to use research might be missed. For example, new companies or startups could be created from basic research.

Basic research is the foundation of practical applications. Neglecting this type of research is a big mistake. The Pfizer SARS-CoV-2 vaccine is an example of this. It was developed from research into mRNA technology, which is basic research which only became useful during the COVID-19 pandemic. Therefore, it is essential to advocate for an integrated approach within academic discourse—one which recognises the continuum from basic to applied research. This approach helps different research activities work together, potentially leading to new ideas which can be used in the real world. If universities encourage both basic and applied research, they can commercialise research more easily and demonstrate the value of various types of research. This strategy helps academic institutions contribute to society and economies, and aligns with their broader missions and objectives. By embracing this perspective in our models and planning, this study examines research commercialisation in a broader way and fosters a more vibrant and impactful innovation ecosystem.

Technology transfer should be fair and inclusive. There is a growing focus on inclusivity, including gender and socio-economic factors, so any technology transfer strategy must also be inclusive. This ensures that innovation benefits everyone and helps society as a whole.

Further research should examine how working across different subjects helps technology transfer and the effect of technology transfer on local development and innovation. Additionally, studies examining how well different IP strategies work could help improve the models discussed. Furthermore, the present analysis and review demonstrate that technology transfer is not a simple process; it is a strategic, integrated endeavour. Its success depends on matching university goals with innovation plans, giving TTOs more power and treating all staff fairly when managing IP.

## Conclusion

This paper has suggested a way to improve R&D in higher education. The map describes five areas: university mission, research strategy, innovation strategy, research management and IP management. This map also demonstrates how these areas help HEIs achieve their goals.



Technology transfer is important for society and innovation. TTOs manage IP and commercialise academic research. However, it is difficult to balance commercial and academic values. Therefore, HEIs must adapt their strategies to address new technologies and varying interests.

This study demonstrates that we must test these models using real data. Future research should assess how well these frameworks work in different institutions. Comparative studies of these models in different educational systems would help adapt R&D strategies to suit different institutions and make them more widely applicable. This approach will make R&D management in HEIs more relevant, ensuring that they continue to use academic research to benefit society.

## References

- Ankrah, S., & AL-Tabbaa, O. (2015). Universities–industry collaboration: A systematic review. *Scandinavian Journal of Management*, 31(3), 387–408. <https://doi.org/10.1016/j.scaman.2015.02.003>
- Aziz, M., & Tran, H. (2022). Enhancing institutional competitiveness: The CERTi approach to assessing faculty research development efforts in higher education. *Journal of Research Administration*, 53(1), 122–143. <https://www.srainternational.org/blogs/sra-jra1/2022/03/10/enhancing-institutional-competitiveness-the-certi>
- Barnett, H.G. (1953). *Innovation: the basis of cultural change*. McGraw Hill
- Bozeman, B., & Boardman, C. (2014). *Research collaboration and team science: A state-of-the-art review and agenda*. Springer. <https://doi.org/10.1007/978-3-319-06468-0>
