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DIGITALIZATION AND VALUE CO-CREATION IN THE CONTEXT OF SOCIAL ENTREPRENEURSHIP

DIGITALIZÁCIÓ ÉS KÖZÖS ÉRTÉKTEREMTÉS A TÁRSADALMI VÁLLALKOZÁSOK KONTEXTUSÁBAN

This paper aims to understand the connections between digitalization, value co-creation and social entrepreneurship. The article also aims to identify future research areas related to these connections. The authors conduct a systematic literature review of 61 journal articles and synthesize their findings. First, they reveal literature gaps: Regarding the first research gap of the connection, their research has identified themes connecting the three streams of literature (digitalization, value co-creation, and social entrepreneurship) that need improvement. Second gap was a lack of COVID-19 focus. Finally, they provide theoretical contributions and recommend directions for future research on digitalization, value co-creation and social entrepreneurship.

Keywords: digitalization, digital transformation, value co-creation, social entrepreneurship, ecological entrepreneurship

A tanulmány célja annak a szakirodalomnak az áttekintése, amely a digitalizáció, a közös értékteremtés és a társadalmi vállalkozások metszetében helyezkedik el, rávilágítva a területek kapcsolódására. A szerzők szisztematikus irodalomáttekintést végeztek, melynek során 61 cikket tekintettek át összegezve, szintetizálva azok főbb eredményeit. Az áttekintés során azonosították a kutatási hézagokat, illetve a három szakirodalmi irányzat (digitalizáció, a közös értékteremtés és a társadalmi vállalkozások) közötti összefüggések további kutatást igénylő területeit, különös tekintettel a COVID-19 fókusz hiányára. Végezetül, elméleti következtetéseket fogalmaztak meg, illetve a digitalizáció, a közös értékteremtés és a társadalmi vállalkozások kutatásaival kapcsolatosan javaslatokat tesznek a jövőbeli kutatási irányokra.

Kulcsszavak: digitalizáció, digitális transzformáció, közös értékteremtés, társadalmi vállalkozások, ökológiai vállalkozások

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Social entrepreneurship is the process of finding ways to increase innovations, utilizing resources, and addressing social needs to create social value (Wu et al., 2020). Social entrepreneurship is gaining more and more attention from scholars and practitioners. The main aim of social businesses is prosperity and positive change in society (Dacin et al., 2010). Social entrepreneurship is a business venture that might be pointed toward profiting society as opposed to only maximizing individual benefits, and it se-

ems to guarantee an altruistic version of capitalism that does not assess all human exercises in business terms (Roberts & Woods, 2005).

Our contemporary world also empowers digitalization, defined as a rise in computers or digital technology usage by an organization, industry or country (Brennen & Kreiss, 2016). Although digitalization can significantly affect entrepreneurship, there is yet restricted information about its results (Elia et al., 2020). Therefore, more studies

are required to see the results of digital transformation and its connection with social businesses more obviously. Furthermore, other than digitalization, social entrepreneurship also can use the process of value co-creation (Lin et al., 2019), which is the joint creation of value by the enterprise and the customers, letting them co-construct service experience to adjust their needs (Prahalad & Ramaswamy, 2004).

There is usually synergy between the three, which increases the positive impact of each: Digitalization makes communication easier, help social entrepreneurs co-create value with diverse stakeholders; secondly, connection holds potential for social change: Technologies help social entrepreneurs for delivering value to beneficiaries, while also enabling them to make new solutions, and adapt to different changing needs (Murdoch & Lamb, 2009; Srivastava & Shainesh, 2015; Wilson et al., 2017; de Bernardi et al., 2019; Goyal et al., 2021; Wan & Liu, 2021; Aisaiti et al., 2021; Loukopoulos, & Papadimitriou, 2022; Chandna, 2022). Last, but not least, 3 concepts are all closely aligned with the United Nations' Sustainable Development Goals. Digitalization can accelerate progress towards achieving the SDGs by enabling access to education, healthcare, financial services, and other necessities; Value co-creation fosters collaboration and partnerships, which are essential for addressing complicated world problems; Social entrepreneurship aims to create positive social and environmental impact through innovative and sustainable business models (Lin et al., 2019; Ratten, 2022; Ceesay, Rossignoli, & Mahto, 2022).

That is why this study's aim is to conceptualize digitalization and value co-creation in the context of social entrepreneurship. In this research, social entrepreneurship, digitalization and value co-creation – three compatible streams of literature – are connected with each other. Resonating with the research objective, this study tries to answer the following research question: What underlying mechanisms tie digitalization, value co-creation and social entrepreneurship?

The methodology that we applied is a systematic literature review focusing on peer-reviewed international articles regarding social entrepreneurship, digitalization and value co-creation. The review process had three phases and followed the well-established guidelines of systematic literature reviews (Tranfield et al., 2003). To explore the literature, the research design is framed with 1) article identification, 2) selection of relevant articles, and 3) qualitative analysis of papers.

Methodology

Research design

We conducted a systematic literature review of the literature on social entrepreneurship, digitalization and value co-creation. The review process had three phases and followed the well-established guidelines of systematic literature reviews (Tranfield et al., 2003). To explore the content of the literature on digitalization

and value co-creation in social entrepreneurship, the research design is framed as follows: Article identification, Selection of relevant articles, and Qualitative analysis of papers.

Article identification

To provide a sound background for this study, peer-reviewed articles published in international journals in English were focused on. This is standard practice since these sources are accepted as 'certified knowledge' and strengthen the findings' reliability (Cuccurullo et al., 2013; Fernandez-Alles & RamosRodríguez 2009; Rashman et al., 2009; Sarto et al., 2014; Torchia et al., 2013). The initial stage aimed to identify related journals and potentially related articles in databases such as Scopus and Web of Science. To answer the key question of our literature review, we conducted systematic research for the strings "social entrepreneurship", "digitalization" and "value co-creation". We took notes of the technical aspects, such as a list of the keywords, query ID, and query string. We searched for synonyms or words that identify the same phenomenon. In the case of value co-creation, it was "value creation" OR "value co-creation" OR "VCC". In the case of digital transformation, "digit*" was used. The asterisk symbol is a function that is used when the desire is to search for words with the same root, however different endings: "digit", "digitalization", "digital", "digitalized", "digital transformation", "digitalizing", and so on. We followed the same procedure with social entrepreneurship. "Social" AND "entrepreneur*" has been tried. Our search strategy included studies that contain any of these words in the title, abstract or anywhere in the main body of the study, tables, figures or appendices. These searches resulted in a total of 257 potentially relevant studies (Table 1).

Table 1
Systematic literature review process

Phase 1: Article Identification (n=257)
Main domains of interest and the aim of systematic literature review: Finding the gap between Digitalization, Value Co-Creation and Social Entrepreneurship
Search for potentially relevant papers (n=257) according to main domains of interest: Period: No limitations (Data gathering ended in 2022) Search String Keywords: „social entrepreneurship” AND „digitalization” „social entrepreneurship” AND „value co-creation” „social entrepreneurship” AND „digital transformation” „digital” AND „social enterprise” „social entrepreneur*” AND „value co-creation” „social entrepreneur*” AND „digit*” „eco entrepreneurship”
Search Scope: Title, Abstract, Keywords Databases: Scopus, Web of Science

Phase 2: Selection of Relevant Articles (n=61)**Creating Exclusion Criteria:**

1. Low-ranked academic journals such as Q3-Q4, according to scimago.com
2. Duplication
3. Not in English articles
4. Articles with no free accessibility or not accessible in full version (only abstract)
5. Different format types such as books, book chapters, conference proceedings, forum papers, summit reports, research proposals

Development of detailed coding scheme and coding relevant (n=61) papers:

Theoretical positioning, Definition of core concepts in the articles, Method: Data type, Country of data origin, Industry, Key informants who data collected from, Sample size, Method of analysis, Key insights, or summary of the main findings

Phase 3: Analysis of Papers**Overview of the body of literature:**

Paper distribution by year, key theories, region of data gathering, methodology

Proposed Framework:

Creating a model incorporates concepts from previous studies and groups in a meaningful way

Identification of research gap and direction for future research

Source: own compilation

Selection of relevant articles

The second phase aimed to examine the relevant identification and preliminary coding of articles. To provide a solid platform for relevancy identification, we established detailed criteria for inclusion. The articles were included if published in highly ranked academic journals (Q1 and Q2 according to the Scimago Journal Rank, <https://www.scimagojr.com/>). We discarded low-ranked academic journals such as Q3-Q4 according to the Scimago journal ranking list. We identified the duplicates and made the first screening by reading the titles and the abstracts. Then, we discarded the duplicates alongside with articles which were not in English. Book, book chapters, conference proceedings, forum papers, summit reports, and research proposals were discarded too. Additionally, we also discarded 5 journal articles with no free accessibility or not accessible in full versions having only abstracts available. In the end, there were 61 articles left.

Analysis of papers

At the third stage, we developed a detailed scheme for relevant papers, by which we coded every relevant paper. This coding scheme was the data repository from which subsequent analysis emerged; hence, the content was directly linked to the formulated review question and the planned assessment of the incorporated studies. In the coding scheme, we recorded the theoretical positioning of the relevant papers, the methodological approach, including data type, country of origin, industry context, key informant whom data was collected from, sample size, method of analysis, key insights and main findings. Then, on the basis of key insights and main findings from

61 chosen articles, we had subsequent narrative literature analysis. First, the connection between digitalization and social entrepreneurship was revealed, followed by the connection between value co-creation and social entrepreneurship. Second, we tried to connect these three streamlines by revealing a gap in the literature which shows the direct relationship between digitalization, value co-creation and social entrepreneurship. In the end, we proposed two theoretical frameworks and a research agenda for future research.

Findings

This section summarizes previous research and studies on the subject matter and presents existing gaps in the literature. After giving literature statistics, the first section shows generic findings regarding the connection between digitalization and social entrepreneurship; then, the second section investigates the connection between value co-creation and social entrepreneurship. Since there is a gap between these three streamlines of literature, the third section tries to synthesize available knowledge in the literature and proposes 2 theoretical frameworks for future research and a table for managerial applications of digitalization and value co-creation in the context of social entrepreneurship.

The literature statistics are summarized in Table 2. Asian studies represent 36%, Europeans 32.7%, and North Americans 4.9%, with a share of 1.6% both in Australia and South America, while 9.8% of the overall studies were originating from multiple continents. The rest did not specify the place of origin. There were several industries, including hospitality, health, education and retail, but most of the companies were also social or ecological enterprises, which is why we did not go into the deeper specific classification of industries, and it was not placed in Table 2. Most of the chosen studies – 59% to be exact, were from Q1 journals, while the rest, 41%, were from Q2 articles. When it comes to analytical methods of the studies, we can say that qualitative methods were in the lead with 65.5% and followed by quantitative ones with 31.1% and mixed studies applying both qualitative and quantitative methods with approximately 3.4%. Article distribution by sample size for quantitative and mixed studies were mostly 500 and over. The rest of the sample sizes of quantitative and mixed studies were either between 100-200 or 200-500, while the less frequent sample size was below 100.

Adjacent theories appeared in multiple articles by frequency were institutional theory, stakeholder theory, grounded theory, theory of bottom of pyramid (BOP), crisis theory, new institutional theory, organizational identity theory and social capital theory. The institutional theory most frequently appeared, and it was mentioned in 13% of chosen articles. It was followed by stakeholder theory, grounded theory, theory of bottom of pyramid (BOP), and they were common in accordingly 8.1%, 6.5%, and 4.9% of the chosen articles.

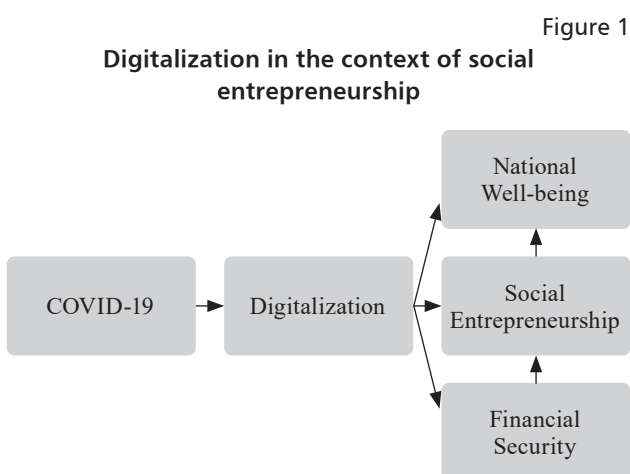
Table 2
Literature statistics (n=61)

Article distribution by geographies	
Asia	22
Europe	20
North America	3
Australia	1
South America	1
Multiple	6
Not Defined	8
Article distribution by journal ranking	
Q1	36
Q2	25
Analytical method	
Qualitative	40
Quantitative	19
Mixed	2
Article distribution by sample size for Quantitative and Mixed studies	
Below 100	3
100-200	5
200-500	6
500 and over	7
Adjacent theories appeared in multiple articles by frequency	
Institutional theory	8
Stakeholder theory	5
Grounded theory	4
Theory of bottom of pyramid (BOP)	3
Crisis theory	2
New Institutional Theory	2
Organizational identity theory	2
Social capital theory	2

Search words: Digitalization, Value Co-Creation, Social and Eco Entrepreneurship, Q1-Q2

Source: own compilation

Digitalization in the context of social entrepreneurship



Source: own compilation

Digitalization in social entrepreneurship: The COVID-19 impact

In the post-COVID world, enterprises need agility and speed to support their human capital and knowledge base while reducing costs (Kuckertz et al., 2020). Speed of learn-

ing can help identify new market niches, define products to develop, and find new ways to communicate with customers (Zahra, 2021). Digital technologies like 3-D printers can enable entrepreneurial opportunities, while social entrepreneurs typically face challenges of social and financial sustainability (Jean, Kim, & Cavusgil, 2020; Williams, Du, & Zhang, 2020; Langley et al., 2017) (Figure 1).

Digital technologies have enabled some social enterprises to maintain connections with established business platforms to address the challenges posed by COVID-19 (Zahra, 2021). Analysis of 128 social enterprises in a post-pandemic period in China shows that digital transformation can positively affect organizational identity (Aisaiti et al., 2021). A case study of eKutir (a social enterprise that uses a digital platform to deliver value for farmers in India) reveals that stakeholder stability and incentives are key factors contributing to the adoption of digitalization (Sengupta et al., 2021). Another post-pandemic research depicts that during COVID-19, the organizational scaling of Greek social enterprises embraced social impact through widening services and building collaborations in local and remote markets through digitalization (Loukopoulos & Papadimitriou, 2022). Digital hybridity – the phenomenon of deploying digital innovation to blend social and financial impacts – has enabled sustainability in social entrepreneurship (He et al., 2022).

There are many research focusing on how digitalization develop into agile marketing capabilities (Moi et al., 2019), because digital businesses show an agile response to modern-day challenges (Kraus et al., 2018; Nambisan, 2017), while social businesses can be flexible and solve societal issues (Mair & Marti, 2006). Battisti's (2019) framework considers socially relevant groups in the entrepreneurial innovation and digital process, while Ibáñez et al. analyze social entrepreneurship and digitalization from a COVID-19 perspective (Ibáñez et al., 2022).

Investigations of nascent entrepreneurship can help to explain why individuals might decide to launch their own businesses, which can have a substantial impact on economic development and job opportunities (Szabo & Aranyossi, 2022). Worldwide Coronavirus lockdowns have expanded the development of the Digital Social Entrepreneurship, which was fulfilling social requirements by utilizing advanced digitalization (Yáñez-Valdés et al., 2023). Ghatak, Chatterjee & Bhowmick (2020) reveals reasons of intention towards digital social entrepreneurship as experiences in social enterprise and digital firm, and empathy, moral obligation, self-efficacy, perceived social support, feasibility and desirability mediate these relationships. The pandemic increased social initiatives, which were rich in innovation for the unsatisfied needs by the government, and due to economic agents seeking altruistic goals to transfer technology to the most vulnerable (Ibáñez et al., 2022).

Digitalization, national well-being and social entrepreneurship

As technologies raise life standards (Torres & Augusto, 2020), digitalization benefits national well-being if the country has an adequate system, and social enterprises

also affect national well-being when institutions are less powerful (Torres & Augusto, 2020). This finding supports the institutional void perspective (Urban & Kujinga, 2017) and contributes to the debate on the institutional perspectives that justify the creation of social businesses (De Beule et al., 2020). However, lack of social businesses can lead to low levels of national well-being in countries with low levels of digitalization, such as Thailand, Indonesia, and Morocco (Torres & Augusto, 2020).

Developing Latin American countries such as Chile also need and benefit from digitalization (Zebryte & Jorquera, 2017). Social benefit commitment guides innovation, and social entrepreneurs serve as an intermediary between citizens and the government (Sharma, Mishra, & Mishra, 2021). Research on 24 European social enterprises reveals an interesting paradox: the best success indicator is the disappearance of the corresponding social need (Desmarchelier, Djellal, & Gallouj, 2021). Digitalization in social entrepreneurship can have a fundamental part in advancing comprehensive development by setting out open doors for unprivileged people and in these communities, they can support the growth of small businesses, provide training, and create jobs, and overall, digitized social enterprises can help alleviate poverty and inequality by doing so.

Tech entrepreneurs are the most likely to start to business by defining their key market and getting an external, extrinsic reward in the form of money or recognition, unlike idealistic youth and arts entrepreneurs (Toscher, Dahle, & Steinert, 2020).

Research on smart city initiatives in four continents reveals four modes of leadership: digital government, a digital driver for economic growth, open platform for digital socio-political innovation, and open platform for the digital economy (Sancino & Hudson, 2020). Social entrepreneurship utilizes digitalization for its activities' optimization while rejecting full automatization and using human intelligent decision support (Popkova & Sergi, 2020).

Financial connection between digitalization and social entrepreneurship

Social entrepreneurship literature usually conceptualizes the phenomenon as a business case where companies utilize financial means to solve social problems or combine the two aims (Battilana & Lee, 2014; Powell et al., 2019). On the contrary, there are fewer studies on how these contradictory aims impact the motivation to open a social business (Chandra, Man Lee & Tjiptono, 2021). One of these studies shows that drive to help society and to have financial gains are influential factors (Chandra, Man Lee & Tjiptono, 2021). Poverty, inequality, climate change, health, education, and human rights are just a few of the most pressing issues we face today, and digitalization of social enterprises has the potential to provide novel and efficient solutions more quickly to the above-mentioned problems. However, the motivation for public service is more powerful than money ethics (Chandra, Man Lee & Tjiptono, 2021).

Research on corporate social entrepreneurship offers individual actions to overcome economic challenges

such as curbed earnings, unsafe work, and low levels of business initiatives, and the case study widens the knowledge-based perspective for digital social entrepreneurship, where fundamental knowledge stems from the personal life of the actors involved in the project (Scuotto et al., 2022). Starting a social business is mainly impacted by one's caring about social issues, not wanting to be successful in commercial terms or skills to handle finance: The creation of values such as aspiration to help society is more important; accounting or financial abilities should be learned afterwards (Chandra, Man Lee & Tjiptono, 2021).

Research conducted by Aisaiti et al. (2019) found that knowledge of inclusive finance and social entrepreneurship increases benefits, decreases risk perceptions, and is essential to promote social businesses and digital finance to develop inclusive finance in rural China: Attitudes such as thinking about new ways to do things, digital innovation thinking, and having an intention to make a difference are important for starting a social enterprise, but risk perception was not as influential as other things due to increasing operating costs (Herlina et al., 2021). To make social businesses achieve their social missions, it is important for social business, government, and research institutes to increase their cooperation to continuously gain farmers' trust and the recognition of social businesses' value (Aisaiti et al., 2019).