- Bozeman, B., Fay, D., & Slade, C.P. (2013). Research collaboration in universities and academic entrepreneurship: the-state-of-the-art. *The Journal of Technology Transfer*, 38(1), 1–67. <https://doi.org/10.1007/s10961-012-9281-8>
- Bromham, L., Dinnage, R., & Hua, X. (2016). Interdisciplinary research has consistently lower funding success. *Nature*, 534(7609), 684–687. <https://doi.org/10.1038/nature18315>
- Busch, L. (2023). *Knowledge for sale: The neoliberal takeover of higher education*. MIT Press. <https://doi.org/10.1093/scipol/scx046>
- Bushaway, R. (2003). *Managing Research*. McGraw-Hill Education.
- Cantwell, B., & Kauppinen, I. (Eds.) (2014). *Academic Capitalism in the Age of Globalization*. JHU Press.
- Carl, J., & Menter, M. (2021). The social impact of universities: assessing the effects of the three university missions on social engagement. *Studies in Higher Education*, 46(5), 965–976. <https://doi.org/10.1080/03075079.2021.1896803>
- Clark, B.R. (1998). *Creating entrepreneurial universities: organizational pathways of transformation*. *Issues in Higher Education*. International Association of Universities and Elsevier Science Ltd.
- Compagnucci, L., & Spigarelli, F. (2020). The Third Mission of the university: A systematic literature review on potentials and constraints. *Technological Forecasting and Social Change*, 161, 120284. <https://doi.org/10.1016/j.techfore.2020.120284>
- Connell, H. (2005). *University Research Management: Meeting the Institutional Challenge*. OECD. <https://doi.org/10.1787/9789264017450-en>
- Conti, A., Thursby, J., & Thursby, M. (2013). Patents as signals for startup financing. *The Journal of Industrial Economics*, 61(3), 592–622. <https://doi.org/10.1111/joie.12025>
- Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university–industry–government relations. *Research Policy*, 29(2), 109–123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4)
- Franzoni, C., Scellato, G., & Stephan, P. (2012). Foreign-born scientists: mobility patterns for 16 countries. *Nature Biotechnology*, 30(12), 1250–1253. <https://doi.org/10.1038/nbt.2449>
- Geuna, A., & Muscio, A. (2009). The governance of university knowledge transfer: A critical review of the literature. *Minerva*, 47, 93–114. <https://doi.org/10.1007/s11024-009-9118-2>
- Geuna, A., & Nesta, L.J. (2006). University patenting and its effects on academic research: The emerging European evidence. *Research Policy*, 35(6), 790–807. <https://doi.org/10.1016/j.respol.2006.04.005>
- Grimaldi, M., Cricelli, L., Di Giovanni, M., & Rogo, F. (2015). The patent portfolio value analysis: A new framework to leverage patent information for strategic technology planning. *Technological Forecasting and Social Change*, 94, 286–302. <https://doi.org/10.1016/j.techfore.2014.10.013>
- Grimaldi, M., Greco, M., & Cricelli, L. (2021). A framework of intellectual property protection strategies and open innovation. *Journal of Business Research*, 123, 156–164. <https://doi.org/10.1016/j.jbusres.2020.09.043>
- Gulamov, A.A., Ozatbekov, Y.F. & Ozatbekova, O.N. (2022). Innovation-oriented way of development of a modern university. *Journal of New Century Innovations*, 15(3), 53–59.
- Gunnarsson, M. (2012). *Research strategies at universities. A brief survey of research strategies at institutional and departmental level*. University of Gothenburg. <http://hdl.handle.net/2077/32437>
- Hayter, C.S., Lubynsky, R., & Maroulis, S. (2017). Who is the academic entrepreneur? The role of graduate students in the development of university spinoffs. *The Journal of Technology Transfer*, 42, 1237–1254. <https://doi.org/10.1007/s10961-016-9470-y>
- Hazelkorn, E., & Herlitschka, S. (2010). Research strategy and management in universities. Higher education management and development. In J. Huisman & A. Pausits (Eds.), *Higher Education Management and Development. Compendium for Managers* (pp.