Crowdfunding is a financing source for social enterprises, with four types of project creators: social entrepreneur, fund seeker, indie producer, and daring dreamer based on four motivations: achievement, monetary need, pro-sociality, and relationship building. (Ryu & Kim, 2018). Due to unique hardships, crowdfunding's usage is still limited in social entrepreneurship. However, Chandna (2022) suggests remobilizing idle resources using digital platforms to support social enterprises by securing assets and connecting stakeholders. Digitalization benefits financial security, allowing social enterprises to perform better and contribute to the solution of some problems in Spain (Martín, 2020). Even though IT support for marketing activities – both in Hungary and abroad – is below the average of other company specialties (Keszezy, 2007), research on ownership of information systems also depicted that that organizational factors in foreign businesses and environmental factors in domestic businesses both influence perceptions (Keszezy, 2017).

Researchers conducted a case study of 30 Dutch-based cryptocurrencies to reveal social innovators' motives and found that digital money systems can be considered social innovations, but their potential for disruptiveness is curbed by design: Money governance could be improved by implementing digital public token-based design and other digital instruments (van der Linden & van Beers, 2017). Social businesses in Indonesia and Singapore have networked with impact investors, suggesting strategic communication through digital technologies to improve them: These approaches, such as facilitating open digital communication between social companies and angel investors, guarantee funding and force the social investment marketplace to improve (Ryder & Vogeley, 2018).

Digitalization's performance increasing impact on social entrepreneurship

Other than finance-related aspects, there are other impacts of digital transformation on social entrepreneurship, such as digitalization decreasing the time spent or increasing health provisions. In this subsection, we show these other impacts.

Social businesses' digital context from profit-oriented companies is different from traditional firms (Benmamoun et al., 2021). By default, social entrepreneurship is very distinct from for-profit companies (Dees, 1998; Mair & Martí, 2006), their online presence is also distinct from their offline one, and in field operation of foreign countries, social businesses take advantage of adapting to local environment (Zahra et al., 2008; Volery, 2010; de Arruda & Levrini, 2015); however, when using websites, they take advantage of standardizing rather than localizing to the service areas (Benmamoun et al., 2021). Thus, improvement in theory should take into account mediums such as websites, social media, and in-person, which have different intentions and results (Benmamoun et al., 2021). Also, social enterprises should consider their target audience when developing an international website rather than copying traditional companies' practices based on consumer culture and language (Benmamoun et al., 2021).

Research is being done to examine how agri-food companies use digital data and how their behavior changes depending on the type of data they are utilizing in the creation of their products (Frau & Keszezy, 2023). In order to get cleaner food production, companies should use nature-driven agility – company's "ability to flexibly and effectively utilize natural resources to adapt the full production process to market changes and capture new value-creation opportunities within nature constraints" (Frau et al., 2022). Research by Frau, Moi, Cabiddu & Keszezy (2022) revealed that nature-driven agility is based on digitalization. Carroll & Casselman's (2019) research on cause-based voluntary service reveals that digitalization reduces uncertainty, expenses and time spent by allowing social enterprises to conduct advanced experiments. Research on Food Assembly, which connects social entrepreneurship and digital innovation to achieve sustainability and a high social impact, reveals that sharing online knowledge impacts sustainable buying and consuming, while on-site knowledge impacts sustainable buying (de Bernardi et al., 2019). Moreover, Goyal, Agrawal, & Sergi (2021) research social businesses to solve water, sanitation, and waste management problems in India's urban areas and show how digital technologies can be used to increase reach, efficiency, transparency, social inclusion, connection, and decrease expenditures, especially in rural regions.

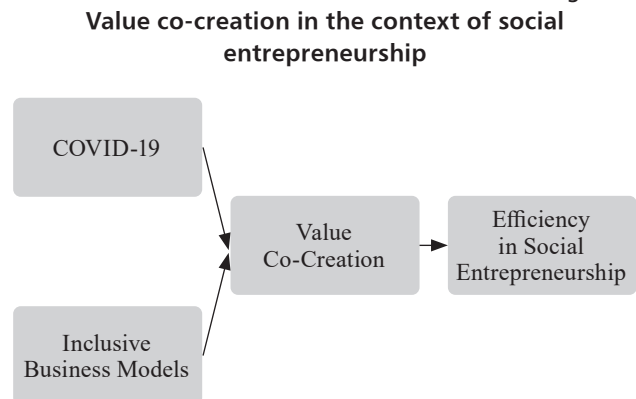
Research in 155 Chinese social enterprises reveals that social businesses should use big data to improve employee performance and increase vitality in their businesses (Wan & Liu, 2021). Circular economy principles contribute to societal transformation through innovation, digital solutions, blockchain technologies, and their social results to address environmental challenges (Ilic et al., 2022).

Similarly, AI-based innovation can reduce social problems, increase work performance, and create new business models through value co-creation (Battisti et al., 2022).

Digitalization solves healthcare access divide in developing societies by increasing geographical accessibility, decreasing expenses, making services inclusive, and technology creates service-centric value by increasing geographical accessibility and decreasing expenses. (Srivastava & Shainesh, 2015). Similarly, Poveda et al. investigate one social enterprise's digital skills training contribution and reveal that it can improve the health conditions of people and provide health services in the Philippines, complementary to public health government programs (Poveda et al., 2019). Wilson et al. (2017) mention that digitalization and use of information and communication technologies facilitate healthcare for elderly Italians in the municipality. Furthermore, Murdock and Lamb (2009) state that Digitalization of the Royal National Institute for the Deaf improved their service quality. Other than the health sector, digitalization also affects eco enterprises in education. As an illustration, Pakura (2020) showed that green-tech startups can benefit from technological advancement through partnerships and the firm development.

Value co-creation in the context of social entrepreneurship

Figure 2



Source: own compilation

Value co-creation and social entrepreneurship: the COVID-19 impact

The outbreak of COVID-19 has caused a surge in digital products and services, one of which is the streaming of theatrical performances online: This new market has opened a host of possibilities for businesses, all while providing customers with an alternate way to enjoy their favorite theatrical productions (Aranyossy, 2022) (Figure 2).

The COVID-19 pandemic also caused social difficulties due to the need to think globally and locally. This had a significant effect on social policy, and policymakers must use social entrepreneurship and value co-creation strategies to address the issues (Ratten, 2022). A social value co-creation perspective can be used to address the COVID-19 crisis, and according to Di Domenico et al. (2010), social value creation is a link between traditional

commercial entrepreneurship and those that take a more societal approach to profit making.

COVID-19 raised levels of co-creation of social value to generate novel benefits for society (Ratten, 2022). Thus, since the government is responsible for providing resources to those affected by natural disasters (Frydman & Phelps, 2020), short-term accommodations have been used for activities that generate profits, allowing them to be used for social causes (Ratten, 2022).

Value Co-Creation and Social Entrepreneurship: Social Value Co-Creation in Inclusive Business Models

Studies in service research have highlighted the importance of value co-creation in the B2B environment (Cabiddu et al., 2019). Literature on social entrepreneurship provides a limited understanding of how to generate social value (Sigala, 2019). It's heavily researched from three major streams of research: entrepreneurial behavior (Dees, 1998; Mort et al., 2003); entrepreneurs' characteristics (Dees, 1998; Kline et al., 2014); and social entrepreneurs' results measuring (Sigala, 2019). Social entrepreneurs need to develop network structure, market practices and market pictures to generate social value (Sigala, 2016). Similarly, studies need to study value co-creation from "sense-of-meaning" approach (Sigala, 2019). By involving customers in value co-creation, social entrepreneurs can ensure their businesses creating meaningful social change.

A case study of Italian social businesses for researching value co-creation shows that involvement of all critical actors in cause-based network increases commitment to address society's problems, enhancing social legitimacy (Ceesay, Rossignoli, & Mahto, 2022). Bendickson (2021) found that advanced knowledge of collaborative value practices of social entrepreneurship alliances can enhance SME managers' collaborative capabilities for enhancing their performance (Taylor & Thorpe, 2004).

To highlight connection between value co-creation and social entrepreneurship, we focus on inclusive business models. Schoneveld's (2020) definition emphasizes involvement of people with limited revenue and value co-creation through solving social problems. It doesn't have profit maximization goal but has potential to make net value for people with limited revenue and create complementary revenue sources (Schoneveld, 2020).

Value co-creation and social entrepreneurship: Increased efficiency

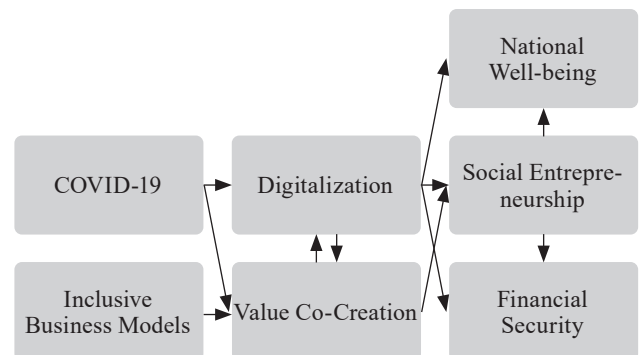
Social entrepreneurial self-efficacy is a concept elaborating human behavior towards social missions that affect one's beliefs, efforts, levels of input, and persistence (Dwivedi & Weerawardena, 2018). Sam Liu and Huang (2020) gather data from 386 firms in Taiwan, investigate social entrepreneurship's role in value co-creation processes among many others and depict that social entrepreneurial self-efficacy positively moderates the different relationships among proactiveness, market orientation and value co-creation.

Even though there are some studies focusing on value co-creation - adverse results of value co-creation (Frau et al., 2018), Abedin, Maloney & Watson (2021) study both the advantages and disadvantages of online communities for value co-creation by social entrepreneurs and reveals that improved access, time-cost efficiency, raised response rate, and networking are among the advantages, while capacity absence, not enough moderation, inactivity and effort fragmentation are disadvantages. Social entrepreneurs concentrate on social value creation for their target group, incorporate social values into their innovations, and guide collective stakeholder action to improve their solutions (Lubberink et al., 2019).

OurCityLove is an example of a social business using value co-creation to increase service quality and accessibility for mobility-impaired persons, and research by Lin et al. (2019) shows that value co-creation increases restaurants' awareness of giving friendly experience, mobility-impaired people's chance to help the investigation and contribute valuable insights to the application, and government can increase mobility impaired people's satisfaction by motivating restaurants with friendly restaurant certification. Social enterprises can use value co-creation to involve supply and demand sides, and government policymakers can also be engaged in this value co-creation process (Lin et al., 2019).

Connecting digitalization, value co-creation and social entrepreneurship

Figure 3
Connecting digitalization and value co-creation and social entrepreneurship



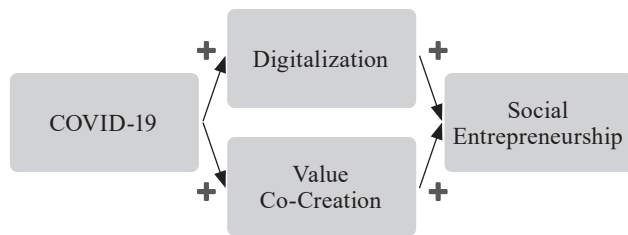
Source: own compilation

Digitalization decreased COVID-19 challenges (Zahra, 2021) and increased collaborations for social enterprises (Loukopoulos & Papadimitriou, 2022). The COVID-19 pandemic caused a lack of government action, leading to increased social initiatives and digital social entrepreneurship to improve stakeholder satisfaction (Ibáñez et al., 2022). If we connect these findings, we can easily sense that COVID-19 increased the level of digital transformation, and digitalization positively affected the performance of social enterprises (see Figure 3).

The pandemic also raised social value co-creation, such as seed plant initiatives and reducing homelessness:

Governments, social enterprises, and homeless people have come together to create new benefits that address the pandemic's negative impacts in which the value co-creation processes have been catalyzed, and as a result, increased focus on social entrepreneurship (Ratten, 2022). We can conclude that the pandemic caused the value co-creation process in the context of social entrepreneurship (see Figure 4).

Figure 4
Framework depicting positive relationship between COVID-19, digitalization, value co-creation and social entrepreneurship



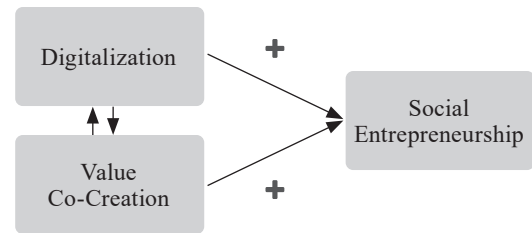
Source: own compilation

Digital financing favors the people for solving social problems (Martín, 2020; Chandna, 2022), and reduces transaction costs (Aisaiti et al., 2019; Goyal et al., 2021). Digitalization can increase sustainability in social enterprises (de Bernardi et al., 2019). Big data enabling has a positive relationship with employee performance in social enterprises (Wan & Liu, 2021). Digitalization improves geographical accessibility, lowers expenses, and, finally, makes health-care services inclusive (Srivastava & Shainesh, 2015). We can conclude that digitalization decreases social entrepreneurial challenges and increase performance in the form of digital finance and crowdfunding (Figure 5).

Similarly, social enterprises can use value co-creation to create a better user experience (Lin et al., 2019). In this way, value co-creation affects social entrepreneurship positively to create a more inclusive, accessible and equitable society. Using digitalization can provide disadvantaged individuals with greater access and more power (Ibáñez et al., 2022). Through digitalization and value co-creation, OurCityLove can bridge the gap in service (Lin et al., 2019).

Taking all these into consideration, we can state that both digitalization and value co-creation increased social entrepreneurship performance (see Figure 5). Since The Friendly Restaurant app is empirical result of value co-creation research (Lin et al., 2019), we can also conclude that value co-creation process improved digitalization in context of social entrepreneurship and relationship between them is also positive. Simultaneously, digitalization has enabled social enterprises to create new value through co-creation. Even though app stems from a value co-creation study (Lin et al., 2019), without digitalization, co-creation process wouldn't happen. Thus, by leveraging technology, social entrepreneurs can collaborate with stakeholders to create innovative products, services, and solutions.

Figure 5
Framework depicting positive relationship between digitalization, value co-creation and social entrepreneurship



Source: own compilation

Additionally, digital tools can be used to facilitate access to support networks and wide range of resources. By using digital tools to co-create value, social entrepreneurs can maximize impact of efforts and create more equitable and sustainable world. Taking all these into consideration, we can conclude that digitalization and value co-creation are mutually affecting each other in positive way (see Fig. 5).

Discussion of findings

In this part, we discuss research gaps, theoretical contributions, managerial relevance and practical implications, recommendations for future research and finally, limitations.

Research gaps and theoretical contributions

A comprehensive review of 61 academic articles was conducted to address key research question of "What underlying mechanisms tie digitalization, value co-creation and social entrepreneurship?" aiming to understand existing knowledge in academic field. To meet the first objective of consolidating existing research and conceptualizing digitalization and value co-creation in context of social entrepreneurship, comprehensive research profile was created. The second objective was to analyze thematic connections between different studies. This was done by exploring common themes across studies in previous section. The aim was to identify any remaining research gaps in order to progress subject's development. It attempted to establish and validate research agenda, examine evidence for particular research question, synthesize existing evidence to provide comprehensive understanding of topic, and finally craft recommendations for action based on review findings.

It appears that research development is leading to new field of study focused on use of digitalization and value co-creation to assist social entrepreneurship. We can expect to see increasing number of studies on this topic in future. However, our research has identified that articles connecting 3 streams of literature is lacking. Our research aim was to identify gaps and connect 3 streams, and with this, we tried to contribute to literature. The first research gap is connection between social entrepreneurship, digitalization and value co-creation. Our research has identified themes connecting three streams of literature that need improvement.

Secondly, there is a deficiency in COVID-19 focus on articles about both digitalization and value co-creation in context of social entrepreneurship. Even though there are separate studies focusing on digitalization and social entrepreneurship in COVID-19 as well as value co-creation and social entrepreneurship in post-COVID-19 period, we think it's vital to investigate all 3 streams of literature together. Research found that literature on correlation between digitalization and value co-creation for social enterprises is scarce and disjointed. Literature on COVID-19 has largely failed in its purpose of synthesizing and providing guidance to businesses and regulators on how to implement programs related to social entrepreneurship, value co-creation, and digitalization in post-COVID-19 period, which is surprising given the vast number of papers on these topics.

This study contributes to current literature by suggesting two theoretical frameworks based on the gaps in the literature and suggesting a research agenda for future research. Framework depicting Positive Relationship between COVID-19, Digitalization, Value Co-Creation and Social Entrepreneurship (see Figure 4) is one of theoretical contributions of this article. The relationship among these variables wasn't explicitly investigated before. The theoretical contribution of this academic research is the contribution that the research makes to the current body of knowledge on the literature streams of digitalization, value co-creation and social entrepreneurship. Additionally, also involving COVID-19 impact, this research adds to the overall understanding of the topic and tries to help gain a new perspective after the pandemic in terms of the existing literature and theory.

The Framework depicting Positive Relationship between Value Co-Creation, Digitalization and Social Entrepreneurship (see Figure 5) is the second theoretical contribution of this article. In this regard, this article helps to reveal a direct relationship between digitalization, value co-creation and social entrepreneurship and tries to resolve the inconsistencies in the literature. The main purpose these theoretical frameworks serve is that these suggestions need for further empirical testing.

Research agenda, recommendations for future research

The current state of research on social entrepreneurship does not provide results that are applicable to different contexts and does not adequately consider the relationship between digitalization, value co-creation and social entrepreneurship. To address this misalignment between theory and practice, a research agenda is needed that focuses on the topics mentioned in this section.

A further suggestion for research into the relationship between digitalization, value co-creation and social entrepreneurship includes studying the topic from the perspective of other mainstream marketing and business themes, such as innovation, sustainability and financial security. Additionally, since our research didn't cover the connection between value co-creation and national well-being,

we left it out, however, since we recognize its great potential, we would like to mention it as a direction for future research as well.

By making thematic choices through clear and wide research questions, the importance of the topic for the pure management subject will be acknowledged. The following research questions in Table 3 can be mentioned for future research:

Table 3

Future research questions

Main topics	Possible Research Questions
Digitalization and Social Entrepreneurship	<p>What are the opportunities and risks of digitalization for social entrepreneurship?</p> <p>How does digitalization affect the ability of social entrepreneurs to access resources?</p> <p>What are the advantages and drawbacks of digitalization for social entrepreneurship?</p>
Value Co-creation and Social Entrepreneurship	<p>How can value co-creation support the financial goals of social entrepreneurs?</p> <p>How can organizations use value co-creation to drive innovation?</p>
Digitalization, Value Co-Creation and Social Entrepreneurship	<p>How does digitalization facilitate the collaboration of stakeholders in social enterprises?</p> <p>How does digitalization enable value co-creation for social entrepreneurship?</p> <p>How can digitalization and value co-creation be used to address sustainability issues in social entrepreneurship?</p> <p>How can digitalization and value co-creation be deployed to improve social entrepreneurship?</p> <p>What role does value co-creation play in digitalization of social enterprises?</p>

Source: own compilation

This study has provided a clear research agenda for marketing, business and management scholars to identify potential gaps and avenues for further research. Two gaps have been identified, which concern the connection of 3 streams and COVID-19 focus. Furthermore, examples of relevant research questions and thematic fields have been proposed. Future research should aim to address these gaps and explore the potential of the suggested research questions and thematic fields. This would enable scholars to gain a deeper understanding of the field and develop effective strategies for managing marketing, business and management operations.