- 131-146). Waxman Verlag GmbH. [https://www.researchgate.net/publication/271505496\\_Research\\_Strategy\\_and\\_Management\\_in\\_Universities](https://www.researchgate.net/publication/271505496_Research_Strategy_and_Management_in_Universities)
- Hicks, D. (2012). Performance-based university research funding systems. *Research Policy*, 41(2), 251-261. <https://doi.org/10.1016/j.respol.2011.09.007>
- Holgersson, M., & van Santen, S. (2018). The business of intellectual property: a literature review of IP management research. *Stockholm Intellectual Property Law Review*, 1(1), 44-63. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=3202847](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3202847)
- Hottenrott, H., & Lawson, C. (2017). Fishing for complementarities: Research grants and research productivity. *International Journal of Industrial Organization*, 51, 1-38. <https://doi.org/10.1016/j.ijindorg.2016.12.004>
- Jackson, D.J. (2011). *What is an innovation ecosystem?* National Science Foundation.
- Jalaliyoon, N., & Taherdoost, H. (2012). Performance evaluation of higher education; a necessity. *Procedia - Social and Behavioural Sciences*, 46(1983), 5682-5686. <https://doi.org/10.1016/j.sbspro.2012.06.497>
- Khan, P.A., Johl, S.K., Akhtar, S., Asif, M., Salameh, A.A., & Kanesan, T. (2022). Open innovation of institutional investors and higher education system in creating open approach for SDG-4 quality education: a conceptual review. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(1), 49. <https://doi.org/10.3390/joitmc8010049>
- Knight, H.J. (2013). *Patent strategy: For researchers and research managers*. John Wiley & Sons.
- Krishnaveni, D.R., & Meenakumari, J. (2010). Usage of ICT for information administration in higher education institutions – a study. *International Journal of Environmental Science and Development*, 1(3), 282-286. <https://doi.org/10.7763/ijesd.2010.v1.55>
- Łącka, I., & Brzezicki, Ł. (2020). Efficiency of the research and development activities of technical universities in Poland. *Nierówności Społeczne Społeczne aA Wzrost Wzrost GospodarczyGospodarczy*, 63(3), 258-274. <https://doi.org/10.15584/nsawg.2020.3.13>
- Laudel, G., & Gläser, J. (2014). Beyond breakthrough research: Epistemic properties of research and their consequences for research funding. *Research Policy*, 43(7), 1204-1216. <https://doi.org/10.1016/j.respol.2014.02.006>
- Lemley, M.A. (2015). Faith-based intellectual property. *UCLA Law Review*, 62, 1328. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2587297](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2587297)
- Mars, M.M., & Burd, R. (2013). Impact over revenue: Toward a social entrepreneurship model for university technology transfer. *Journal of Entrepreneurship and Organization Management*, 2(1), 1-7. <https://doi.org/10.4172/2169-026X.1000104>
- McDonnell-Naughton, M., & Păunescu, C. (2022). Facets of social innovation in higher education. In Păunescu, C., Lepik, K.L., Spencer, N. (Eds.), *Social Innovation in Higher Education* (pp. 9-35). Springer. [https://doi.org/10.1007/978-3-030-84044-0\\_2](https://doi.org/10.1007/978-3-030-84044-0_2)
- Mico University. (2019). *Institutional Research Policy*. <https://themico.edu.jm/policies>
- Mittelmeier, J., & Yang, Y. (2022). The role of internationalisation in 40 years of higher education research: major themes from Higher Education Research & Development (1982–2020). *Higher Education Research & Development*, 41(1), 75-91. <https://doi.org/10.1080/07294360.2021.2002272>
- Mohamed Hashim, M.A., Tlemsani, I., & Matthews, R. (2022). Higher education strategy in digital transformation. *Education and Information Technologies*, 27(3), 3171-3195. <https://doi.org/10.1007/s10639-021-10739-1>
- Namara, R.B., Komakech, R.A., Rwemisisi, J.T., Namubiru, P.S., Alinda, F., & Barifajjo, M.K. (2023). Management of research in a post-graduate institute: quality assurance systems. *Asian Journal of Education and Social Studies*, 49(4), 240-251. <https://doi.org/10.9734/ajess/2023/v49i41204>
- OECD. (1963). *Proposed standard practice for surveys on research and experimental development, The 'Frascati Manual'*. OECD. <https://www.oecd-ilibrary.org>
- OECD. (1980). *The measurement of scientific and technological activities 'Frascati Manual' manual' 1980*. OECD. <https://www.oecd-ilibrary.org>
- OECD. (1992). *Oslo Manual: Proposed guidelines for collecting and interpreting technological innovation data*. OECD. <https://www.oecd-ilibrary.org>
- OECD. (1993). *Frascati Manual 1993: Proposed standard practice for surveys on research and experimental development*. OECD. <https://www.oecd-ilibrary.org>
- OECD. (2002). *Frascati Manual: The measurement of scientific and technological activities*. OECD. <https://www.oecd-ilibrary.org>
- OECD. (2005). *Oslo Manual: Guidelines for collecting and interpreting innovation data*. OECD. <https://www.oecd-ilibrary.org>
- OECD. (2005). *University Research Management: Developing Research in New Institutions*. OECD Publishing. <https://doi.org/10.1787/9789264006966-en>
- OECD. (2015). *Frascati Manual 2015: Guidelines for collecting and reporting data on research and experimental development*. OECD. <https://www.oecd-ilibrary.org>
- OECD. (2018). *Oslo Manual 2018: Guidelines for collecting, reporting and using data on innovation*. OECD. <https://www.oecd-ilibrary.org>
- Perkmann, M., Salandra, R., Tartari, V., McKelvey, M., & Hughes, A. (2021). Academic engagement: A review of the literature 2011-2019. *Research Policy*, 50(1), 104114. <https://doi.org/10.1016/j.respol.2020.104114>
- Perkmann, M., Tartari, V., McKelvey, M., Autio, E., Broström, A., D'este, P., Fini, R., Geuna, A., Grimaldi, R., Hughes, A., & Krabel, S. (2013). Academic engagement and commercialisation: A review of the