Limitations of the research

This study presents some limitations, which need to be addressed in further research. The choices made in a systematic literature review can be disputed, as the sample is highly dependent on the search keywords and the applied restrictions. Quality criteria may further exclude impor-

tant studies, and the sample is naturally limited to the offer available, as papers were selected from two different databases. Additionally, the guiding research question could be explored in a different way, such as multiple case studies with in-depth face-to-face interviews with social entrepreneurs, which could provide further insight into the relationship between digitalization, value co-creation and social entrepreneurship. To ensure a comprehensive review of this topic, it is essential to consider the limitations of this research and address them in future studies.

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KEY DRIVERS OF BUSINESS PROCESS INNOVATION – THE ROLE OF STRATEGIC FOCUSES AND PRODUCT INNOVATION

MI HAJTJA AZ ÜZLETI-FOLYAMATINNOVÁCIÓT? – A STRATÉGIAI FÓKUSZOK ÉS A TERMÉKINNOVÁCIÓ SZEREPE

In this paper, the authors examine how and to what extent various strategic focuses of companies as well as product innovation influence business process innovation (BPI) outcomes in manufacturing companies. This empirical study is based on a large-scale representative sample of 4,000 Hungarian manufacturing companies using the 2016 version of the Community Innovation Survey. The results suggest that larger firms and prospector business strategy have higher BPI outcomes. Empirical findings indicate that the prospector strategy-led strategic focus on new products and new customer groups has a significant positive effect on BPI outcomes. On the contrary, the focus on low-price, customer-specific solutions, and improved products has no significant relationship with BPI outcomes. Furthermore, product innovation only amplifies the relationship between specific strategy focuses and BPI does not directly drive it.

Keywords: business strategy, business process innovation, process innovation, organisational innovation, marketing innovation

Ebben a cikkben a szerzők azt vizsgálják, hogy a vállalatok üzleti stratégiájának fókuszja, valamint a termékinnováció hogyan és milyen mértékben befolyásolja az üzleti folyamatok innovációjának (BPI) eredményeit a gyártó vállalatoknál. Empirikus vizsgálatuk a Közösségi Innovációs Felmérés (Community Innovation Survey, CIS) 2016-os verziójának 4000 magyar feldolgozóipari vállalatból álló reprezentatív mintáján alapul. Eredményeik szerint a nagyobb méretű és a kutató üzletstratégia-típust követő vállalatokra jellemzőbb a BPI. A kutató üzleti stratégia az új termékekre és új vásárlói csoportokra történő stratégiai fókuszálást jelent, aminek jelentős pozitív hatása van a BPI-eredményekre. Ezzel szemben az alacsony árú, ügyfélspecifikus megoldásokra és a továbbfejlesztett termékekre való fókuszálásnak nincs szignifikáns kapcsolata a BPI-eredményekkel. Kutatásuk szerint a termékinnováció csak felerősíti az egyes üzleti stratégiai fókuszok és a BPI-eredmények közötti kapcsolatot, de azokra közvetlenül nem hat.

Kulcsszavak: üzleti stratégia, üzleti folyamatinnováció, folyamatinnováció, szervezeti innováció, marketinginnováció

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The constantly changing economic environment of companies requires continuous adaptation and renewal. One only needs to think about the challenges of rapidly changing customer tastes and habits, global competition, digitalisation, or the climate crisis. This continuous drive for renewal requires innovation not only in goods and services, but also in business processes, including operational routines, skills, marketing, or organisational matters. We refer to this complex renewal of business processes as Business Process Innovation (BPI).

Understanding the relationship between strategic focus and BPI is crucial for managers and policymakers. By strategic focus, we mean the key direction of business efforts that provides a compass for business decisions, including innovation-related decisions. Managers should be aware of the amount and direction of effort that they should put into the renewal of their business processes to support the strategies they want to achieve. However, this issue is also important to policymakers. For example, we can find government support schemes for technological investments, but if that investment is not paralleled with additional innovation in areas such as processes, organisation, or marketing, then the innovation effort can easily fail.

According to Gobble (2012), companies with high R&D spending are not necessarily the best financial performers. And the reason behind this is the lack of strategic alignment of innovation efforts. As she says, “*one of the keys is a clear, actionable corporate strategy and a thorough understanding of how and where innovation fits in that strategy*” (Gobble, 2012, p. 63). Ramanujam & Mensch (1985) also mentioned setting innovation goals and allocating resources to innovative activities as the first two most important strategic choices in innovation strategy.

Although there is existing research that examines the relationship between strategy and process, marketing or organisational innovation, its integrated consideration as a BPI is rare. Therefore, we investigate the relationship between some specific strategic focuses and the efforts put into BPI, answering the following research question: How do strategic focuses relate to business process innovation outcomes?

We are aware that the number of potential strategic focuses is numerous. In this study, our attention is focused on a limited set of them, representing an innovation-push approach (focusing on improving products or developing new ones), a customer-pull approach (focusing on customer-specific solutions or new markets), and a competition-based approach (focusing on low price).

We use data from the Community Innovation Survey (CIS) of Hungarian manufacturing companies from 2016. Our sample covers 4,000 manufacturing companies.

In this paper, we first investigate the relevant literature. Then, we form our research model and elaborate the hypotheses. After introducing the data, we present the analysis. The paper is closed with a discussion and conclusions.

Theoretical background

A widely shared belief in Operations Management that processes – specifically, business processes – can provide a competitive advantage for companies. Therefore, our focus lies in understanding how companies can develop their business processes, and how different strategic intents or focuses can influence the outcome of BPI. By „outcome,” we mean that the company has completed or finalised the BPI process. For simplicity, we use BPI instead of the BPI outcome throughout the paper.

The drivers of innovation in the literature have received a great deal of attention. Grounded in the strategic management literature, drivers of innovation can be internal or external, for example,

- 1) environmental pressure: drivers that stimulate the organisation to innovate (Gann & Salter, 2000).
- 2) knowledge exchange between partners (Goverse et al., 2001).
- 3) business strategy and related innovation strategy (Pisano, 2015).
- 4) technological capabilities (consisting of technical factors allowing firms to develop innovative products and processes (Gann & Salter, 2000).
- 5) absorptive capacity of the firm (Zahra & George, 2002).

Our study explores the interplay between business strategic focus and BPI, while also considers the role of product innovation. Therefore, based on the literature, we first introduce BPI, followed by the business strategies behind the strategic focus. We will then examine the relationship between a company’s strategic focus and its BPI efforts. Finally, we investigate the role of product innovation.

Business process innovation – building blocks

Business innovation as a concept is multi-dimensional, consisting of different types of innovation which affect organisations in multiple ways. For innovation researchers (see, e.g., Reichstein & Slater, 2006), the Oslo manuals (OECD/Eurostat, 2005, 2018) provide definitions of business innovation and its types. According to the Oslo Manual (OECD/Eurostat, 2018), business innovation consists of product innovation and business process innovation (process, organisational, and marketing), and “*it is a new or improved product or business process that differs significantly from the firm’s previous products or business processes and that has been introduced on the market or brought into use by the firm*” (p. 68). However, the 2018 manual does not give a definition for the types within BPI. We should go back to the previous edition (OECD/Eurostat, 2005) to find them. We summarised the definitions in Table 1. These manuals provide the basis for the Community Innovation Survey (CIS) for European countries and are the most relevant sources of information for our paper.

Regarding BPI, the 2018 manual considers the following functional areas of business where business process innovation can occur: a) production of goods and services,

b) distribution and logistics, c) marketing and sales, d) information and communication systems, e) administration and management, f) product and business process development (p. 73). This coverage is larger than it was in the 2005 manual; for example, product and business process development (point f)), or innovation in sales, after-sales, and other support functions within the marketing field (c) have not been investigated before.

Table 1
Basic definitions of innovation types

Type	Definition	Source
Business innovation	"...a new or improved product or business process that differs significantly from the firm's previous products or business processes and that has been introduced on the market or brought into use by the firm." (p. 68)	OECD/ Eurostat (2018)
Product innovation	a new or improved good or service that differs significantly from the firm's previous goods or services and that has been introduced on the market. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness, or other functional characteristics.	OECD/ Eurostat (2005, 2018)
Business process innovation	a new or improved business process for one or more business functions that differs significantly from the firm's previous business processes and that has been brought into use in the firm.	OECD/ Eurostat (2018)
Process innovation	the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.	OECD/ Eurostat (2005)
Marketing innovation	the implementation of a new marketing method involves significant changes in product design or packaging, product placement, product promotion or pricing	OECD/ Eurostat (2005)
Organizational innovation	the implementation of a new organisational method in the firm's business practices workplace organisation or external relations	OECD/ Eurostat (2005)

Source: own compilation

Business process innovation typically occurs within the internal operations of organisations, and it is closely linked to technology and digital advancement. It represents an updated version of approaches such as business process management, business re-engineering, or business process re-design (Anand et al., 2013). In a sense,

BPI can potentially eliminate non-value-adding business processes and improve cost, quality, and time. In this way, it efficiently meets the goals of the business and the demands of the customers. Other authors provide slightly different definitions compared to the Oslo manual. Based on the literature review by Anand et al. (2013) about these approaches, Davenport defines BPI as "performing work activities in a radically new way to attain visible and dramatic results to meet the business objectives"; Smith considers it as "end-to-end process by which improved, renewed, or replacement products, solutions, and services are delivered in practice, generating new 'top line' business value"; Leigh sees BPI as achieving "an entirely new set of performance features" (Anand et al., 2013, p. 4).

Practically, BPI includes process, organizational, and marketing innovation as different layers of innovation, providing a wider end-to-end, multiple-layer approach. This is one of the ways to achieve long-term positive business results. To illustrate this, consider an analogy from process design: having a high-capacity machine is useless if the other machines are unable to keep pace. The same holds for the entire business.

In this paper, we approach process innovation in the wider BPI sense. We do this because we have witnessed dynamic changes in manufacturing over the last few years. We should also consider the blooming of lean management (Stone, 2012), recent digital and Industry 4.0 efforts (Demeter, Losonci, & Nagy, 2021), or the servitization of manufacturing companies (Matthyssens & Vandembemt, 2010). Although the longevity, starting point, or scope of efforts might differ in various examples, we argue that these changes should be considered more widely than simple marketing, process routine, or technology changes because they trigger organisational adjustments (Báthory, 2020) and even modifications in the way products are sold to customers. It is no coincidence that the literature discusses the "lean transformation" or "digital transformation" of companies, referring to organisation-wide, profound changes.

Although the literature is relatively rich in grasping the characteristics and impacts of these building blocks (i.e., process, organisational, and marketing innovation) (e.g., Reichstein & Salter, 2006; Wu & Lin, 2010; Naidoo, 2010) there is much less research on BPI as a complex phenomenon. Surprisingly, few empirical articles explicitly deal with BPI.

Business strategy focus

We aim to investigate the relationship between strategic focus and BPI. Companies can focus their efforts on many different things (in relation to innovation), but due to the limited set of potential focus we have in our dataset (CIS 2016 database), we focus our attention on a limited set of strategic focuses listed in Table 1, first column. In this chapter, we identify how these potential strategic focuses can be related to the business strategy of companies.

Business strategy specifies how a specific business in the firm's portfolio will compete in the marketplace (Varadarajan, 2018). The principal focus of business strategy is

the achievement and maintenance of competitive advantage by leveraging the distinctive resources of the firm and the focal business to implement a value-creating strategy (Varadarajan & Jayachandran, 1999). Business strategy has been regarded as important for creating competitive advantage, determining financial performance (if it is associated with innovation types), and customer value (marketing performance) (Porter, 1980; Varadarajan, 2009; Zahra & Covin, 1994).

Due to the limited resources that companies have, they must focus their efforts. According to Berthon et al. (1999), companies can have a customer or innovation orientation. A customer-orientated (also known as demand-pull, Adams et al., 2019) strategy listens to the voice of the customer and starts development from customer inputs. An innovation-oriented (also known as technology-push, Adams et al., 2019) strategy makes developments in-house and then finds the relevant market for the development.

There are two well-known frameworks of business strategy (Hambrick, 2003). Porter's (1980) generic business strategy framework focuses on customers and competitors, while Miles and Snow's (1978) typology focuses on the intended rate of product market change. Porter's generic strategies (1980) provide a fundamental means of achieving competitive advantage by proposing how firms create customer value compared to its customers. He introduced three types of strategies: (1) cost leadership (low cost); (2) differentiation (uniqueness); (3) focus (defining market niches). Miles and Snow (1978) classified business units into four strategic types: *Prospectors* (exploit new products and market opportunities), *analysers* (minimise risk while maximising the opportunity to profit), *defenders* (attempt to seal off a portion of the total market to create a stable set of products and customers), *reactors* (a "residual strategy, arising when one of the other three strategies is improperly pursued).

Walker and Ruekert (1987) created a hybrid typology. Their model synthesizes the Miles and Snow (1978) typologies and Porter's (1980) generic strategies. The hybrid typology defines business strategies in terms of two major dimensions: (1) the unit's desired rate of new product market development (consistent with the prospector, analyser, and defender categories of Miles and Snow), and (2) the unit's intended method of competing in its core business or established product markets (either through maintaining a low-cost position or by differentiating itself by of-

fering the higher quality or better service, as suggested by Porter). In other words, this strategy consists of prospectors, low-cost defenders, differentiated defenders, and reactors. Our study does not include the reactors due to a lack of proactive manner.

The suggested relationship between CIS 2016 strategic focuses and the business strategy frameworks is shown in Table 2.

Table 2 elucidates the reasons behind the assignment of variables to specific business strategies. Slater and Olson (2000) stressed that the key to success for *prospectors* is the development of innovative new products and entry into new markets. Hambrick (1983) found that prospectors, who can be regarded as (technology) leaders, have large product R&D expenses. For prospectors, maintaining a reputation as an innovator in products and markets is important. Moreover, for differentiation strategy, it is vital to clearly identify the customer on whose needs the differentiation is based. Product innovation is an option to differentiate and create something unique. Therefore, we place the strategy focuses on new products and new customer groups in the prospectors' and differentiation business strategy.

On the contrary, the high priority of *low-cost defenders* is on improving efficiency, focusing on engineering tasks, and emphasizing cost control (Laugen et al., 2006; Olson et al., 2005). So, these firms compete primarily based on the price (cost) and quality. Walker and Ruekert (1987) suggest that process engineering, production, distribution, and finance (rather than marketing) constitute the dominant functions in low-cost defender firms. These firms pursue efficiency in all parts of their value chain by attempting to reduce costs in primary activities (Porter, 1985). Consequently, these firms 'will focus on a low-cost strategy.

Analysers are a combination of prospectors and defenders. Analysers strive for improved efficiency and adopt only those innovations that appear to have strong market potential (Snow & Miles, 1978). For this reason, they strive to improve product and process innovation.

The key to success for *differentiated defenders* is to provide premium services and/or high-quality products to select sets of customers who value and are willing to pay for them (Olson, 2005). Therefore, these companies will focus more on customer orientation solutions by maintaining customer loyalty through superior products/services.

Table 2

Own classification of strategy focuses driven from CIS 2016

Strategic focuses (CIS 2016)	Berthon et al. (1999)	Porter (1980)	Miles & Snow (1978)	Walker & Reukert (1987)
New products	Innovation orientation (Technology push)	Differentiation	Prospector	Prospector
Improved products		Differentiation	Analyser	Analyser
New customer groups	Customer orientation (Demand pull)	Differentiation	Prospector	Prospector
Customer specific solution		Differentiation	Defender	Differentiated defender
Low price		Cost Leadership	Defender	Low-cost defender

Source: own compilation

Overall, the business strategies in Table 2 provide a theoretical background for the positioning of strategic focuses used in CIS 2016. However, it is worth noting that despite their limitations in providing a comprehensive perspective, these focuses still offer a useful framework for delineating the directions of business strategy.

Strategic focus and business process innovation

The issue of whether the business strategy should be aligned with innovation or not has been the subject of numerous studies. For instance, a study by Zahra and Covin (1994) examines how the business-level strategy influences a company's focus on different types of innovation (product, process, and administrative) and sources. They suggest that the starting point in the deployment of innovation types is to reconcile them with business strategy. To consolidate, Varadarajan (2009) emphasizes that innovations of various types are central to a business strategy for achieving and sustaining a competitive advantage in the marketplace.

A strategic innovation orientation provides collective guidance and direction that drive a firm to achieve sustainable competitive advantage (Narver & Slater, 1990; Zhou et al., 2005). For instance, cost-reduction strategies have become predominant as firms seek new ways of reducing the cost of production to gain a competitive advantage in price. In this context, process innovation strategy implementation involves actions that improve the speed, efficiency, and reliability of production processes, resulting in improved product innovation and product quality performance (Jayaram et al., 2014). Defenders are best at capturing such a strategy by introducing cost control and continually attempting to develop greater efficiency in existing operations (Snow & Miles, 1978).

Furthermore, marketing innovation strategies help the company to adapt to the new demand patterns of their target customers to realise the survivability of their existing businesses (Wang et al., 2020). Thus, the firm efficiently attempts to meet the demand of customers and create superior customer value. According to a study by Naidoo (2010), marketing innovation assisted in developing and sustaining competitive advantage based on Porter's business strategies (differentiation and cost leadership).

Organisational innovation strategies are strongly associated with greater flexibility, adaptability, and organisational performance (Alänge & Steiber, 2011). For instance, organisational innovation strategy is driven by factors such as the introduction of new or improved workplace organisation methods to sustain competitive advantage. Based on these arguments, low-cost defenders and analysers may adopt organisational innovation, as they tend to have clearly defined objectives and well-established operational procedures for holding down the costs (Walker & Reukert, 1987).

When the results regarding the relationship between strategies and innovation are considered, the defender is associated with process innovation; the analyser is the most related to administrative innovation, but it also supports other innovation types; prospector goes with product

innovation, and the reactor with no innovation (Zahra & Covin, 1994). Marketing differentiation strategy has a relationship to process innovation, and this relationship is negative.

If we consider the dimensions of business strategy (e.g., Miles & Snow (1978) typology, or the research of Zahra & Covin (1994)), prospector firms tend to be the main driver of business process innovation, followed by analysers and defenders. Generally, it can be asserted that business strategy plays a significant role as a driver of business process innovation, particularly when combined with the availability of sufficient resources.

Based on the very diverse and puzzled approaches the most, we can say that there seems to be a relationship between the business strategy (focus) and innovation. So, we formulate the following hypothesis:

H1: Business process innovation is driven by strategic focus.

The relationship of product innovation with strategic focuses and BPI

BPI is not independent of product innovation. Product innovation can be the main reason for BPI, since new products can require new technologies to be able to produce new features (Reichstein & Salter, 2006) they may also need new procedures, new skills, new managers, as well as new markets and customers. Therefore, product innovation can be a driver for BPI. However, product innovation is not necessarily required to achieve BPI. Existing products can also be produced and delivered using new processes, organisational structures, or marketing approaches.

Product innovation differentiation affects each type of innovation positively. Product and service efficiency strategy are negatively related to product innovation and positively to process innovation (Augusto et al., 2014). Furthermore, Varadarajan (2009) suggests that product innovations are central to a business marketing strategy in myriad contexts such as (i) meeting customer needs and wants, (ii) responding to changes and shaping customer preferences, (iii) entering a new market.

Product innovation can be an important driver and has the potential to serve as a crucial catalyst for the innovation of processes. Reichstein and Salter (2006) analysed the relationship between product and process innovation and found a strong correlation between the ratio of product and process innovation based on data from eighteen industries. Martinez-Ros (2000) also found complementarities between the two innovation types, although product innovation encouraged process innovation more than vice versa. In contrast, Kraft (1990) found that while product innovation drives process innovation, process innovation does not influence product innovation.

Similarly, new products and/or services might lead to innovation in marketing (Purchase & Volery, 2020). For example, companies turning to developing digital products and getting skills in digital technologies might also adopt new communication channels and rely on service-dominant logic or on user community perspectives.

H2: Product innovation is a driver for business process innovation.

Product innovation is critical to the growth and success of most companies. Even if a company has a brilliant strategy, it may not be able enough to execute that strategy without making the necessary innovations. According to Prajogo (2016), it has been observed that product innovation offers firms and customers various values other than the “newest” or “novelty” itself. Firm’s new product strategy typically delineates the direction of the firm’s new product program (for example, the types of products, market, and technology), the orientation or stance (for example, leader/aggressive versus follower/passive), and the commitment to the program. Atuahene-Gima (1995) investigated the moderating effect of product innovativeness on the relationship between market orientation and new product performance.

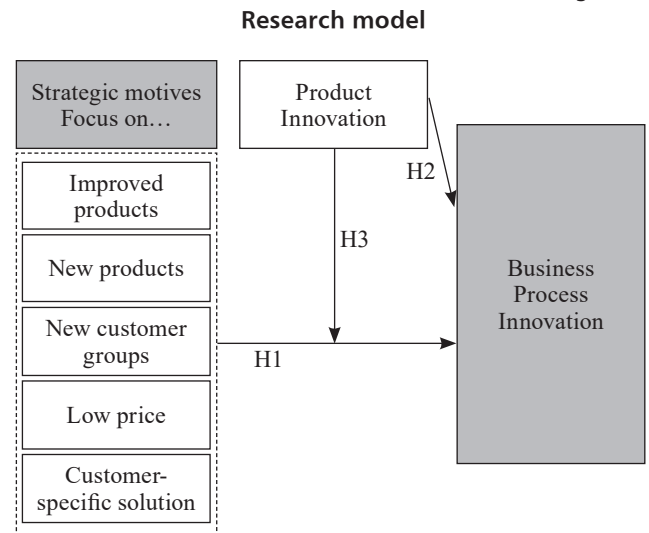
A key motivation for employing product and process innovation in manufacturing firms is to improve product performance (Jayarama et al., 2014). Product innovation can facilitate the relationship between strategic focus and BPI. Having real product innovation can strengthen this relationship by making the strategy a reality, thus making changes in business processes necessary. Product innovation literature recognises that strategic orientation is important for developing new products ((Jeong, Pae, & Zhou, 2006). The literature is rather limited on the moderating effect of product innovation between strategic focus and BPI. A study by Li et al. (2008) showed that product innovativeness could positively moderate the relationship between market orientation and performance in small Chinese firms. Another study by Liu and Chen (2015), investigated the moderating effect of product innovativeness between strategy orientation and new product performance. They confirmed the moderating role of product innovativeness, which influences the relationship between market orientation strategy and new product performance. Therefore, product innovation can serve as a moderator between strategic focuses and BPI because while strategic focuses e.g., new products or new customer solutions, are in line and influenced by product innovation, BPI involves improving or re-engineering the way a firm’s operations and processes are structured that can leverage to support the development of new products or processes. Thus, based on the above-mentioned, we propose:

H3: Product innovation is a moderator between strategic focus and BPI.

The research framework

To structure our analysis, we will investigate the relationship between strategic focus and BPI. It is expected that BPI is driven by strategic focus and affected by product innovation. The research model of this study is presented in Figure 1.

Figure 1



Source: own compilation

In our view, it is our contention that the strategic motives for innovation exert a significant influence on both the extent to which BPI occurs and the specific type of innovation that emerges within the BPI framework. For example, focusing on new products can stimulate all elements of BPI because new products might need new technologies to produce (and related processes), new ways to market them, and new organisational units to manage. Moreover, a cost orientation leads to a focus on reducing non-value-added services, identifying cost-saving sourcing options, and developing lower-cost alternative product and service delivery methods (Scott et al., 2009). Therefore, focusing on low prices requires process innovation, organisational as well as marketing innovation, because the prices might need more efficient processes to lower costs, and processes can be facilitated by organisational changes. Marketing literature focuses mainly on two orientations: customer and competitor orientation (Naver & Slater, 1990). Customer orientation is an organisational culture that facilitates the understanding of targeted buyers and allows for the continuous creation of customer value. Focusing on new customer groups probably requires marketing innovation the most, but logistics can also be significantly impacted by this strategic shift, as the organisation may need to adjust its supply chain and distribution networks to reach and serve these new customer groups effectively. Customer-specific solution focus can require a more customer-focused organisational setup and different marketing tools, just like in the case of servitized companies.

In addition, it is worth noting that the actual implementation of product innovation, as opposed to mere strategic planning, can serve as an even more powerful catalyst for BPI. While strategic intentions and plans are certainly important, the tangible results and outcomes of product innovation can provide valuable insights and opportunities for organisations to innovate their business processes in more effective and impactful ways.

Research methodology and data

We used the Hungarian dataset from the 2016 edition of the Community Innovation Survey (CIS). This survey is used biannually by the European Commission in European countries to continuously monitor innovation performance (for details, see the website of the survey: https://ec.europa.eu/eurostat/cache/metadata/EN/inn_cis10_esms.htm). In Hungary, the Hungarian Statistical Office has been responsible to manage the questionnaire and the data.

The target population for CIS 2016 consisted of all enterprises with 10 or more employees that had activity in innovation statistics within NACE Rev2 sections B, C, D, E, H, J, K, and divisions 46, 71, 72, and 73. In Hungary, the survey was conducted online and was compulsory for companies with more than 100 employees, while a sample was taken from smaller companies. A total of 6,741 companies responded to the questionnaire, and we used only data from the manufacturing sector (Section C), which comprised exactly 4,000 companies.

According to Figure 1, we used three groups of data from various parts of the questionnaire. One group consisted of the components of BPI, (with each variable being nominal with yes/no options):

- 1) process innovation (measured using three variables: new methods of manufacturing; logistics, delivery, or distribution methods; supporting activities),
- 2) organisational innovation (measured using three variables: new business practices; new methods of organising work responsibilities and decision making; new methods of organising external relations),
- 3) marketing innovation (measured using four variables: significant changes to the aesthetic design or packaging;

new media or techniques for product promotion; new methods for product placement or sales channels; new methods of pricing goods or services).

The BPI construct, (with a range of 0-10) was created by adding up all these 10 variables, with a “yes” response indicating the use of each variable.

The next group is product innovation, which is calculated as the sum of two binary (yes/no) variables: goods innovations and service innovations.

The third group describes the strategic focus of enterprises using five variables, with a degree of importance value ranging between 0-3 (0-not important; 3-high importance):

- a) improving existing goods or services,
- b) introducing entirely new goods or services,
- c) reaching new customer groups,
- d) providing customer-specific solutions,
- e) offering low prices.

Beyond these three main groups, we used three control variables for our analysis: 1) the (logarithm) of the number of employees, since the size of the company can influence the available resources for any innovation; 2) industry (measured as a dummy), since different industries have different levels of innovation (see Reichstein & Salter, 2006); 3) whether the company belonged to a group, that is, subsidiary of a group (measured as a dummy), since the headquarter or other members of the group’s network can facilitate (by knowledge and resources) BPI in the company.

The descriptive statistics of the variables are summarised in Table 3. Based on these statistics, focusing on improving existing products and services is the most im-

Table 3

The descriptive statistics of key variables

Variable group	Variable	Mean	Standard variation
<i>Process innovation</i>	New methods of manufacturing (ratio of companies)	0.1090	0.3117
	New logistics, delivery, or distribution methods (ratio of companies)	0.0365	0.1876
	New supporting activities (ratio of companies)	0.0678	0.2513
<i>Organisational innovation</i>	New business practises for organising procedures (ratio of companies)	0.0530	0.2241
	New methods for organising work responsibilities (ratio of companies)	0.0700	0.2552
	New methods of organising external relations (ratio of companies)	0.1043	0.3056
<i>Marketing innovation</i>	Significant changes to design or packaging (ratio of companies)	0.0780	0.2682
	New media or techniques for product promotion (ratio of companies)	0.0688	0.2531
	New methods for product placement (ratio of companies)	0.0443	0.2057
	New methods of pricing (ratio of companies)	0.0558	0.2295
<i>Product innovation</i>	The company introduced new goods (ratio of companies)	0.1745	0.3796
	The company introduced new service (ratio of companies)	0.0445	0.2062
<i>Strategic focus</i>	Focus on improving existing goods or services (0-3 scale)	2.509	0.811
	Focus on introducing new goods or services (0-3 scale)	1.698	1.006
	Focus on reaching new customer groups (0-3 scale)	2.016	0.976
	Focus on customer specific solutions (0-3 scale)	2.028	1.005
	Focus on low price (0-3 scale)	1.725	0.899
<i>Control variables</i>	Number of employees	131	376
	Belonging to company group (ratio of companies)	0.2910	0.4543

Source: own compilation

portant strategic focus, followed by reaching new customers and providing customer-specific solutions. Among the innovation types, new product innovation (0.1745, which is 17% of companies) is by far the most frequently used. The next two are new manufacturing methods (11%) and new methods of organising external relations (10%). New logistics methods, product placement, and service innovation are the least frequently used.

Analysis and results

For the analysis, we used linear regression models estimated using the ordinary least squares (OLS) method, since our dependent variables are discrete. Although alternative methods such as logistic regression could also be used, binary logistic regression requires a simplified version of the dependent variable, resulting in a loss of information. The choice of multiple logistic regression as another alternative generates many parameters, making it difficult to overview the results and it is also extremely complex to interpret the parameters of such a model.

We have estimated 3 models for BPI depending on the set of explained variables:

- In Model 1, we used only the potential control variables: the number of employees, the dummy of enterprise group membership (0 or 1), and the dummies of the main activity of the company (according to its NACE code).
- In Model 2, we added the dummies of the strategic focuses (5 variables) and product innovation.
- Model 3 is completed by the interaction of the strategic focuses and product innovation (5 additional variables).

We assumed that the strategic focuses are highly correlated with each other. Therefore, we attempted to use some factors instead of the five variables. However, investigating the correlation matrix of these variables, we found that even the largest correlation coefficient is only slightly over 0.5 (Table 4). So, we decided to keep them as separate variables.

Model estimations for BPI are presented in Table 5. The coefficients of the industry dummies are not shown in

Table 4

The correlation matrix of the strategic focuses

Focus on ...	Improved products	New products	New customer groups	Customer-specific solutions	Low price
Improved products	1.000	0.358	0.393	0.436	0.352
New products	0.358	1.000	0.477	0.387	0.353
New customer groups	0.393	0.477	1.000	0.522	0.420
Customer-specific solutions	0.436	0.387	0.522	1.000	0.434
Low price	0.352	0.353	0.420	0.434	1.000

Source: own compilation

Table 5

The OLS model for business process innovation

		Dependent variable: Business process innovation					
		Model 1		Model 2		Model 3	
		Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
	Intercept	-.454	0.000	-.783	0.000	-.651	0.000
Control variables	Number of employees (log)	.307	0.000	.174	0.000	.170	0.000
	Group membership	.067	0.270	.049	0.356	.059	0.272
	Product innovation			1.68	0.000	.016	0.951
Strategy Focus on ...	improving existing goods or services			.066	0.023	.045	0.149
	introducing new goods or services			.092	0.000	.067	0.013
	reaching new customer groups			.062	0.020	.049	0.092
	customer-specific solutions			.033	0.201	.029	0.299
	low-price			-.030	0.249	-.029	0.326
Inter-actions with product innovation	improving existing goods or services					.253	0.003
	introducing new goods or services					.237	0.001
	reaching new customer groups					.136	0.056
	customer-specific solutions					.036	0.586
	low-price					.037	0.572
		Adj R ² = 0.086		Adj R ² = 0.293		Adj R ² = 0.301	
		F (25, 3974) = 16.04		F (31, 3968) = 54.58		F (36, 963) = 48.78	

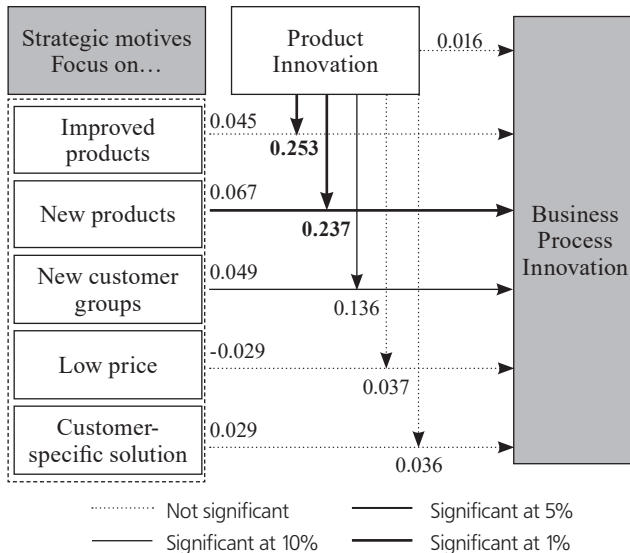
Source: own compilation

the tables because of practical reasons (24 manufacturing industries), but they were significant.

All models are significant, but the R^2 measure is quite low in Model 1. When we add strategic focuses as independent variables, the explaining power of the model increased significantly. Model 3 for BPI is the best model of all with the highest R^2 , indicating that it is easier to explain the more complex dependent variable.

Figure 2

Model 3 – the impact (coefficient) of strategic motives on BPI



Source: own compilation

The number of employees is significant in all models, and its coefficient is positive, indicating that larger enterprises tend to innovate their business processes more than smaller ones. The group membership parameter is positive only in the case of organisational innovation. So, if a company operates in a group of enterprises, it helps to innovate the organisation, but it does not hold for the other types of innovation.

The interaction terms show similar significance to the strategic goal dummies. However, the interactions of product innovation with the “Focus on low-price” and the “Focus on customer-specific solutions” strategies are not significant. In case of the “Focus on reaching new customer groups” strategy, the interaction parameter is close to the significance level, but it is not significant at 5%. On the other hand, the interactions of product innovation with the “Focus on improving your existing goods or services” and the “Focus on introducing new goods or services” strategies are significant with a positive coefficient. This means that product innovation positively moderates the impact of these two strategic focuses; the higher level of product innovation causes a higher partial effect of the “Focus on improving your existing goods or services” and the “Focus on introducing new goods or services” strategies (see Figure 2).

The models have relatively high explaining power with an adjusted R-squared of 0.3. However, despite the good explanation power, there are very few significant relationships.

A peculiar finding is that although Model 2 indicates that product innovation has a significant effect on BPI (as shown in Table 5), this relationship becomes non-significant when interaction effects are added in Model 3, as it is absorbed by the interaction terms. This means that product innovation does not directly affect BPI. Instead, it strengthens the relationship between strategic focuses and BPI.

Regarding the control variables, the number of employees is significant in each model. The industry also matters and is significant (although not shown in the Table). Contrary to expectations, the study suggests that being part of a multinational corporation may not have a significant effect on an organisation’s ability to undertake successful (BPI) initiatives.

Discussion

This paper offers an insight into how strategic focuses are tied to BPI. According to the results in Table 5 and Figure 2, focusing on new products and/or reaching new customers and acting for product innovation will result in a corresponding impact on BPI (*H1 is partially accepted*, as 2 of the 5 strategic focuses have a significant relationship with BPI). The results are consistent with the starting point in the referred articles, namely that strategic focuses are related to BPI and have a significant impact on it (Zahra & Covin, 1994; Augusto et al., 2014; Ramanujam & Mensch, 1985). However, only the two most ambitious business focuses (new products or new customer groups) significantly influence the BPI.

If the BPI measure ranges from 0 to 10, it implies that the BPI score is a composite index that is based on the number and type of BPI that a company has accomplished. A higher score indicates that a company has achieved more types of BPI and, therefore, has a higher level of BPI. Consequently, the extent to which changes occur in terms of scope (i.e., the number of distinct BPI components affected) and depth (the degree to which these components are affected) is a crucial factor. The introduction of new products and new customer groups entails a significantly broader scope and depth of change since multiple components of business processes require more radical changes.

Generally, the data suggest that prospectors (represented by focusing on new product development and/or new customer groups) dedicate more attention to BPI than defenders and analysers. These findings are partially supported and are consistent with extant literature (Porter, 1980; Walker & Reukert, 1987; Augusto et al., 2014; Zahra, 1994; Miles & Snow, 1978; Berthon et al., 1999; Csepeti, 2010). For instance, Augusto et al. (2014) found that product innovation differentiation affects each type of innovation positively, which also suggests a strong impact of new product focus.

However, we did not find that the product/service efficiency strategy (that we relate to a low-price focus) would go with process innovation, as argued by Augusto et al. (2014). This strategic focus, which was claimed as the most important driver by Ramanujam & Mensch (1985), can hardly be detected as a driver of BPI. Focus on low prices, which can be related to efficiency (although their match depends on the pricing strategy of the company), is the most rarely chosen, and the relationship to BPI even has a negative coefficient (although non-significant).

When examining our findings, it becomes apparent that the strategic focus on low prices and customer-specific solutions exerts a relatively minor influence on BPI as a complex system, probably because the scope and depth of these changes are relatively low. Their impact is not wide enough, targeting only specific areas. For this reason, the low-cost and customer-specific solutions strategy focuses may not serve as a primary driver of BPI, and they may engender other forms of innovation, such as technological innovation (for example, buying/developing a more productive machine). Our results contradict Naidoo (2010), who found a negative relationship between customer orientation and marketing innovation and a positive relationship between the other two orientations (competitor and inter-functional coordination) and marketing innovation. Although the categories do not entirely match, we found the opposite. Reaching new customer groups (what we consider as customer orientation) has the strongest positive relationship with BPI, and low price (which can be related to competitor orientation) has no impact on BPI. This contradiction can be the result of different formulations of strategies, but also due to us considering not only marketing innovation but overall BPI.

The results of our investigation failed to furnish substantive empirical corroboration for the hypothesized proposition encapsulated in hypothesis 2 (*H2 is rejected*). As soon as the regression incorporates the moderation effect, product innovation stops being a driver for BPI and instead has a strong moderating effect on the relationship between strategy focuses and BPI. This result goes against the findings in the literature (Reichstein & Salter, 2006), which says that product innovation is a key driver of process innovation. This result might stem from the fact that the moderation effect of product innovation has not been considered before. Leaving that out of the regression product innovation would have a driver effect. It means that not product innovation per se, but the strategic focus (more specifically, focus on developing new products and/or searching for new markets) drives BPI, and it is just amplified by product innovation. This suggests that companies that prioritise these objectives view BPI as an integral part of business innovation from the outset.