- literature on university–industry relations. *Research Policy*, 42(2), 423-442. <https://doi.org/10.1016/j.respol.2012.09.007>
- Pinto, J.K., & Slevin, D.P. (1989). Critical success factors in R&D projects. *Research Technology Management*, 32(1), 31–35. <https://doi.org/10.1080/08956308.1989.11670572>
- Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rodgers, M., Britten, N., Roen, K., & Duffy, S. (2006). *Guidance on the conduct of narrative synthesis in systematic reviews. A product from the ESRC methods programme. Version 1.* Lancaster University. <https://doi.org/10.13140/2.1.1018.4643>
- Qin, X., & Du, D. (2018). Measuring universities' R&D performance in China's provinces: a multistage efficiency and effectiveness perspective. *Technology Analysis and Strategic Management*, 30(12), 1392-1408. <https://doi.org/10.1080/09537325.2018.1473849>
- Radović, S., Hummel, H.G., & Vermeulen, M. (2023). The mARC instructional design model for more experiential learning in higher education: theoretical foundations and practical guidelines. *Teaching in Higher Education*, 28(6), 1173-1190. <https://doi.org/10.1080/13562517.2021.1872527>
- Rana, S., Verma, S., Haque, M.M., & Ahmed, G. (2022). Conceptualizing international positioning strategies for Indian higher education institutions. *Review of International Business and Strategy*, 32(4), 503-519. <https://doi.org/10.1108/RIBS-07-2021-0105>
- Rasli, A., Tee, M., Lai, Y.L., Tiu, Z.C., & Soon, E.H. (2022), October. Post-COVID-19 strategies for higher education institutions in dealing with unknown and uncertainties. *Frontiers in Education*, (7), 992063. <https://doi.org/10.3389/educ.2022.992063>
- Ravi, R., & Janodia, M.D. (2022). Factors affecting technology transfer and commercialization of university research in India: A cross-sectional study. *Journal of the Knowledge Economy*, 13(1), 787-803. <https://doi.org/10.1007/s13132-021-00747-4>
- Rooksby, J.H. (2020). Understand IP considerations regarding online instruction. *Campus Legal Advisor*, 20(12). <https://doi.org/10.1002/cal.40295>
- Schumpeter, J.A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle.* Harvard University Press.
- Siegel, D.S., & Wright, M. (2015). Academic entrepreneurship: time for a rethink? *British Journal of Management*, 26(4), 582-595. <https://doi.org/10.1111/1467-8551.12116>
- Siegel, D.S., Waldman, D.A., Atwater, L.E., & Link, A.N. (2004). Toward a model of the effective transfer of scientific knowledge from academicians to practitioners: qualitative evidence from the commercialization of university technologies. *Journal of Engineering and Technology Management*, 21(1-2), 115-142. <https://doi.org/10.1016/j.jengtecman.2003.12.006>
- Siegel, D.S., Waldman, D., & Link, A. (2003). Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study. *Research Policy*, 32(1), 27-48. [https://doi.org/10.1016/S0048-7333\(01\)00196-2](https://doi.org/10.1016/S0048-7333(01)00196-2)
- Solievich, T.N. (2022). Specific aspects of improving the quality of education in higher education institutions. *ACADEMICIA: An International Multidisciplinary Research Journal*, 12(9), 31-34. <https://doi.org/10.5958/2249-7137.2022.00759.5>
- Soranzo, B., Nosella, A., & Filippini, R. (2017). Redesigning patent management process: an action research study. *Management Decision*, 55(6), 1100-1121. <https://doi.org/10.1108/MD-04-2016-0226>
- Stolze, A., & Sailer, K. (2022). Advancing HEIs' third-mission through dynamic capabilities: The role of leadership and agreement on vision and goals. *The Journal of Technology Transfer*, 47(2), 580-604. <https://doi.org/10.1007/s10961-021-09850-9>
- Tahmooresnejad, L., & Beaudry, C. (2018). Do patents of academic funded researchers enjoy a longer life? A study of patent renewal decisions. *Plos One*, 13(8), p.e0202643. <https://doi.org/10.1371/journal.pone.0202643>
- Teixeira, A.A., & Ferreira, C. (2019). Intellectual property rights and the competitiveness of academic spin-offs. *Journal of Innovation & Knowledge*, 4(3), 154-161. <https://doi.org/10.1016/j.jik.2018.12.002>
- Thompson, V.A. (1965). Bureaucracy and innovation. *Administrative Science Quarterly*, 10(1), 1-20. <https://doi.org/10.2307/2391646>
- Tien, N.H., Ngoc, N.M., Trang, T.T.T., & Mai, N.P. (2022). Sustainable development of higher education institutions in developing countries: Comparative Analysis analysis of Poland and Vietnam. *Contemporary Economics*, 16(2), 195-210. <https://doi.org/10.5709/ce.1897-9254.477>
- Tijssen, R. (2011). Joint research publications: a performance indicator of university–industry collaboration. *Evaluation in Higher Education*, 5(2), 19-40. [https://www.researchgate.net/publication/263919226\\_Joint\\_research\\_publications\\_A\\_performance\\_indicator\\_of\\_university-industry\\_collaboration#fullTextFileContent](https://www.researchgate.net/publication/263919226_Joint_research_publications_A_performance_indicator_of_university-industry_collaboration#fullTextFileContent)
- Trommter, M. (2008). *Intellectual property rights in agricultural and agro-food biotechnologies to 2030.* OECD International Futures Project. [https://www.researchgate.net/publication/23984578\\_Intellectual\\_property\\_rights\\_in\\_agricultural\\_and\\_agro-food\\_biotechnologies\\_to\\_2030\\_C\\_OECD\\_International\\_Futures\\_Programme](https://www.researchgate.net/publication/23984578_Intellectual_property_rights_in_agricultural_and_agro-food_biotechnologies_to_2030_C_OECD_International_Futures_Programme)
- Tumwebaze Alicon, A. (2022). Higher education research, development agendas in Africa. Where is the convergence? A literature review. *On the Horizon*, 30(4), 182–189. <https://doi.org/10.1108/OTH-04-2022-0021>
- Van de Ven, A.H. (1986). Central problems in the management of innovation. *Management Science*, 32(5), 590-607. <https://doi.org/10.1287/mnsc.32.5.590>