The analysis indicates that the moderation effect of product innovation on the relationship between strategic focuses and BPI is significant in three instances, namely the introduction of improved or new products and new customer groups (*H3 is partially accepted*). Since the literature focuses more on the moderation between strategy and product performance (Li et al., 2008; Liu & Chen,

2015), this result is new to the literature. Furthermore, in the light of the previous paragraph discussing the role of product innovation as a driver (assumed in the literature before) versus as a moderator of the relationship between strategic focus and BPI, this indicates an important result.

Conclusions

The aim of this research is two-fold: first, to examine the link between strategic focuses and BPI; second, to explore the role of product innovation. We presented compelling evidence sourced from a significant number of companies (4,000) operating within the Hungarian manufacturing industry, derived from the 2016 Community Innovation Survey.

There are two main contributions of this research. First, our research found that complex BPI is only driven by ambitious prospector business strategies, which are based on developing new products and/or searching for new customers. Second, product innovation is not a driver of BPI, but plays a moderating role in the relationship between strategic focus and BPI. It does not eliminate the important role of product innovation in BPI, but its role is limited to a subset of strategic focuses (developing improved/new products or searching for new customers).

As for the managerial implications, if a company intends to introduce new products to the market, managers should be aware that they must innovate their business processes, which include not only the manufacturing processes but also marketing and logistics. Moreover, innovation might also be required in external relations and/or internal organisational structures. On the contrary, if the company focuses on improving existing products, which is usually the case, then the magnitude of required innovation in business processes is usually smaller. Regarding the role of product innovation, the primary driver of BPI is the business strategy, and product innovation only can amplify its impact on business processes. Therefore, managers should understand and focus their attention on the direction and radicality of the strategy and handle business processes accordingly.

Our paper explored a limited set of potential strategic focuses, and a more extensive set could provide more detailed insight into the relationship between strategy and BPI. The 2018 CIS survey has completely revised the strategic section, presenting opportunities for a more in-depth analysis. Furthermore, given that a low-price strategic focus does not demonstrate a significant relationship with BPI, based on the findings of this study, it would be worthwhile for future research to address how this specific strategic focus can be supported from an innovation-based perspective.

Whilst this study employs a widely recognised survey, it is not exempt from limitations. First, we relied on a general-purpose survey that had an influence on the item selection and research model. Still, the number of observations is a unique feature of our study, so it compensates for the operationalisation problem to some extent.

Second, given the data collection period (2014-2016), the geographical (Hungary) and industrial focus (manufacturing), our results can only be generalized for countries with similar features (in terms of innovation). Third, we assumed a linear relationship between strategic focuses and BPI outcomes. Future research could address this relation assuming curvilinear links that are proved viable in the innovation outcome literature (Sharma et al., 2019).

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Appendix: The original survey questions used for the analysis

During the three years 2014 to 2016, how important were each of the following strategies to your enterprise?

	Degree of importance			
	High	Medium	Low	Not important
Focus on improving your existing goods or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Focus on introducing entirely new goods or services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Focus on reaching new customer groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Focus on customer specific solutions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Focus on low-price	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

During the three years 2014 to 2016, did your enterprise introduce:

	Yes	No
New or significantly improved methods of manufacturing for producing goods or services	<input type="checkbox"/>	<input type="checkbox"/>
New or significantly improved logistics, delivery or distribution methods for your inputs, goods, or services	<input type="checkbox"/>	<input type="checkbox"/>
New or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing	<input type="checkbox"/>	<input type="checkbox"/>

During the three years 2014 to 2016, did your enterprise introduce:

	Yes	No
New business practices for organising procedures (i.e., first time use of supply chain management, business re-engineering, knowledge management, lean production, quality management, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
New methods of organising work responsibilities and decision making (i.e., first time use of a new system of employee responsibilities, teamwork, decentralisation, integration or de-integration of departments, education/training systems, etc.)	<input type="checkbox"/>	<input type="checkbox"/>
New methods of organising external relations with other enterprises or public organisations (i.e., first time use of alliances, partnerships, outsourcing or sub-contracting, etc.)	<input type="checkbox"/>	<input type="checkbox"/>

During the three years 2014 to 2016, did your enterprise introduce:

	Yes	No
Significant changes to the aesthetic design or packaging of a good or service (<i>exclude changes that alter the product's functional or user characteristics – these are product innovations</i>)	<input type="checkbox"/>	<input type="checkbox"/>
New media or techniques for product promotion (i.e., first time use of a new advertising media, a new brand image, introduction of loyalty cards, etc)	<input type="checkbox"/>	<input type="checkbox"/>
New methods for product placement or sales channels (i.e., first time use of franchising or distribution licenses, direct selling, exclusive retailing, new concepts for product presentation, etc)	<input type="checkbox"/>	<input type="checkbox"/>
New methods of pricing goods or services (i.e., first time use of variable pricing by demand, discount systems, etc)	<input type="checkbox"/>	<input type="checkbox"/>

What was your enterprise's average number of employees in 2014 and 2016?

2014

--	--	--	--	--	--	--

2016

--	--	--	--	--	--	--

Source: own compilation

TECHNOLOGY ADOPTION AMONG HIGHER EDUCATION STUDENTS TECHNOLÓGIAELFOGADÁS FELSŐOKTATÁSI HALLGATÓK KÖRÉBEN

The acceptance of technology is of decisive importance in enhancing diffusion of innovation. Personal opinions and attitudes to technology offer particular foundational points for associated development. This study contributes to greater understanding of factors influencing technology acceptance among higher education students. Findings are based on measuring factors of contribution (optimism, proficiency) and inhibition (dependency, vulnerability) drawn from the technology adoption propensity (TAP) instrument and also by calculating TAP index scores derived from a sample of 873 Hungarian higher education students. Results indicate moderate technology adoption propensity driven by high optimism. Types of study (business, engineering, administrative) were used as grouping factors for the analysis. Optimism indicates similar results by criterion of study type, but proficiency in technology use is highest among engineering students. Considering goals of the Hungarian National Digitalization Strategy, targeted training programs and acquisition of more experience are necessary in order to improve proficiency in use of technology.

Keywords: technology acceptance; technology adoption propensity, higher education students, analysis of variance

A technológia elfogadottsága döntő jelentőségű az innovációk elterjedésében. A technológiával kapcsolatos személyes vélemények és attitűdök alapvetően meghatározók a fejlődés szempontjából. A kutatás célja, hogy hozzájáruljon a technológia elfogadását befolyásoló tényezők megértéséhez felsőoktatási hallgatók körében. A tanulmány a technológiaelfogadási hajlandóság (TAP) modellben megfogalmazott támogató (optimizmus, jártasság) és gátló (függőség, sebezhetőség) tényezőinek mérését, továbbá a TAP-index kiszámítását használja eszközként. A kutatási minta 873 magyar felsőoktatási hallgató válaszait tartalmazza. Az eredmények mérsékelt technológiaátvételi hajlandóságot mutatnak, amelyet a magas optimizmus vezérel. Az elemzésben a tanulmányok típusa (üzleti, mérnöki, közigazgatási) szerepelt csoportosító tényezőként. Az optimizmus hasonló eredményeket mutat a hallgatók között, de a használatban való jártasság a mérnökhallgatók körében magasabb. A Nemzeti Digitalizációs Stratégia céljait figyelembe véve a jártasság javítására irányuló képzési programokra és több szakmai tapasztalatszerzésre van szükség.

Kulcsszavak: technológiaelfogadás, technológiaátvételi hajlandóság, felsőoktatási hallgatók, varianciaelemzés

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Competition between businesses and accelerated changes in customer expectations have mutually reinforcing effects. Furthermore, traditional product development and project management methods have become progressively outdated given that greater time pressure for faster market introduction of novel products or services can no longer be achieved through such means (Berényi & Soltész, 2022; PMI, 2017). This phenomenon is amply documented in management science and the speed of change has remarkably increased with the accelerated development of information technology. By dealing with strategic and other aspects of technology management (Deutsch, Hoffer, Berényi & Nagy-Borsy, 2019), understanding of various factors of technology acceptance and the motivation for using technology are highlighted in this article. In particular, we attempt to locate an appropriate toolset for measuring technology acceptance. In relation to this objective, this study aims to investigate the topic area by using the technology adoption propensity (TAP) instrument developed by Ratchford & Barnard (2012) for measuring contributory and inhibitory factors in relation to accepting new technologies. The study also focuses on higher education students from business, engineering, and public administration fields in order to compare their approach to technology use. Results can thus be used to establish targeted marketing strategies and to support education program development.

The diffusion of innovation model (Rogers, 1964; Rogers, 2003) is widely used for describing the spread of a new product or service. Moreover, the model has been successfully extended to examine the life cycle of technologies, business units, or entire business organizations. By describing dynamics of diffusion and by calculating business impacts as costs and revenues, a reasonable expectation is that of forecasting consumer behavior. Location of innovators and early adopters as consumers, and then measuring the extent of accelerated technology adoption by the early majority, requires a comprehensive understanding of influencing factors of purchasing intentions and crucial intermediate decisions. For example, sales and price cuts of related goods and services may be powerful tools in the short term, but achievement of strategic benefits entails exploration of motivational and inhibitory factors rooted in personal attitudes.

Technology acceptance has a wider effect beyond that of business, and governmental interest has accordingly emerged. Relatedly, the Hungarian government prepared a National Digitalization Strategy (2022) to provide direction for the subsequent eight years. Although it focuses on information technology, the implied consequences of the strategy for society as a whole are remarkably broader. The introductory narrative of the strategy summarizes the COVID-19 pandemic and highlights that only those countries and societies that consciously use digital technologies in all aspects of life can compete internationally in the short term and beyond on a consolidated level. IT infrastructure development is especially noteworthy, and access to building local and international networks is also provided within the strategic remit. Enhanced use of this background is constantly expanding in mobile technolo-

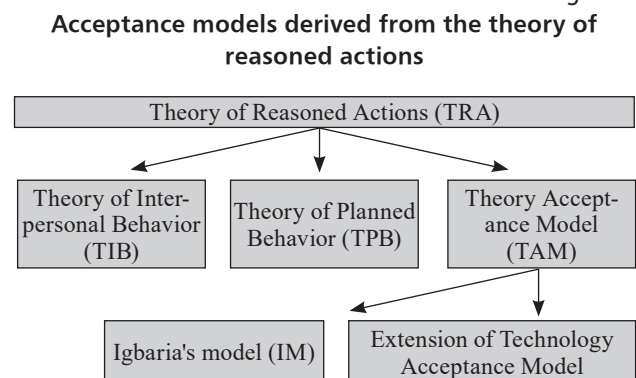
gies in particular with trends following changes measured in the European Union. In parallel, the need for a comprehensive strategy is urgent, which is accordingly justified by overall complexity and interdependence of the digital ecosystem. Such efforts include development of personal aspects in relation to use of technology.

This paper is organized as follows: the initial sections provide an insight into popularly accepted technology acceptance models and compares them to the measurement of technology adoption propensity. The research methodology and the sample characteristics are then presented with the empirical study based on 873 responses from higher education students. This section also emphasizes operation of the TAP index and its composition in terms of sub-samples. The concluding section outlines implications in line with the remit of the Hungarian National Digitalization Strategy.

Adoption and acceptance models

Understanding consumer motivation for purchasing new products and services and accompanying attitudes has long been a prime focus of research attention. In this regard comprehensive overviews have been presented by Isaias & Issa (2005), Keszey & Zsukk (2017), and Taherdoost (2018). Several researchers have also used related models for various purposes (for example, Berényi, Deutsch, Pintér, Bagó, & Nagy-Borsy, 2021); IT applications are also emphasized in for examples blockchain technology (Semenova, 2020), digital entertainment (Aranyossy, 2022) and in financial technologies (Horváth, 2022; Shahzad, Zahrullail, Akbar Mohelska, & Hussain, 2022; Firmansyah, Masri, Anshari & Besar, 2023). The use of IT in education dramatically increased in the COVID-19 lockdown period (Allassafi, 2021; Halász & Kenesei, 2022). Moreover, challenges presented by chatbots and artificial intelligence (AI) applications may become key issues for the future (Luo, Lau, Li & Si, 2022; Chocarro, Cortiñas & Marcos-Matás, 2023). Nonetheless, challenges in IT acceptance can be traced back to the emerging role of digitalization in business models with a wider remit than those of digital data, automatization, and network building. Madaras in particular (2020) highlights the role of digital consumer access as one of the four prime areas emerging from the growing field of research.

Figure 1



Source: based on Taherdoost (2018)

In Figure 1 Taherdoost (2018) derives various models from the theory of reasoned action (TRA) developed by Fishbein and Ajzen (1975), which was formed as a generic model for predicting personal choices and behavior. The model introduced the concept of the intention to perform a certain behavior which precedes actual behavior and which is influenced by personal attitudes and subjective norms. Ajzen (1991) added further explanatory factors and interrelations to the concept and published the theory of planned behavior (TPB). The additional element is that of perceived behavioral control measuring perceived ease or difficulty of performing a particular behavior.

The technology acceptance model (TAM) was developed by Davis (1986) and was later updated and extended by Venkatesh & Davis (2000) and by Venkatesh & Bala (2008) to include a more complex system of explanatory variables. The main elements of this model are respectively, perceived usefulness, perceived ease of use, intention to use, and usage behavior and it is widely regarded as a popular framework among researchers for establishing statistical analysis. It was principally designed to measure how users come to accept and use technology in the field of information systems, but opportunities are not limited to this area alone. Igarria's model (IM) further emphasizes that extrinsic and intrinsic motivational factors influence the acceptance or rejection of new technology (Igarria & Schiffman, 1994).

Venkatesh et al. (2003) produced a unified view which was summarized in the unified theory of acceptance and use of technology (UTAUT) model. Behavioral intention and use of behavior were retained in this model, but the structure is somewhat simplified. Behavioral intention is deemed to be influenced by performance expectancy, effort expectancy, social influence, and facilitation conditions. Moreover, gender, age, experience, and voluntariness of use act as control variables.

Although not explicitly highlighted in the models mentioned in this section, the foundations for this study are assumed to be pre-defined for subsequent evaluation. Task-technology fit models (Goodhue & Thompson, 1995) also incorporate task characteristics and the existing relationship between adapting a given technology and its adequate nature to perform a given task also acts as an element of analysis for the purpose of this study.

Justification for and content of the TAP instrument

A common characteristic of behavioral, technology acceptance, task-technology fit, and unified models is that interpretation is limited to a pre-defined technology. However, the structure and variables used in the previously presented models allows for general applicability and adaptation of frameworks in relation to newly set objectives. In accordance with the need for predicting future behaviors it is assumed missing products or services or limited knowledge and experience for purposes of evaluation exist to some extent. Acceptance models thus include several general factors as moderating variables with various and continuous extensions of the TAP model thereby suggest-

ing a need to focus on background variables. There are generally two instruments widely available for approaching barriers presented in task-dependent evaluation. Firstly, the technology readiness index (TRI), and the updated TRI 2.0 were developed (Parasuraman, 2000; Parasuraman & Colby, 2014). Secondly, the technology adoption propensity model was developed by Ratchford & Barnhart (2012). The TAP instrument can be traced back to emergence of the technology readiness index (TRI) model (Parasuraman, 2000). However, Ratchford and Barnhart (2012) found TRI to be somewhat cumbersome with its 36 survey items, and also that some elements were no longer relevant due to ongoing trends in technology use. Therefore, subsequent researchers developed a compressed and refined model with 14 items to measure consumer beliefs and attitudes toward new forms of technology. The revised version of the TRI model (Parasuraman & Colby, 2015) however still employed a reduced number of survey items.

Ratchford and Ratchford (2021) used the TAP scale to study a range of 19 varieties of use of technology, including online travel, online purchase, online investment, online utility bill payments, video chat, and electronic security. The reliability and validity of these instruments were tested in a Hungarian sample by Martos, Kapornaky, Csuka & Sallay (2019), with results based on the TAP model. TAP is essentially a survey-based instrument, and the measure of technology adoption propensity is known as the TAP index with a scoring system based on four factors. There are two contributory factors (optimism and proficiency) in relation to accepting new technologies which are described as follows: (related questions are presented in Table 1):

- **Optimism.** This is the belief that technology provides a better life for consumers. It incorporates the perceived usefulness factor present within the TAM models. The index also focuses on how technology may enhance the respondent's life rather than how it enhances the generalized lives of others.
- **Proficiency.** This incorporates competencies necessary to learn to use new technologies. Considering that performance depends on ability and intentions, proficiency can predict relevant information, both applicable to technology developers and also in terms of education policy in order to locate specific areas of focus (Ratchford & Barnhart, 2012).

In addition to contributory factors, two inhibitory factors (dependence and vulnerability) are considered with related questions designed for reverse coding.

- **Dependence.** This is defined as the sense of being overly dependent on technology. Spending too much time with technology, especially info-communication tools, may thus have a harmful impact on personal lifestyles and social contacts.
- **Vulnerability.** In general the belief that the use of technology can lead to harmful impacts may increase distrust in it. Several malicious activities made possible by technology are well known which may engender skepticism and a need for protection against them as such (Ratchford & Barnhart, 2012).

Table 1
Technology adoption propensity survey items

Optimism	Technology gives me more control over my daily life
	Technology helps me make necessary changes in my life
	Technology allows me to more easily do the things I want to do at times when I want to do them
	New technologies make my life easier
Proficiency	I can figure out new high-tech products and services without help from others
	I seem to have fewer problems than other people in making technology work
	Other people come to me for advice on new technologies
	I enjoy figuring out how to use new technologies
Dependence	Technology controls my life more than I control technology
	I feel like I am overly dependent on technology
	The more I use a new technology, the more I become a slave to it
Vulnerability	I must be careful when using technologies because criminals may use the technology to target me
	New technology makes it too easy for companies and other people to invade my privacy
	I think high-tech companies convince us that we need things that we don't really need

Source: based on Ratchford & Barnhart (2012)

Research design

Research goal

The Hungarian National Digitalization Strategy (2022) was developed in 2022 for the period 2022-2030. Essentially, the strategy aims to help Hungary put digital infrastructure, the economy, education, and digital public services at the heart of its competitiveness and modernization efforts by recognizing the need for digital transformation. The second pillar of the strategy concerns digital competencies, including enhancement of knowledge, improving acceptance of technology, and exploiting opportunities.

This present study aims to contribute to the knowledge base with regard to factors influencing technological innovation and the understanding of personal aspects of acceptance of technology. Moreover, IT plays a dominant role in technology and a broader and general interpretation of technology is crucial since the process and the influencing factors of acceptance are not limited exclusively to use of IT. Empirical investigations related to higher education students present a limitation, but their attitudes and beliefs should be considered given that they form the basis of educated future generations. In this regard, the generation theory developed by Strauss & Howe (1991) offers a framework to predict consumer and labor market decisions (see Meretei, 2017; Szabó-Szentgróti, Gelencsér, Szabó-Szentgróti, & Berke, 2019; Csiszárík-Kocsir, Ga-

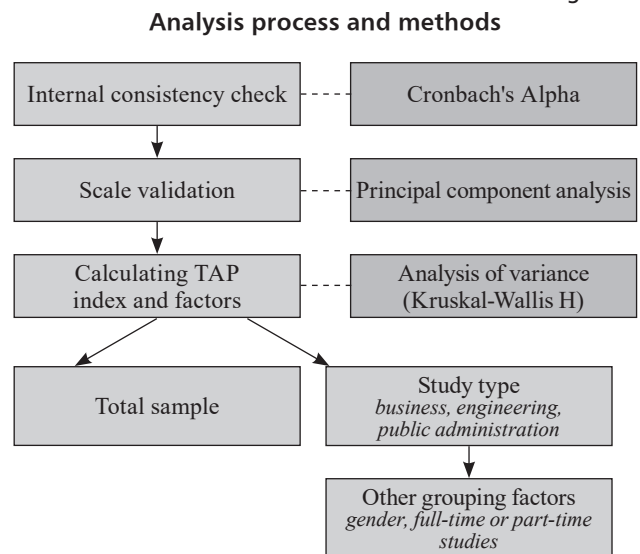
rai-Fodor, & Varga, 2022). Major challenges were identified in this study based on generational differences between people working together. However, understanding thinking patterns and value systems of higher education students can support business and social goals. There are thus two research questions formulated for this study:

- What is the level of technology adoption propensity among higher education students?
- Does technology adoption propensity differ by criterion of the type of study?