Van Eck, N., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2), 523-538.

<https://doi.org/10.1007/s11192-009-0146-3>

Wagner, C.S., Whetsell, T.A., & Mukherjee, S. (2019). International research collaboration: Novelty, conventionality, and atypicality in knowl-

edge recombination. *Research Policy*, 48(5), 1260-1270.

<https://doi.org/10.1016/j.respol.2019.01.002>

Zomer, A., & Benneworth, P. (2011). *The rise of the university's third mission*. In *Reform of Higher Education in Europe* (pp. 81-101). Brill.

[https://doi.org/10.1007/978-94-6091-555-0\\_6](https://doi.org/10.1007/978-94-6091-555-0_6)



## MTA SECTION IX. COMMITTEE ON BUSINESS ADMINISTRATION – PUBLICATION EXCELLENCE AWARD 2023

MTA Section IX., Committee on Business Administration, Subcommittee on Industrial and Business Economics, Subcommittee on Marketing Science, and Subcommittee on Management and Organizational Sciences annually award prizes for outstanding scientific work. The Subcommittees aim to recognize and encourage high-quality publication work by academic colleagues through the Publication Excellence Awards.

**Nomination process:** the Publication Excellence Awards were announced in the first semester of 2024, with proposals invited by 31 May 2024 in three categories, with precise references of the proposed publications and a short professional justification. Printed and/or online publications published in 2023 were also eligible, considering that only articles or books published in the MTMT are eligible. According to the call for proposals, own publications are also eligible, but only if at least one of the authors is a member of the public body of the Economics Committee of the Academy of Sciences, Section IX.

**Evaluation and decision process:** In making its decision, the Committee will consider the professional and scientific quality of the proposed entries, the relevance of the subject matter, and the impact on the development of the discipline. The evaluation of journals will be based on the list of journals by MTA Section IX and the Scimago international journal list. In the first step, the proposals received were evaluated individually by the members of the Working Committee, ranking the publications by category, indicating the 1-3 ranking of the publications proposed for the award, and justifying the proposals. (If a member of the Committee is directly or indirectly involved in a work, he/she does not vote in the category/publication concerned.) After the votes had been aggregated, the Working Committee, which carried out the evaluation, finalized the proposal for the award in further discussion. 1 work per subcommittee and category was awarded a Publication Excellence Award.

### Subcommittee on Industrial and Business Economics Publication Excellence Award 2023

In the field of Industrial and Business Economics, 38 publications were proposed this year: 9 publications in the textbook/textbook category, 14 in Hungarian, and 15 in foreign languages. 1 proposal in the category of Hungarian-language articles and 2 proposals in the category of textbook/textbook papers did not meet the pre-selected criteria (these proposals were excluded), so the committee evaluated and ranked 14 Hungarian-language articles and 7 books.

**Members of the Publication Excellence Award Working Committee of the MTA Section IX. Committee on Business Administration, Subcommittee on Industrial and Business Economics:** *Gelei Andrea*, full professor, Corvinus University of Budapest – president of MTA Section IX. Committee on Business Administration, Subcommittee on Industrial and Business Economics; *Wimmer Ágnes*, full professor, Corvinus University of Budapest – president of the Publication Excellence Award Working Committee of the MTA Section IX. Committee on Business Administration, Subcommittee on Industrial and Business Economics; *Bélyácz Iván*, professor emeritus, University of Pécs; *Dobos Imre*, full professor, Budapest University of Technology and Economics; *Görög Mihály*, full professor, Pannon University; *Kovács Zoltán*, full professor, Pannon University; *Szerb László*, full professor, University of Pécs; *Kenesei Zsófia*, full professor, Corvinus University of Budapest (representing the Subcommittee on Marketing Science); *Heidrich Balázs*, full professor, Budapest Business University (representing the Subcommittee on Management and Organizational Sciences). *Jámbor Zsófia*, associate professor, Corvinus University of Budapest, is the secretary of the working committee.

#### Winner of the international journal article category:

Csiki Ottó, Demeter Krisztina, & Losonci Dávid (2023). How to improve firm performance? – The role of production capabilities and routines. *International Journal of Operations & Production Management*, 43(13), 1-26.

#### Winner of the Hungarian language article category:

Gelei Andrea, Fodor Szabina, & Ternai Katalin (2023). Az ipar 4.0-felkészültség értékelési rendszere a témamodellezés segítségével–központban a kis-és középvállalatok. *Közgazdasági Szemle*, 70(11), 1230-1260.

#### Winner of the book category:

Sándor Ágnes, Gubán Ákos, & Mezei Zoltán (2023). *Digitális érettségen alapuló életciklusmodell KKV-k számára*. Akadémiai Kiadó, Budapest

## Subcommittee on Marketing Sciences Publication Excellence Award 2023

**Members of the Publication Excellence Award Working Committee of the MTA Section IX. Committee on Business Administration, Subcommittee on Marketing Sciences:** *Mitev Ariel*, full professor, Budapest Corvinus University – president of MTA Section IX. Committee on Business Administration, Subcommittee on Marketing; *Keszey Tamara*, full professor, Corvinus University of Budapest – president of the Publication Excellence Award Working Committee of the MTA Section IX. Committee on Business Administration, Subcommittee on Marketing Science; *Berács József*, full professor, Corvinus University of Budapest; *Balaton Károly*, professor emeritus, University of Miskolc; *Dinya László*, full professor, University of Szeged; *Hetesi Erzsébet*, professor emerita, University of Szeged; *Hlédik Erika*, associate professor, Eötvös Loránd University; *Piskóti István*, full professor, University of Miskolc; *Reketye Gábor*, professor emeritus, University of Pécs; *Szűcs Krisztián*, associate professor, University of Pécs; *Törőcsik Mária*, full professor, University of Pécs; *Veres Zoltán*, full professor, Pannon University. *Kisfűrjesi Nóra*, assistant professor, at Corvinus University of Budapest, is the secretary of the working committee.