Research process

Data collection was performed by using a voluntary online survey designed to explore the individual approaches to technology-related questions. The survey questionnaire includes the instrument for measuring technology adoption propensity (TAP) and calculating the TAP index based on methodology developed by Ratchford and Barnard (2012) with a reversed coding function used for inhibitory factors. Data collection also incorporated English language translation of the questions devised by Martos et al. (2019). The research analysis process is outlined in Figure 2.

Figure 2



Source: authors' own work

Internal consistency was initially tested by use of the Cronbach's Alpha indicator, and dimension reduction was applied to check validity of suggested factors drawn from the original model. Due to the scales used and the absence of normal distribution in the measures, non-parametric tests were preferred for analysis. Mean values were used for a simplified representation of the results wherever it was found to be appropriate, and were supplemented with characteristics of the distributions.

Statistical analysis was supported with use of IBM SPSS and Microsoft Excel tools by following technical instructions set out by Sajtos & Mitev (2007) and Pallant (2020):

- Dimension reduction used principal component analysis with Promax rotation for checking the factor structure.
- The variance analysis test included use of the significance test of the Kruskal-Wallis H indicator.
- Correlation analysis used the Spearman’s rank correlation method.

Sample characteristics

The research sample consisted of 873 Hungarian higher education students. Data collection is still ongoing and responses in this study are drawn from 2021 and 2022. The study types applicable to respondents cover disciplines of business, engineering, and public administration. The sample composition is summarized in Table 2.

Table 2

Sample composition (number of respondents)

Grouping factor		business	engineering	public administration
Total sample		452	151	270
Gender	female	287	49	154
	male	165	102	116
Full-time or part-time	full-time	388	79	187
	part-time	63	72	83

Source: authors' own work

Reliability analysis indicates acceptable results for deployment of the technology adoption propensity questions (Cronbach’s Alpha = 0.703, n=14).

Scale validation

Since the TAP instrument forms the core tool of the analytical process, the appropriateness of the initially suggested TAP factors was checked in the research sample. Measures of sampling adequacy were found to be acceptable (KMO=.761; Bartlett’s Test of Sphericity sig.=.000). Principal component analysis offered four factors with an eigenvalue higher than 1, representing 58.42% of the variance. Use of PROMAX rotation (K=4) with Kaiser Normalization in 5 iterations confirmed the original factor composition (Table 3).

Table 4

Matrix for checking the Fronell-Larcker criterion

	Optimism	Proficiency	Dependence	Vulnerability
Optimism	0.715			
Proficiency	0.356	0.768		
Dependence	-0.091	-0.047	0.760	
Vulnerability	-0.034	-0.032	0.356	0.705

Source: authors' own work

By following rationale outlined by Hair et al. (2014), the Fronell-Larcker tool is deemed acceptable based on composite reliability (CR) values since they are greater than 0.7. The average variance extracted (AVE) values are greater than 0.5, except for the vulnerability factor, which is just below this level. By taking limitations of the study into account, this result is acceptable but further investi-

Table 3

Pattern matrix of principal component analysis with composite reliability (CR) and average variance explained (AVE)

	1.	2.	3.	4.
<i>Optimism</i> (CR=0.801, AVE=0.511)				
Technology allows me to more easily do the things I want to do at times when I want to do them	-0.062	0.796	-0.131	0.144
Technology helps me make necessary changes in my life	-0.084	0.768	0.057	-0.097
New technologies make my life easier	-0.012	0.778	0.017	0
Technology gives me more control over my daily life	0.205	0.464	0.24	-0.052
<i>Proficiency</i> (CR=0.845, AVE=0.577)				
Other people come to me for advice on new technologies	0.857	-0.105	0.034	-0.032
I seem to have fewer problems than other people in making technology work	0.885	-0.043	-0.041	0.049
I can figure out new high-tech products and services without help from others	0.788	0.009	-0.044	0.012
I enjoy figuring out how to use new technologies	0.467	0.361	-0.02	0.022
<i>Dependence</i> (CR=0.803, AVE=0.577)				
I feel like I am overly dependent on technology	0.022	0.135	0.774	-0.146
Technology controls my life more than I control technology	-0.071	-0.054	0.687	0.254
The more I use a new technology, the more I become a slave to it	-0.024	-0.058	0.813	0.017
<i>Vulnerability</i> (CR=0.747, AVE=0.497)				
I think high-tech companies convince us that we need things that we don’t really need	0.05	-0.156	0.071	0.646
New technology makes it too easy for companies and other people to invade my privacy	0.036	-0.025	0.054	0.716
I must be careful when using technologies because criminals may use the technology to target me	-0.041	0.2	-0.101	0.749

Source: authors' edition based on SPSS output

gation of the vulnerability component would be required with an extended sample. Table 4 summarizes correlations between the factors, replaced with the square roots of the AVE values in the main diagonal. For the Fronell-Larcker criterion to be accepted in this regard the AVE of each construct should be higher than the highest squared correlation with that of any other construct (Hair et al., 2014).

Results and discussion

Following novel products and services

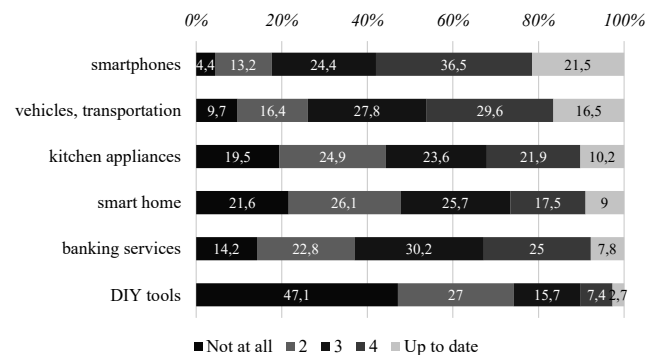
In line with variables presented in the TAM and UTATUT models, personal interest in novel products and services can be acknowledged as an indicator of technology acceptance. It can also be assumed that such interest supports technology acceptance. Original studies based on the TAP instrument (Ratchford & Barnhart, 2012; Ratchford & Ratchford, 2021) measured the actual use of products and services by deployment of binary yes/no questions as a grouping factor for the TAP index score. This study attempts to use a different approach for piloting purposes in accordance with our research goal. Respondents were asked to assess on a five-point scale whether they are interested in novel products and services in some areas with items selected based on researchers' decisions, including those based on topics highlighted in the literature. The current dominance of information technologies is prominent in the literature, but technology itself has a broader interpretation (Pataki, 2013). Beyond specifically outlined IT-related areas (smartphones, smart homes, and banking services), survey results also indicates reference to household related topics. Technological development is continuous in terms of use of household tools and associated methods, but do not form the focus of public attention in relation to public discussion of technology. Kitchen appliances and do-it-yourself (DIY) tools both specifically cover the remit of household issues in our survey.

Based on the distribution of responses, students' interests are not uniform, and some topics are particularly prominent. Smartphones form the greatest focus of attention among students, followed by that of new technological solutions in vehicles and transportation (Figure 3). The ratio of uninterested students is the lowest in relation to the latter categories. Interest in smart home and kitchen appliances presents a more scattered picture, which is similar to interest in modern banking solutions and most respondents are not interested in DIY tools. Correlation analysis confirmed moderate but significant results between sur-

vey items to suggest predictability of a general personal approach to novel products and services. The highest values were found in correlations between smartphones and smart homes (Spearman's $\rho=0.425$), smart homes and transportation (Spearman's $\rho=0.386$), and smartphones and transportation (Spearman's $\rho=0.368$).

Based on the model on components of technology (Szakály, 2002; Deutsch, Hoffer, Berényi & Nagy-Borsy, 2019), infoware is included as well as technoware, humanware and orgware ingredients, thereby encompassing all equipment and procedures on information supply of the transformation process. In line with general appreciation of information technologies, especially mobile solutions, prominent interest in smartphones is understandable. The spread of information requires use of novel products and procedures, but it simultaneously assists in acceptance of other innovations (Csordás & Nyirő, 2012).

Figure 3
Distribution of responses on following novel products and services



Source: authors' own work

General interest in vehicles and transportation can be derived from a need to solve environmental problems, but its economic role and vulnerability should however not be ignored (see Mészáros, 2010; Keszeý & Tóth, 2020).

Electric vehicles currently represent innovation in terms of technological development within a broad spectrum of scientific interest ranging between engineering and business perspectives, but transportation has nonetheless become a key objective of the 'sharing economy' (Zilahy, 2016).

Correlation analysis of responses indicated significant results for each item. The strongest correlation was found between smartphones and smart homes (Spear-

Table 5
Correlation coefficients between survey items on following novel products and services

	smart homes	vehicles, transportation	kitchen appliances	DIY tools	banking services
smartphones	0.425	0.368	0.119	0.113	0.186
smart homes		0.386	0.250	0.339	0.290
vehicles, transportation			0.090	0.29	0.288
kitchen appliances				0.123	0.212
DIY tools					0.260

Source: authors' own work based on SPSS output

man's rho=0.425, sig.<0.001), and the lowest was between smartphones and DIY tools (Spearman's rho=0.113, sig.<0.001). The correlation coefficients are summarized in Table 5 (n=873 for each category and significance is lower than 0.001 except for the value 0.008 between transportation and kitchen appliances). The moderate and especially low Spearman's rho values would suggest that perceptions of different technologies are not highly interdependent.

Survey results suggest a picture of a mixed sample due to the multimodal distribution of the TAP index score (Figure 5). The TAP index value is lower than 2 in 0.4% of responses, 2 or higher but lower than 3 in 44.6% of responses, 3 or higher but lower than 4 in 52.2% of responses, and above 4 in 1.7% of responses in relation to the total sample. The distribution thus cannot be considered as normal for the total sample and also for business and engineering students (Table 7).

Table 6

Mean values and the analysis of variance results, following novelties

	smartphones	smart homes	vehicles, transportation	kitchen appliances	DIY tools	banking services
business students	3.6	2.53	3.28	2.85	1.77	2.86
engineering students	3.62	2.99	3.3	2.54	2.38	2.90
public administration students	3.51	2.70	3.22	2.82	1.91	2.94
Kruskal-Wallis H	0.702	15.107	0.602	7.085	43.15	0.741
d _f	2	2	2	2	2	2
Asymp. Sig.	0.704	0.001*	0.740	0.029*	0.000*	0.690

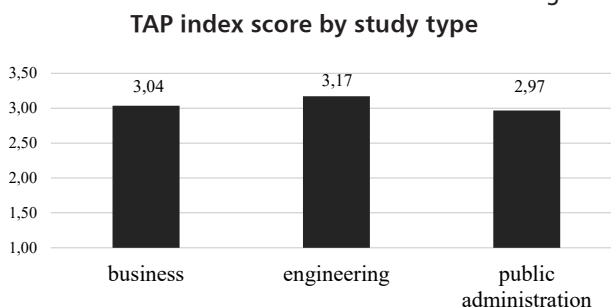
Source: authors' own work based on SPSS output, * significant at p<0.05

A variance analysis test was conducted to explore differences in approaches between students based on their study types. Results confirmed significant differences for smart homes, kitchen appliances, and DIY tools, while values for smartphones, transportation, and banking services are broadly similar. Table 6 illustrates test results (significant differences are marked with *) and the mean values of student evaluations by criterion of study type.

TAP index score by criterion of study type

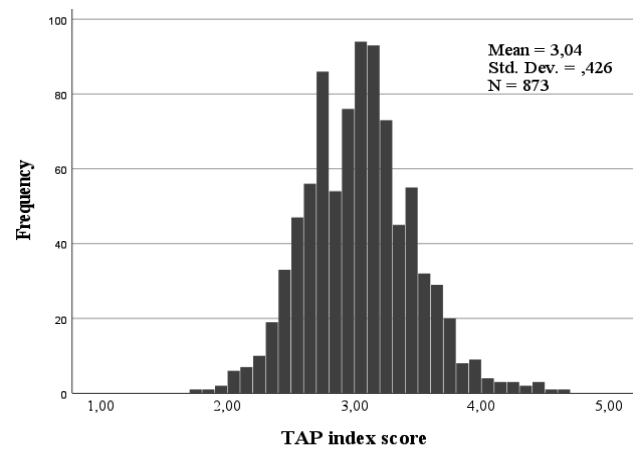
The TAP index score was expressed on a five-point scale (1 to 5); higher values represent a higher level of technology adoption propensity. The mean value of the TAP index score is medium (3.04) for the entire sample, and is highest among engineering students and lowest among public administration students (Figure 4). The Kruskal-Wallis test (H=19.215, d_f=2, sig.<0.001) statistically confirmed significant differences by criterion of study type.

Figure 4



Source: authors' own work

Figure 5
Distribution of the TAP index score, total sample



Source: authors' own work based on SPSS output

Table 7

Normality test results

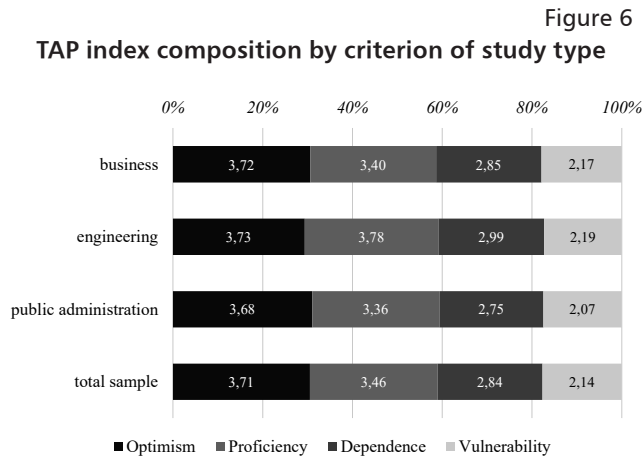
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	d _f	Sig.	Statistic	d _f	Sig.
business	0.038	452	0.127	0.987	452	0.000*
engineering	0.076	151	0.033	0.976	151	0.010
public administration	0.041	270	0.200	0.997	270	0.823
total sample	0.031	873	0.042	0.993	873	0.001

Source: authors' own work based on based on SPSS output,

* significant at p<0.05

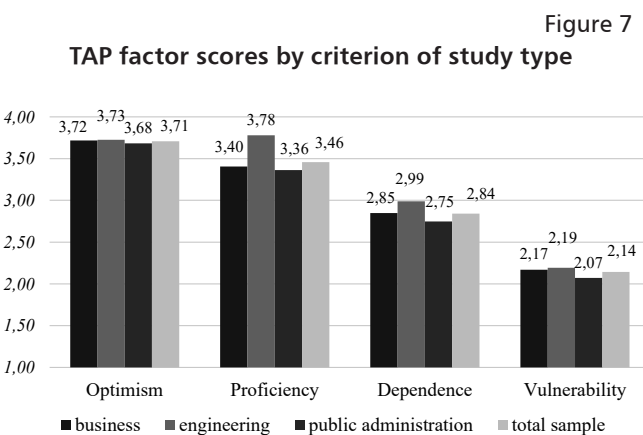
TAP index composition

The TAP index comprises four factors, consisting of optimism, proficiency, dependence, and vulnerability. Mean values are used to simplify presentation of results (Figure 6).



Source: authors' own work

Results indicate similar mean values among sub-samples in relation to optimism, while engineering students display higher values in other factors (Figure 7) and distributions of values confirms these differences. In further relation to the optimism factor, 83.4% of business, 82.3% of engineering, and 81.2% of public administration students possess a factor value above the medium level. Furthermore, engineering students consider themselves as the most proficient in terms of using technology. The factor value is above medium for 81.4% in this category, while the value is 64.8% for business and 60.8% for public administration students. Simultaneously, high dependence values are more common for engineering students whereby 39.1% possess a factor value above the medium level. The same factor value is 34.5% for business and 32.9% for public administration students. The vulnerability factor displays similar results in that 12.6% of engineering, 8.8% of business, and 7.1% of public administration students are placed above the medium value.

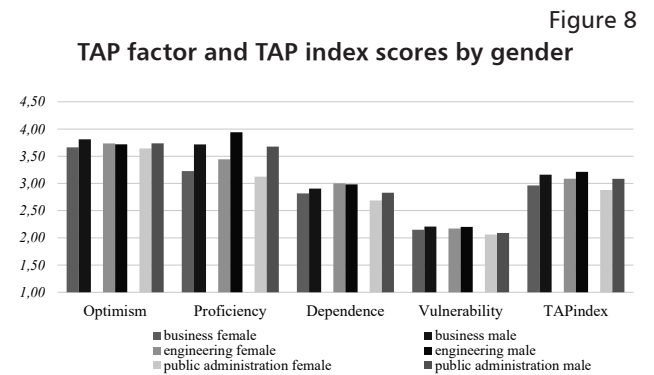


Source: authors' own work

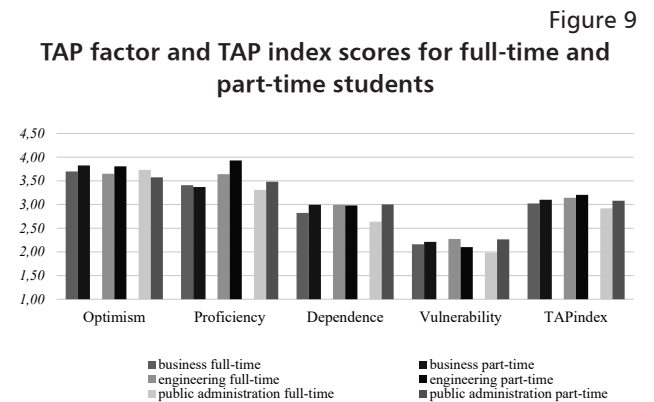
The non-parametric analysis of variance test by criterion of study type confirmed significant differences in relation to proficiency (Krusal-Wallis $H=29.734$, $d_f=2$, $sig.<0.001$) and dependence (Kruskal-Wallis $H=6.281$, $d_f=2$, $sig=0.043$).

Analysis according to grouping criteria

Sample characteristics allows for analyzing differences in the TAP index factors and score by gender (Figure 8) and by comparing scores of full-time and part-time students (Figure 9). The data set is summarized in Table 8. In the case of part-time students, a greater extent of work experience can be reasonably assumed.



Source: authors' own work



Source: authors' own work

Results suggest that male students, compared to female and part-time students, and compared to full-time counterparts, possess higher TAP factor and TAP index scores in most cases. A remarkable exception is that of relatively higher vulnerability of full-time engineering students (2.27 full-time compared to 2.10 part-time). Assumed work experience of part-time students is also reflected in differences in the TAP index scores, but the composition displays higher optimism of full-time students of public administration students and relatively high vulnerability of engineering students. A non-parametric analysis of variance test was conducted for each sub-sample which however could not confirm the significance of these differences (Table 9). The TAP index is significantly different in terms of gender in each sub-sample and among pub-

lic administration students in relation to their full-time or part-time study status. Moreover, dependence and vulnerability factor scores are significantly different only within the category of public administration students.