### Winner of the international journal article category:

Pop Rebeka Anna, Hlédik Erika, & Dabija Dan Cristian (2023). Predicting consumers' purchase intention through fast fashion mobile apps: The mediating role of attitude and the moderating role of COVID-19. *Technological Forecasting and Social Change*, 186, 122111.

### Winner of the Hungarian language article category:

Hornyák Miklós, Kruzslicz Ferenc, & Lányi Beatrix (2023). A kis- és középvállalatok digitális transzformációja – az online jelenlét és a versenyképesség összefüggései. *Közgazdasági Szemle*, 70(5), 517-543.

### Winner of the book category:

Szűcs Krisztián, Lázár Erika, & Németh Péter (2023). *Marketingkutatók 4.0*. Akadémiai Kiadó, Budapest.

## Subcommittee on Management and Organizational Sciences Publication Excellence Award 2023

In the field of Management and Organization, 32 publications were proposed this year: 6 publications in the textbook/peer-reviewed book category, 9 in Hungarian, and 17 in foreign languages. All the record number of proposals received met the pre-selection criteria, which justified the award of several prizes.

**Members of the Publication Excellence Award Working Committee of the MTA Section IX. Committee on Business Administration, Subcommittee on Management and Organizational Sciences:** *Bakacsi Gyula*, full professor, Budapest Business University – president of MTA Section IX. *Heidrich Balázs*, full professor, Budapest Business University – president of the Working Committee of Publication Excellence Award of MTA Section IX., Committee on Business Administration, Subcommittee on Marketing Science; *Balaton Károly*, professor emeritus, University of Miskolc; *Bencsik Andrea*, full professor, Pannon University; *Dobák Miklós*, full professor, Corvinus University of Budapest; *Sasvári Péter*, associate professor, Ludovika University of Public Service; *Agárdi Irma*, associate professor, Corvinus University of Budapest (representing the Subcommittee on Marketing Science); *Wimmer Ágnes*, full professor, Corvinus University of Budapest (representing the Subcommittee on Industrial and Business Economics). *Kisfűrjesi Nóra*, assistant professor, at Corvinus University of Budapest, is the secretary of the working committee.

### Winner of the international journal article category:

Király Gábor, & Köves Alexandra (2023). Facing finitude: Death-awareness and sustainable transitions. *Ecological Economics*, 205, 107729

### Winner of the Hungarian language article category:

Csillag Sára, Király Gábor, Rakovics Márton, & Géring Zsuzsanna (2023). A fenntarthatóság tétova szószólói: Mit és hogyan kommunikálnak az üzleti iskolák a fenntarthatósággal kapcsolatban? *Vezetéstudomány*, 54(7-8), 58-76.

### Winner of the book category:

Kása Richárd (2023). *Szervezeti szubkultúrák azonosítása*. Akadémiai Kiadó, Budapest.

Congratulations to the winners. Thank you to the colleagues who made the proposals and to the members of the working committee who evaluated the proposals.

#### Wimmer Ágnes

Chairman of the Publication Award Subcommittee on the Committee on Industrial and Business Economics of the Hungarian Academy of Sciences, Section IX.

#### Keszey Tamara

Chairman of the Publication Award Subcommittee of the Committee on Marketing Sciences of the Hungarian Academy of Sciences, Section IX.

#### Heidrich Balázs

Chairman of the Publication Award Subcommittee on Management and Organization Sciences of the Hungarian Academy of Sciences, Section IX.

## MTA IX. OSZTÁLY GAZDÁLKODÁSTUDOMÁNYI BIZOTTSÁG PUBLIKÁCIÓS NÍVÓDÍJAI – 2023

Az MTA IX. Osztály Gazdálkodástudományi Bizottság Ipar- és Vállalatgazdaságtan Albizottsága, Marketingtudományi Albizottsága és Vezetés- és Szervezéstudományi Albizottsága évente díjazza a kiemelkedő tudományos műveket Az Albizottságok a Publikációs Nívódíjjal kívánják elismerni és ösztönözni akadémiai kollégák magas színvonalú publikációs munkáját.

**Javaslatlételi folyamat:** A Publikációs Nívódíjak meghirdetésére 2024 első félévében került sor, az ajánlásokat 2024. május 31-ig kértük be három kategóriában, a javasolt publikációk pontos hivatkozási adatainak megadásával és rövid szakmai indoklással. 2023-ban megjelent nyomtatott és/vagy online publikációkkal is lehetett pályázni, figyelembe véve, hogy kizárólag az MTMT-ben rögzített cikk, illetve könyv díjazható. A kiírás szerint saját publikáció is javasolható, de csak olyan cikk vagy könyv, melynek legalább egy szerzője az MTA IX. Osztály Gazdálkodástudományi Bizottság köztestületi tagja.