Table 8
TAP scores in terms of grouping factors

		Optimism	Proficiency	Dependence	Vulnerability	TAP index
business	female	3.66	3.23	2.82	2.15	2.96
	male	3.81	3.72	2.90	2.21	3.16
	full-time	3.70	3.41	2.82	2.16	3.02
	part-time	3.83	3.37	2.99	2.21	3.10
engineering	female	3.73	3.44	3.00	2.17	3.09
	male	3.72	3.94	2.98	2.20	3.21
	full-time	3.65	3.64	3.00	2.27	3.14
	part-time	3.81	3.93	2.98	2.10	3.21
public administration	female	3.64	3.13	2.69	2.06	2.88
	male	3.74	3.68	2.83	2.09	3.08
	full-time	3.73	3.31	2.64	1.99	2.92
	part-time	3.58	3.48	3.00	2.26	3.08

Source: authors' own work

Correlations between following novel products and services and TAP factors

A prominent question arises as to whether a correlation exists between following novel products and services and TAP fac-

tors. The Spearman's rho and significance values as such are summarized in Table 10, which indicate a significant but low or at least moderate correlation between TAP factor scores and scores for students following novel product and services, except for kitchen appliances. In the cases of smartphones, smart home, transportation, and banking services, optimism indicates a positive correlation; proficiency significantly correlates with following DIY tools as novel products or services. The highest correlation values were located between smartphones–proficiency and smart home–proficiency correlated pairs. Optimism and proficiency factors seem to be able to explain given levels of following novel products and services, while inhibitory factors by contrast suggest a somewhat negligible impact in this regard.

Conclusion

The Hungarian National Digitalization Strategy (2022) emphasizes that a systematic approach is required to develop digital ecosystems. The introductory part of the strategy points out that while access to modern infrastructure is available, there exists a formidable barrier to further improvements in terms of a high proportion of people without digital skills and a low willingness to participate in learning programs. Understanding technology adoption propensity can thus be considered as a suitable tool for measuring attitudes to IT technologies and their use in society as a whole, in line with the original purpose of the developers of the instrument (Ratchford & Barnhart, 2012). Results of this study have confirmed applicability of the TAP instrument in order to describe the approach to novel products and services. Enhancement of investigation through further research may allow for mapping individual characteristics by deployment of different grouping factors such as by profession or other attributes.

Table 9
Analysis of variance test results in terms of grouping factors

Grouping factor	Sub-sample (d _r =1)	Optimism	Proficiency	Dependence	Vulnerability	TAP index	
Gender	Business	Kruskal-Wallis H	8.086	45.801	1.705	0.924	22.478
		Asymp. Sig.	0.004*	0.000*	0.192	0.336	0.000*
	Engineering	Kruskal-Wallis H	0.051	10.254	0.069	0.231	4.574
		Asymp. Sig.	0.821	0.001*	0.793	0.631	0.032*
	Public administration	Kruskal-Wallis H	0.846	28.698	1.208	0.152	17.053
		Asymp. Sig.	0.358	0.000*	0.272	0.697	0.000*
Full-time or part-time	Business	Kruskal-Wallis H	2.411	0.001	1.691	0.094	1.113
		Asymp. Sig.	0.120	0.976	0.193	0.759	0.291
	Engineering	Kruskal-Wallis H	1.188	4.336	0.033	1.565	0.327
		Asymp. Sig.	0.276	0.037*	0.857	0.211	0.567
	Public administration	Kruskal-Wallis H	4.003	2.489	10.227	9.535	9.443
		Asymp. Sig.	0.045*	0.115	0.001*	0.002*	0.002*

Source: authors' own work based on SPSS output, * significant at p<0.05

Table 10

Correlation analysis results between following novel products and services and TAP factors and index scores

		Optimism	Proficiency	Dependence	Vulnerability	TAP index
smartphones	Correlation Coefficient	0.251	0.396	-0.058	0.037	0.262
	Sig.	0.000*	0.000*	0.087	0.276	0.000*
smart homes	Correlation Coefficient	0.195	0.331	0.002	0.067	0.249
	Sig.	0.000*	0.000*	0.964	0.048*	0.000*
vehicles, transportation	Correlation Coefficient	0.130	0.285	0.051	-0.006	0.208
	Sig.	0.000*	0.000*	0.135	0.859	0.000*
kitchen appliances	Correlation Coefficient	0.043	-0.052	0.019	0.045	0.013
	Sig.	0.208	0.125	0.579	0.181	0.706
DIY tools	Correlation Coefficient	0.039	0.278	0.087	0.054	0.215
	Sig.	0.251	0.000*	0.010*	0.108	0.000*
banking services	Correlation Coefficient	0.156	0.185	0.032	-0.025	0.162
	Sig.	0.000*	0.000*	0.346	0.461	0.000*

Source: based on SPSS output, * significant at $p < 0.05$

In relation to the first research question on the level of technology adoption propensity, moderate results were found by the TAP index score for all students. Few respondents possess an exceptionally low or high TAP index score in the sample, and it is encouraging to note that the proportion of students with higher than medium values exceeds those below the medium value. Such experience is encouraging as a whole and may serve to enhance further diffusion of technology use in any given field, but the relatively high ratio of 'laggards' is of concern. Survey results also indicate strong potential for utilization of optimism to adopt new technology given that it possesses a relatively high value, while the vulnerability component indicates a relatively low value for the entire sample. It follows that a suitable policy goal should be to improve proficiency of use.

The second research question concerned differences in technology adoption propensity between business, engineering, and public administration students. Results confirmed the assumption on differences between professions represented by the study type followed by higher education students. Principally, our study found statistically significant differences to suggest existence of a strong need for targeted development strategies. High optimism and low vulnerability emerged to be general characteristics regardless of the study type of respondents, while proficiency in use and dependence were higher for engineering students than for others. The optimism factor value exceeds that of proficiency except for engineering students, which therefore emphasizes the prominence of the need for education and training in use of technology. Gender differences indicate a more active approach of males compared to females, while greater assumed work experience

for part-time students confirmed significantly higher technology adoption propensity in this regard, primarily for public administration students.

In relation to goals of the National Digitalization Strategy, the results of this study suggests it is highly suitable for enhancing high-level optimism that use of technology generally provides a better life. However, proficiency in use should be strengthened and emphasized as the main contributor to technology adoption. The positive impact of work experience corroborates the overall need to gain experience in technology use through practice. Results indicating differences in study type also have implications in terms of targeted training strategies for different professions.

Limitations and further research

As may be expected, there are some notable limitations within the scope of this research project. Despite use of validated methodology for measuring technology adoption propensity and the careful planning of data collection and analysis, the generalizability of results is limited. The research sample was relatively large, but systematic and random sampling was not performed. Professions represented by business, engineering, and public administration students do not cover the entire range of professions served by higher education. Distortions in results derived from the self-administered voluntary survey exist, but these were controlled by the validated methodology used for evaluation. Moreover, since there are limited empirical studies available based on the TAP instrument, discussion of comparisons was not distinctly feasible. We consider this study as an explanatory research basis for further testing of methodology and for preparing further data collec-

tion, including on an international scale. In order to ensure broad interpretation of results, we intend to construct a sample base that allows for use of a regression model approach to replace the use of analysis of variance tests.

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GENDER ISSUES IN PROCUREMENT: A REVIEW OF CURRENT THEMES AND FUTURE RESEARCH DIRECTIONS

NEMEK KÖZÖTTI EGYENLŐSÉG KÉRDÉSEI A BESZERZÉSBN: ÁTTEKINTÉS AZ AKTUÁLIS TÉMÁKRÓL ÉS A JÖVŐBELI KUTATÁSI IRÁNYOKRÓL

This paper provides a comprehensive literature review of gender-related themes in procurement research, tracing their evolution over time. Analysis of 45 peer-reviewed articles focusing on both company and public procurement reveals the trends in publication focus, publishing frequency, top journals, key authors, keywords used, similarities between the public and the private sector, etc. Additionally, the paper highlights four major themes of existing gender-related issues addressed in the literature: the glass ceiling effect, team diversity, supplier diversity and skill sets. The study also suggests potential areas for future research in this field. Importantly, the article emphasizes the social significance of gender-related considerations in procurement research, particularly in light of the growing importance of socially responsible procurement for promoting sustainability objectives.

Keywords: gender, public procurement, company procurement, literature review

A nők helyzetével számos kutatás foglalkozik. Ez a cikk átfogó irodalmi áttekintést nyújt arról, hogy hogyan jelenik meg a téma a nemzetközi beszerzési és közbeszerzési kutatásokban. A vállalati és a közbeszerzésre egyaránt összpontosító 45 lektorált cikk elemzése feltárja a publikációs fókusz, a publikációs gyakoriság, a vezető folyóiratok, a legfontosabb szerzők, a használt kulcsszavak, a köz- és a magánszektor közötti hasonlóságok stb. tendenciáit. Ezen túlmenően a tanulmány kiemeli a szakirodalomban tárgyalt, nemekkel kapcsolatos meglévő problémák négy fő témáját: az üveglafonhatás, a csapat sokszínűsége, a beszállítói sokszínűség és a készségkészletek. A tanulmány ezen a területen a jövőbeni kutatások lehetséges területeit is felveti. Fontos, hogy a cikk hangsúlyozza a nők egyenlő esélyeivel kapcsolatos megfontolások társadalmi jelentőségét a beszerzési kutatásban, különösen annak fényében, hogy a társadalmilag felelős beszerzés egyre fontosabbá válik a fenntarthatósági célok előmozdítása szempontjából.

Kulcsszavak: gender, közbeszerzés, vállalati beszerzés, szakirodalmi áttekintés

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Gender issues are increasingly gaining prominence on the public sector agenda, and companies are actively addressing these issues both from a human resources perspective and in relation to their suppliers. It is essential

to recognize that gender issues are not isolated but rather intricately connected with socially responsible procurement. In practice, these aspects seldom stand alone, and understanding the interplay between gender issues and

socially responsible procurement is crucial for a comprehensive analysis of the topic. Therefore, this introduction will contextualize the study within the broader framework of gender-responsive procurement.

International organizations have emphasized the significance of considering gender issues within the broader context of sustainability goals. The World Bank, for example, has drawn attention to the profound impact of unequal treatment, limited opportunities for women in management roles, and the challenges faced by women-owned companies in securing contracts. These factors have significant implications for economic development and poverty eradication (World Bank, 2012).

Recognizing the intrinsic link between gender equality and sustainable development, in 2015, the United Nations established goal 5 in its set of 17 sustainable development goals (SDGs) specifically aimed at achieving gender equality and empowering women and girls (United Nations, 2017). With nine targets and 14 indicators, this goal seeks to eliminate gender-based discrimination and ensure equal rights and opportunities for women and girls.

In line with these global efforts, the European Institute of Gender Equality (EIGE, 2021) advocates for a gender-responsive public procurement approach. This approach acknowledges that gender issues are not separate from social procurement but are intertwined with it. It calls for conscious efforts by buyers and suppliers to address and reduce gender inequality actively. Governments, too, are taking steps to address social and environmental problems in supplier management. Examples include the Modern Slavery Act of the UK and the German Supply Chain Due Diligence Act, which emphasize women's need for equal rights and opportunities.

Moreover, beyond its business objectives, procurement plays a critical role in supporting social objectives such as diversity and sustainability in the supply chain (Gelderman et al., 2017; Silva & Ruel, 2022). By recognizing that equal opportunity to work and fair pay are fundamental human rights, procurement can act as a catalyst for facilitating these rights among the suppliers and sub-suppliers (Kirton, 2013). Understanding the gender dynamics within procurement processes is key to achieving targeted outcomes and informed policy-making processes. By integrating gender issues into the broader social and environmental responsibility framework, we can advance sustainable development goals while promoting gender equality.

Although some previous studies attempted to summarize the policies and government actions to create a gender balance, none focused exclusively on the gender issues reviewed in the literature. The earliest attempt was made by McCrudden (2004), who tried to map the existing efforts undertaken by several countries to empower minority ethnicity as well as genders. Post and Byron (2015) limited the focus of their meta-analysis to the relationship between female board members and the financial performance of companies. Two gender-specific reviews were done by Medina-Arnaiz (2010), whose focus was only on Spanish procurement policies and by Sarter (2020) whose focus was on German public procurement facilitation. All

these reviews were limited, either because of focus on a specific country or a specific aspect affecting gender issues.

With the current work, we aim to overcome this by compiling the findings of our study conducted to synthesize prior gender-centric research in the realms of purchasing and supply management for procurement activities to help direct further exploration of this topic which could benefit both the public and the private sector. Comparing the practices of the corporate sector and public procurement is the subject of more research, as the two sectors can learn from each other (e.g., Hawkins et al., 2011; Vörösmarty & Tátrai, 2019). As there is a low number of studies in public procurement and company procurement, we decided to extend the literature analysis by including both. By acknowledging the interconnectedness between gender issues and socially responsible procurement, this study aims to comprehensively understand the topic and its implications for sustainable development goals.

The structure of the paper will be the following. First, the search and data analysis methodology is described. In section 3, some basic statistics of the papers are analyzed. Section 4 summarises the results of the keyword analysis, the theme model developed summarising the topics of identified papers and the comparison of private and public sector procurement. Section 5 describes the research results according to the four identified themes. Finally, results are summarised, and research gaps are highlighted.

Methodology

The literature review is an increasingly common analytical tool in business literature (Snyder, 2019). In order to ensure that the results reflect the actual results of scientific research as closely as possible, many studies also use methods that promote reproducibility and objectivity in procurement-related topics. Examples include the PRISMA method (e.g., used by Vejaratnam et al., 2020), Denyer & Transfield's (2009) approach (used by, e.g., Wetzstein et al., 2019) or Durach's (2017) method. These methods have in common that they seek to answer a predefined research question by selecting articles from well-known databases (usually Scopus and Web of Science in the business field) according to given criteria (e.g., keywords, year, language). The search commonly results in a broader literature, so an essential step in each method is to check and validate the relevance of the database results by experts.

Drafting Research Questions

Our research aims to review the gender-related topics in procurement research to find out what issues have been addressed in the literature, how they have changed over the period under study and what differences and similarities can be identified in research on the public procurement sphere and the business sector. Thus, the following research questions related to public procurement were formulated:

- What gender-related issues have been addressed in literature?

- How have they changed over time?
- What differences and similarities can be identified when comparing public-sector and private-sector procurement?

Determine the Characteristics Required for the Studies

The current efforts aim to analyze and synthesize research findings related to procurement, including procurement practitioners, their practices and their impact. For this reason, we selected articles from peer-reviewed publications in scientific journals for our database. The database therefore excludes, e.g., publications of public organizations or conference presentations.

Sample of Potentially Relevant Literature

We started by searching the well-known Scopus and Web of Science (WoS) databases for articles published in scientific journals in English published from 2000 to the date of the search (30 July 2022). We searched for the phrases: “gender” or “woman” or “women” and “procurement” or “purchasing” or “sourcing” in the title, abstract and keywords of the documents. The search in the Scopus database without specifying the subject area resulted in 2948 papers. However, among the possible subject areas, only Business, Management and Accounting and Decision Sciences were relevant, resulting in 656 papers. When searching the WoS database, we limited the search to Management, Business and Public administration topics. This gave us 1076 results.

After screening the focus of the papers and their relation to gender issues in procurement as well as accounting for duplicates, we were able to form an initial shortlist of 50 papers for our review.

Identification of Relevant Literature and Coding

We first narrowed down the database by title and abstract. Most of the articles we excluded dealt with consumer buying-related topics. This was followed by the detailed reading of the papers. Each was read and evaluated by two researchers. In some cases, to ensure interrater reliability, the article was re-read, and the three authors jointly decided to include an article in the database resulting in the final inclusion of 45 papers. The evaluation and coding of each paper followed this. Here again, the principle of double independent assessment and joint decision by the three evaluators in ambiguous cases was applied.

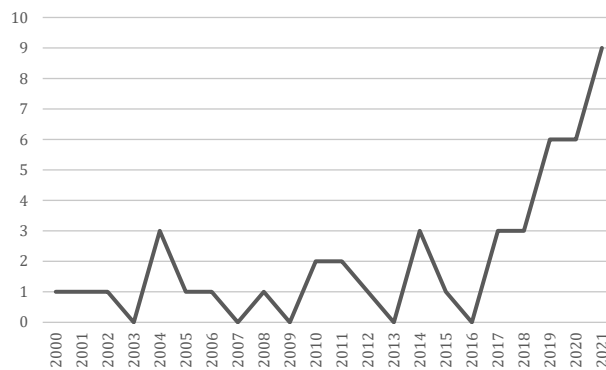
Descriptive analysis of the database

First, the most important demographic characteristics of the sample were analyzed.

There has been a mixed trend in the field, with a growing number of publications in the last decade (Figure 1). While merely one article was published in the year 2000, and no publication in the field was made for five years in between (Years: 2003, 2007, 2009, 2013, and 2016), gradual interest in the field has developed with as many as nine

articles published in the year 2021, totalling 45 articles between the year 2000 and 2021. This increased interest may be attributed to the growing willingness of organizations to incorporate gender issues in procurement to comply with government regulations and have a better brand image. (See Figure 1 for the yearly data.)

Figure 1
Number of papers published annually in selected sources



Source: own compilation

Most of the major journals dealing with issues of supply chain management and public procurement published several articles representing gender issues in procurement, but the Journal of Purchasing and Supply Management dominated the field by publishing five articles, Journal of Supply Chain Management published four papers and five more journals published two papers each during this period. A further 25 journals each published only one gender-related article. Table 1 contains the list of journals that published at least two papers.

Table 1
Top journals

Name of the journals	No. of papers
Journal of Purchasing and Supply Management	5
Journal of Supply Chain Management	4
International Journal of Gender and Entrepreneurship	2
International Journal of Procurement Management	2
Journal of Business Ethics	2
Journal of Public Procurement	2
Public Money & Management	2

Source: own compilation

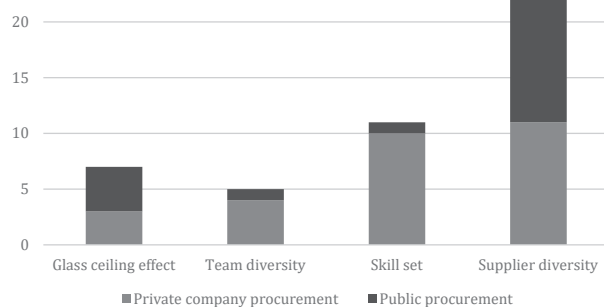
It is also worth highlighting the most influential authors. In all, 106 authors contributed to the 45 articles. The names of those who co-authored more than one article are listed in Table 2. Two authors (Barbara Orser and Allan R. Riding, who were co-authors) contributed to three articles. The majority of the authors (95 out of 106) appear as authors of only one article.

Procurement in the public and the private sector

Public procurement and private sector procurement are often separated in research. However, in the case of research on gender, we felt it was important to compare the topics of the two research strands. From this analysis, we found that the articles clearly chose their sides, dealing with the private sector or public procurement. 18 articles discussed gender issues in public procurement, while 27 of them stuck to the purchasing practice of the private sector. Until 2019, company procurement was the more promising area of research as it had a greater number of issues and consistency in publishing (average of one article per year). An interesting observation was found for the year 2020 when all six articles published on this topic dealt with public procurement, while for 2021, one less article was published in public procurement than in private sector procurement. Overall, there were a growing number of publications in both areas.