**Értékelési és döntési folyamat:** A beérkezett pályaműveket az Albizottság munkáját támogató Nívódíj Munkabizottság tagjai értékelik. A Munkabizottság döntése során figyelembe veszi a javasolt pályaművek szakmai, tudományos színvonalát, a tárgyalt témakör relevanciáját, a tudományág fejlődésére gyakorolt hatását. A folyóiratok értékelésénél az MTA IX. Osztályának folyóiratlistája és a Scimago nemzetközi folyóiratlistája irányadó. A beérkezett javaslatokat első lépésben a Munkabizottság tagjai külön-külön értékelték, kategóriánként rangsorolva a publikációkat, megjelölve az 1-3. helyen díjazásra javasoltakat, a javaslatokat indokolva. (Ha egy bizottsági tag valamely műnél közvetlenül vagy közvetve érintett, az adott kategóriában/publikációhoz kapcsolódóan nem szavaz.) A szavazatok összesítését követően az értékelést végző Munkabizottság egy további egyeztetés keretében véglegesítette a díjazásra vonatkozó javaslatot. Publikációs Nívódíjban albizottságokként és kategóriánként 1 mű részesült.

### Az Ipar- és Vállalatgazdaságtan Albizottság Publikációs Nívódíjai – 2023

Az Ipar- és Vállalatgazdaságtan területén idén 38 publikációra érkezett javaslat: 9 publikációra a szakkönyv/szakkönyvben megjelent tanulmány kategóriában, 14 magyar nyelvű és 15 idegen nyelvű szakcikkre. A magyar nyelvű szakcikk kategóriában 1, a szakkönyv/szakkönyvben megjelent tanulmány kategóriában 2 beérkezett javaslat nem felelt meg az előzetesen támasztott kritériumoknak (ezeket a javaslatokat kizárták), így végül 14 magyar nyelvű szakcikket és 7 könyvet értékelt és rangsorolt a bizottság.

**Az MTA IX. Osztály Gazdálkodástudományi Bizottság Ipar- és Vállalatgazdaságtan Albizottság Publikációs Nívódíjára jelölt publikációkat értékelő Munkabizottság tagjai:** Gelei Andrea, egyetemi tanár, Budapesti Corvinus Egyetem – az MTA IX. Osztály Gazdálkodástudományi Bizottság az Ipar- és Vállalatgazdaságtan Albizottság elnöke; Wimmer Ágnes, egyetemi tanár, Budapesti Corvinus Egyetem – az MTA IX. Osztály Gazdálkodástudományi Bizottság Ipar- és Vállalatgazdaságtan Albizottság Publikációs Nívódíj Munkabizottságának elnöke; Bélyácz Iván, professor emeritus, Pécsi Tudományegyetem; Dobos Imre, egyetemi tanár, Budapesti Műszaki és Gazdaságtudományi Egyetem; Görög Mihály, egyetemi tanár, Pannon Egyetem; Kovács Zoltán, egyetemi tanár, Pannon Egyetem; Szerb László, egyetemi tanár, Pécsi Tudományegyetem; Kenesei Zsófia, egyetemi tanár, Budapesti Corvinus Egyetem (a Marketingtudományi Albizottság képviselőjében); Heidrich Balázs, egyetemi tanár, Budapesti Gazdasági Egyetem (a Vezetés- és Szervezéstudományi Albizottság képviselőjében). A munkabizottság titkára Jámber Zsófia, egyetemi adjunktus, Budapesti Corvinus Egyetem.

#### A nemzetközi szakcikk kategória díjazottja:

Csiki Ottó, Demeter Krisztina, & Losonci Dávid (2023). How to improve firm performance? – The role of production capabilities and routines. *International Journal of Operations & Production Management*, 43(13), 1-26.

#### A magyar nyelvű szakcikk kategória díjazottja:

Gelei Andrea, Fodor Szabina, & Ternai Katalin (2023). Az ipar 4.0-felkészültség értékelési rendszere a témamodellezés segítségével – középpontban a kis- és középvállalatok. *Közgazdasági Szemle*, 70(11), 1230-1260.

#### A szakkönyv kategória díjazottja:

Sándor Ágnes, Gubán Ákos, & Mezei Zoltán (2023). *Digitális érettségen alapuló életciklusmodell KKV-k számára*. Akadémiai Kiadó, Budapest.

## A Marketingtudományi Albizottság Publikációs Nívódíjai – 2023

A Marketingtudomány területén idén 20 publikációra érkezett javaslat: 3 publikációra a szakkönyv/szakkönyvben megjelent tanulmány kategóriában, 1 magyar nyelvű és 16 idegen nyelvű szakcikkre. A beérkezett javaslatok mind megfeleltek az előzetesen támasztott kritériumoknak.

**Az MTA IX. Osztály Gazdálkodástudományi Bizottság Marketingtudományi Albizottság Publikációs Nívódíjára jelölt publikációkat értékelő Munkabizottság tagjai:** *Mitev Ariel*, egyetemi tanár, Budapesti Corvinus Egyetem – az MTA IX. Osztály Gazdálkodástudományi Bizottság Marketingtudományi Albizottság elnöke; *Keszei Tamara*, egyetemi tanár, Budapesti Corvinus Egyetem – az MTA IX. Osztály Gazdálkodástudományi Bizottság Marketingtudományi Publikációs Nívódíj Munkabizottságának elnöke; *Berács József*, egyetemi tanár, Budapesti Corvinus Egyetem; *Balaton Károly*, professor emeritus, Miskolci Egyetem; *Dinya László*, egyetemi tanár, Szegedi Tudományegyetem; *Hetesi Erzsébet*, professor emerita, Szegedi Tudományegyetem; *Hlédik Erika*, egyetemi docens, Eötvös Loránd Tudományegyetem; *Piskóti István*, egyetemi tanár, Miskolci Egyetem; *Reketye Gábor*, professor emeritus, Pécsi Tudományegyetem; *Szűcs Krisztián*, egyetemi docens, Pécsi Tudományegyetem; *Törőcsik Mária*, egyetemi tanár, Pécsi Tudományegyetem; *Veres Zoltán*, egyetemi tanár, Pannon Egyetem. A munkabizottság titkára *Kisfűrjesi Nóra*, tanársegéd, Budapesti Gazdasági Egyetem.

### A nemzetközi szakcikk kategória díjazottja:

Pop Rebeka Anna, Hlédik Erika, & Dabija Dan Cristian (2023). Predicting consumers' purchase intention through fast fashion mobile apps: The mediating role of attitude and the moderating role of COVID-19. *Technological Forecasting and Social Change*, 186, 122111.

### A magyar nyelvű szakcikk kategória díjazottja:

Hornyák Miklós, Kruzslicz Ferenc, & Lányi Beatrix (2023). A kis- és középvállalatok digitális transzformációja – az online jelenlét és a versenyképesség összefüggései. *Közgazdasági Szemle*, 70(5), 517-543.

### A szakkönyv kategória díjazottja:

Szűcs Krisztián, Lázár Erika, & Németh Péter (2023). *Marketingkutató 4.0*. Akadémiai Kiadó, Budapest.

## A Vezetés- és Szervezéstudományi Albizottság Publikációs Nívódíjai – 2023

A Vezetés- és Szervezéstudomány területén idén 32 publikációra érkezett javaslat: 6 publikációra a szakkönyv/szakkönyvben megjelent tanulmány kategóriában, 9 magyar nyelvű és 17 idegen nyelvű szakcikkre. A rekordszámú beérkezett javaslat mindegyike megfelelt az előzetesen támasztott kritériumoknak, ez indokolta több díj kiosztását.

**Az MTA IX. Osztály Gazdálkodástudományi Bizottság Vezetés- és Szervezéstudományi Albizottság Publikációs Nívódíjára jelölt publikációkat értékelő Munkabizottság tagjai:** *Bakacsi Gyula*, egyetemi tanár, Budapesti Gazdasági Egyetem – az MTA IX. Osztály Gazdálkodástudományi Bizottság elnöke; *Heidrich Balázs*, egyetemi tanár, Budapesti Gazdasági Egyetem – az MTA IX. Osztály Gazdálkodástudományi Bizottság Vezetés- és Szervezéstudományi Publikációs Nívódíj Munkabizottságának elnöke; *Balaton Károly*, professor emeritus, Miskolci Egyetem; *Bencsik Andrea*, egyetemi tanár, Pannon Egyetem; *Dobák Miklós*, egyetemi tanár, Budapesti Corvinus Egyetem; *Sasvári Péter*, egyetemi docens, Nemzetközi Közszolgálati Egyetem; *Agárdi Irma*, egyetemi docens, Budapesti Corvinus Egyetem (a Marketingtudományi Albizottság képviselőjében); *Wimmer Ágnes*, egyetemi tanár, Budapesti Corvinus Egyetem (az Ipar- és Vállalatgazdaságtan Albizottság képviselőjében). A munkabizottság titkára *Kisfűrjesi Nóra*, tanársegéd, Budapesti Gazdasági Egyetem.

### A nemzetközi szakcikk kategória díjazottjai:

Király Gábor, & Köves Alexandra (2023). Facing finitude: Death-awareness and sustainable transitions. *Ecological Economics*, 205, 107729.

### A magyar nyelvű szakcikk kategória díjazottjai:

Csillag Sára, Király Gábor, Rakovics Márton, & Géring Zsuzsanna (2023). A fenntarthatóság tétova szószólói: Mit és hogyan kommunikálnak az üzleti iskolák a fenntarthatósággal kapcsolatban? *Vezetéstudomány*, 54(7-8), 58-76.

### A szakkönyv kategória díjazottjai, megosztott első díj:

Kása Richárd (2023). *Szervezeti szubkultúrák azonosítása*. Akadémiai Kiadó, Budapest.

Gratulálunk a díjazottaknak. Köszönjük a javaslatokat tevő kollégák és a javaslatokat értékelő munkabizottság tagjainak a munkáját.

#### Wimmer Ágnes

az MTA IX. Osztály Gazdálkodástudományi Bizottság Ipar- és Vállalatgazdaságtan Albizottság Publikációs Nívódíj Munkabizottság elnöke

#### Keszei Tamara

az MTA IX. Osztály Gazdálkodástudományi Bizottság Marketingtudományi Albizottság Publikációs Nívódíj Munkabizottság elnöke

#### Heidrich Balázs

az MTA IX. Osztály Gazdálkodástudományi Bizottság Vezetés- és Szervezéstudományi Albizottság Publikációs Nívódíj Munkabizottság elnöke