Figure 4

The focus of themes by private sector procurement (CP) and public procurement (PP)



Source: own compilation

Based on Figure 4 the substantial differences between the most researched themes in the private sector and public procurement should be noted. Studies analyzing the private companies' practice address all four focal issues identified, and the largest number of the studies are clustered in the supplier diversity domain. For public procurement, the focus is also on supplier diversity to a large extent, along with the glass ceiling effect. The four themes are more evenly balanced in the research on private-sector procurement. However, the share of research on 'skill set' and 'team diversity' themes is significantly higher than for public procurement.

Overview of the literature

As indicated earlier, the articles in our database are grouped around four themes. However, the research focus of each of these topics is very diverse and will be reviewed here.

Glass ceiling effect

Overall, the literature on the glass ceiling effect tried to bring to light the disadvantaged positions of women in so-

ciety. A common theme in gender research is that women are disadvantaged in terms of promotion within an organization, with fewer women in management positions and the difference in pay. Similar research has been done in the area of procurement.

Lawrence et al. (2018) search for the reasons of lower representation of women among senior purchasing managers in the UK. The findings suggested that female advancement within procurement is affected by both generic organizational and procurement-specific impediments, including inadequate work design, male-dominated cultures, negative stereotypes, high levels of travel and an aggressive ethos that characterizes many procurement functions. McCue et al. (2017) also indicate that females still face the glass ceiling while climbing ladders in the public sector and men were more clustered in higher-level management roles of procurement. According to their paper, although men and women were comparable in terms of education, experience, and other qualities, men were still paid better, evidencing the presence of discrimination. Here a glass ceiling is defined as invisible obstacles that hinder feminine progress to top management levels even after being equally competitive as their male associates.

The wage gap is an essential indicator of discrimination. There are several research findings on this, with somewhat contradictory results. Ogden et al. (2002) found no significant influence of gender on compensation when they evaluated factors affecting Chief Purchasing Officers' salaries. The results showed a difference, although not significant; however, the percentage of males involved in the assessment was large compared to their female counterparts (indirectly indicating the glass ceiling effect). Larson and Morris (2008) found being a male purchasing and supply professional in Canada meant higher yearly compensation (apart from factors like education and experience). However, these differences were more profound at the middle management level, where women received, on average, \$12000 less than men. At the same time, their career progression also showed that it was difficult for women to reach higher positions.

Gender differences are also found in smaller firms. Oluka et al. (2020) surveyed female-owned businesses and found that they were primarily small and medium-sized, and very often, they were disadvantaged, inter alia, due to lack of funds, landing them in disadvantaged positions also as suppliers. Increasingly women-centric, socially responsive procurement policies would help these female entrepreneurs to develop their business performance.

Not only as employees but also as entrepreneurs, women feel discriminated against. Identifying the barriers for small firms to capital access for fulfilling public procurement performance obligations, Rasheed (2004) found that female-owned enterprises had higher perceptions of barriers to accessing financial resources resulting in lower market share. One of the reasons cited for this was unfavourable lending terms of capital lenders towards female owners. They emphasize on more remedial support by the procurement agencies to deal with financing issues.

Even after governments acknowledge the need to boost women-owned enterprises and draft favourable policies to include them better in procurement activities, women entrepreneurs still face unprecedented hurdles. Bomani and Derera (2021) conducted in-depth interviews with female business owners to understand they faced hassles like lack of expertise and adequate knowledge, awareness of opportunities and shortage of funds and equipment to fulfil big orders while contracting with the public authorities. Their study shows a positive ray of hope as female entrepreneurs partner with male business owners and even bid for the contract as a group to exploit synergies. However, more provision of training and funding should be looked into by the public sector.

To summarise the results, we can see that women's unequal position is reflected in their advancement within organizations. Also, they have a harder time as entrepreneurs, as many of the conditions and opportunities they need to succeed as suppliers in the market are less available to them. While the studies within organizations are mainly related to developed countries, studying the difficulties of becoming a supplier is more of a research topic in the context of public procurement.

Team diversity

Team diversity in the context of this review is the dispute between heterogeneity vs homogeneity through representativeness of all genders in business actions in an attempt to draw a positive image of the company while achieving economic, environmental, and social objectives. Broadly, it is about the consequences of ending workforce discrimination and facilitating inclusivity.

Swift and Gruben (2000) attempted to show how different genders vary in decision-making in the USA and realized that women purchasers attached greater importance to several relational attributes like support offered and dependability of vendors than men when selecting suppliers. These attributes can be considered useful when handling critical or complex items purchases. Complementing this, Park and Krishnan (2005) found even with individuals in the same organizational hierarchy, their gender influenced supplier selection behaviour: while male managers focused on profitability and capacities of suppliers, female managers were more emotionally involved in decision-making and considered the dependability and trustworthiness of suppliers along with their financial performance. These findings support increasing team diversity by including both genders in decision-making. Messner's (2017) study of IT employees in India found that overall, women were more committed to their work organization than men leading to less switching/retention cost for their companies and higher motivation.

The results of Jermstipparsert and Srihirun (2019) implied that gender had an impact on the management of the supply chain, and it also moderated its relationship with leadership. Ruel and Fritz (2021) also add to the discussion of gender diversity by focusing on dissimilarity in consideration of sustainability aspects by purchasing managers of different genders because of their variation in

softer skills like empathy, listening skills, social aspects, well-being, and attention to risk considerations when adamantly following policies. However, they found no impact of diversity on the environmental aspects of sustainability issues in either cluster. One of the key contributors to the unequal representation of women in all supply chain management levels was variance in education. Group diversity is encouraged as it has a positive impact on organizational communication and social affiliation.

To foster diversity, Benjamin (2020) focused on how employee union representatives can be used as a medium to voice gender equality concerns, among other issues, when formulating public procurement contracts leading to more diversity-oriented policies, directly benefitting marginalized groups, such as women's career progression. Strang (2021) revealed experience, quality and certifications available were some of the determiners of the successful completion of upscale public procurement projects. However, gender, along with age, education etc., of the project manager had no significant impact, indirectly pointing towards no added value by virtue of the sex of the manager. We keep in mind that the author points out that the sample was significantly male-dominated which could have influenced the results, and this also directs us to the understanding that women are underrepresented as project managers.

To summarise the results, the research suggests that differences are also reflected in decision-making in many respects. Although a wide variety of perspectives are explored in the above studies, it is agreed that gender diversity in teams has an impact on the outcome of teamwork.

Skill Sets

The research conducted in this sub-category focused primarily on examining whether skills like communication/negotiation abilities are gender dependent. Since these skills are key to successful business operation and profitability for both purchasing and sales professionals, knowing their association could be useful. Furthermore, studies tried to understand whether individual attributes and characteristics impact the relationship between buyers and sellers. Knowing whether gender has an influence can be helpful for both private and public procurers while making team selections.

One of the early studies in Asia was done by Sojka et al. (2001) in Pakistan, aiming to understand the influence of the perception of different genders of buyers on sales representatives in a variety of industries. The research found that gender-related norms for career choices were still prevalent, but there was no preference for a salesperson of the same gender as the purchaser, although differences in characteristic perceptions were found. For example, all the buyer groups considered the willingness to take risks, while assertiveness was higher among men; at the same time, women were held to be more sincere, understanding and good listeners. Similarly, Plank et al. (2006) found organizational purchasers perceived women to be less active in aggravating conflicts in a buyer-seller relationship compared to men as they had a less confronta-

tional leadership style, adding further to the debate of why women should be included in the buying-selling team.

Ma et al. (2021) suggest employing women in supply chain collaboration is advantageous as they perform better in collaboration exercises on both the retailer and the supplier side. Using multiple gender pairings, the authors demonstrated that women were more collaborative as buyers and sellers, and male and female agents worked better in teams with other women. In terms of ethicality, Husser et al. (2014) probed into the decision-making process of French purchasing professionals and students when confronted with ethical and non-ethical choices to find whether gender orientation had a bearing on ethicality. Among experienced buyers, women excelled on ethicality, while women were generally more ethical than men, which directly affects purchasing-selling decisions. Rottig et al. (2011) also investigated ethical issues and had to control gender as a variable impacting ethical decision-making during their study among university students because of mixed results of its influence in preceding literature.

McCrudden (2004) performed a cross-continent collection of historical developments to shed light on how social outcomes were promoted by different countries like the USA, South Africa, Ireland, etc. Using procurement as an enforcement tool to promote gender-compliant anti-discrimination policies. He illustrates that even if male workers were initially the primary beneficiaries, the use of procurement to attain goals like equal pay and good working conditions, creating employment, awarding contracts, etc., has also benefitted other minorities. Trade union activity has played a particularly important role in raising wages and job benefits for women (and other marginalized populations) to respectable levels.

An interesting outcome resulted when Newell et al. (2019) administered a survey to Chinese business professionals undertaking MBA classes with involvement in purchasing activities for their organizations to scrutinize whether the gender of the buyer-seller impacted the business. One of the highlights of their findings was the Queen-Bee phenomenon experienced where the feminine gender had a bias towards their fellow female buyers for aspects like trust perceptions and valued more favourably organizations with male representatives. However, results showed female buyers were significantly loyal to their organizations. But for the men, this bias was absent altogether while evaluating variables like trust and expertise. On the other hand, Ho and Lin's (2014) study of Chinese purchasing professionals reported no gender differences in terms of moral judgment while purchasing when organizational rules and ethics guided decision-making.

Contrary to the sales literature on gender, Pullins et al. (2004) found no contrast between buyers' attitudes to trust, reliability, customer orientation and conduct based on the diverse gender of salespeople. However, women were generally assumed to be associating themselves with more established companies and were more reliable. Also, the healthcare sector has become increasingly competitive, making strategic alliances the need of the hour. However, Oumlil and Williams (2011) showed that the gender of the

purchasing official had no hold on the degree of success of the partnerships formed. This emphasizes that men have no more significant contribution to an alliance's success, so perhaps other genders should be equally participating in such decisions. Ryu and Sueyoshi (2021) analyzed the awardees of research grants for small business innovation by the U.S. Department of Defence and found that, if women-owned businesses succeeded at networking and were given preferential treatment, they could accelerate their performance and outperform their counterparts in the public procurement market.

In terms of decision-making, women were found to be more inclined towards ethical considerations. Husser et al. (2019) reported women buyers fared better than men in recognizing ethical issues and behaving ethically. Complementing this, Croom et al. (2021) compared the personality traits of men and women in the U.K. as they seemingly affected buyer-supplier relations among procurement actors and found that men displayed slightly higher levels of corporate psychopathy, which made them more prone to being self-centred and unethical.

While Detkova et al. (2021) identified differences in insights on corruption among male and female government officials in Russia, where the women were more aware of its harmful effects on procurement, suggesting their higher probability to support anti-corruption practices while the men were unaffected. They also demonstrated that women were less likely to have high positions despite having almost similar expertise. Also, Faes et al. (2010) did a long time series analysis of data collected over 18 years during negotiation role-plays in buyer-oriented purchasing training sessions to conclude differences in negotiation characteristics of buying professionals. They found that, in a competitive environment, men were more ambitious in setting targets, while women set more achievable goals and tended to exceed their expectations comparatively. However, women often reach more no-deals than men as they tend to use less tactical communication.

To understand factors impacting employment retention, Ali et al. (2018) did an online survey in the USA to identify the underlying characteristics that provoked procurement officers to switch employment. They found if only the gender of a person was considered, men and women were equally likely to leave their jobs, but individually men were more likely to switch if their salaries contributed a small percentage of total household income and for better managerial positions while age, willingness to move, education, etc. motivated women more. The authors concluded that if sufficient growth opportunities are given, women are more loyal to the organization they belong to.

To summarise the results, the picture that the research paints of gender differences is highly complex.

Supplier Diversity

Procurement and selling directly influence the economy by creating wealth and supporting social aims like a holistic growth of the population. Hence, in this sub-category, we tried to integrate research that focused on supporting

gender diversity via procurement. Public procurement is also a public policy tool to promote social welfare. Thus, support for disadvantaged suppliers is a priority, reflected in the research we have identified.

Medina-Arnaiz (2010) studied the case of Spain to showcase the provisions of the law on public sector contracts which included social clauses on gender equality. Through Act 3 of 2007 (Organic law), Spain desired to promote gender mainstreaming and equality by compelling public authorities to adopt corrective measures benefiting women in all activities, favouring social objectives over financial benefits. She also elaborated on various EU directives that clearly defined what social aspects meant and associated ways to promote inclusion which helped countries to further refine their policies with the possibility to incorporate a gender perspective in the contract award phase.

Similarly, Sarter (2020) did a review of policies in Germany and found trends of equality considerations in public procurement and concluded that policies needed to be transformed into laws if some concrete response was to be seen as a voluntary adaptation of policies failed to promote greater inclusion, hampering women's opportunity to fit-in in a male-dominated workforce.

Maertens and Swinnen (2012) administered one of the few studies on gender issues in the supply chain in Africa and claimed a direct link between gender equality and supply chain growth, helping to understand how unequal representation issues could be tackled at the supplier level in agrifood logistics. Through their extensive first-hand data collection, the authors describe women's disadvantaged position in gaining contracts for high-value outputs from food industries due to their limited access to resources like land, water, labour and machinery, forcing them to work as daily wage earners rather than owners. Even among labourers, there existed differences, although reduced, in terms of wages paid to men and women. Women were disadvantaged in their employment contract terms and penalized for being less educated, resulting in not being able to get permanent positions leading to occupational segregation.

Wu and Sirgy (2004) conducted a US-based industry-wide study of the attitude of purchasing managers towards suppliers; their findings, although inconclusive, revealed a pattern of gender discrimination where purchasing managers denoted more willingness to purchase from an unknown male-owned supply firm than from an unknown female-owned firm, even when the quality of their products was similar, highlighting the unconscious bias. Thus, they focused on networking for female-owned businesses to improve their chances of getting orders.

Buyer-supplier relations are critical for any successful procuring organization and frequent supplier switching can be costly if done without any explicit reason. However, Mir et al. (2016) found there was no impact of gender on the supplier switching decision of buyers suggesting that women as buyers would lead to no extra cost to the company due to supplier switching. Blount and Li (2021) analyzed survey data of buyers in the U.S. and the U.K.

to determine factors influencing procurement decisions. They realized that women tended to have a more optimistic attitude toward supplier diversity, helping to support the social and relational aims via procurement. Furthermore, they found male buyers were anticipated to elevate the buying costs by being stringent with the fulfilment of their procurement metrics.

Women are disadvantaged not only as employees but also as entrepreneurs. Orser et al. (2021)'s study of SME suppliers to the Canadian government revealed that, in many sectors, women-owned businesses were not sufficiently represented due to hindrances like the complexity of the contracting process itself, limited fulfilment capability and experience as well as lack of awareness of the available opportunities. A surprising revelation of the study was that mostly women-owned SME supplier organizations were highly underrepresented in sectors where women-owned firms had the highest concentration. The authors suggested measures like training to women business owners and more clarity on the government's reservation rules.

Although socially conscious policies were drafted to make procurement a driver of change looking beyond profit objectives, only a few studies voiced the opinion of subcontractors who employ the highest percentage of people in the construction sector. Loosemore et al. (2019) study of Australia's construction field is an exception to this where they tried to understand why subcontractors are not very enthusiastic about such policies. The results suggested that if there is no government support and adequate training and education deployment for disadvantaged groups like women, employing them is seen as an expense rather than a positive impact on the organization. Hence, compulsory measures should be taken to ascertain more participation rather than relying on the voluntary initiative of suppliers.

To show the constructive impact of gender inclusion policies, Wright (2015) dug into the construction sector of the UK to see if public procurement could be used to mitigate gender issues in a seemingly masculine world and presented the case of Women into Construction Project, which was initiated in 2008 for the development of London Olympic Park. He discusses the capacity of procurement to compel stakeholders to consider social aims like improving women's participation in the construction sector, reducing the gender pay gap, and employing under-represented groups.

Wright and Conley (2020) also refer to the Women into Construction Project of the UK to emphasize the numerous skill enhancement actions taken to improve the supply of female labourers in construction while efforts were also undertaken to provide placements to them once the project ended. Through semi-structured interviews, the authors documented the positive impact of such actions on female career development as well as on the contracting company's reputation. Likewise, Sarter and Thomson (2020) acknowledge the relevance of procurement practices to encourage gender balance in organizations. However, providing incentives is not enough for participating companies as the majority of the surveyed companies did

not adopt the policies in response to procurement guidelines. The authors raised concerns about the power of public procurement itself to foster equality in partner organizations and suggested supplementing it with other actions to enhance equality measures undertaken; however, the benefits of enforcing equality considerations are still found to be positive.

It has been voiced by women’s advocate agencies that various certifications of women-owned businesses might improve their chances of winning contracts as the buyers become more aware of the supplier’s status. But Orser et al. (2019) found contrary results and concluded that such certifications did not help motivate women-owned businesses to bid more or their chances of getting the bid accepted. Essentially, there was no advantage against male-owned businesses because of the certification.

Atal et al. (2019) emphasize the onus on the IT industry to support the gender diversity of supplier firms by developing a 7-step sourcing process to strategically evaluate the suppliers and give them an edge based on their higher gender diversity. Asking questions related to women participation in the workplace at several stages of sourcing may nudge the suppliers to improve their women-employee ratio.

Finally, sustainability is gaining prominence and is an important consideration for all stakeholders in society today. Purchasing managers need to evaluate the actions of their suppliers as it can also have an impact on the buying company. So, Goebel et al. (2018) checked if, among other factors the gender of purchasing managers impacted their willingness to pay more for certified sustainable and environmentally viable options, sustainability as a factor had positive appeal for both male and female purchasers.

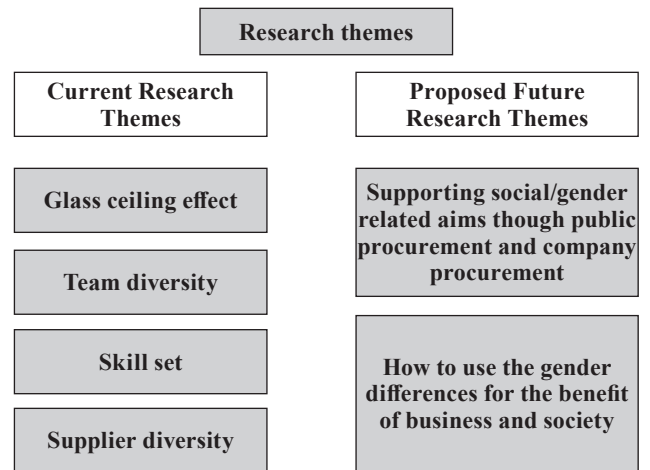
Conclusion

The purpose of this paper was to review the existing studies conducted in the field of procurement relating to gender issues, to the best of our knowledge, this is the first such attempt. The paper focused on performing a comprehensive study to identify the current trends and suggest future research paths that upcoming studies can explore. These are summarised in Figure 5.

Our analysis highlights that gender is an emerging issue in procurement research, and the existing research can be categorized into four themes. Studies on the glass ceiling effect showed gender-specific disadvantages to advance within organizations and procurement-specific impediments. These include inadequate work design, male-dominated cultures, negative stereotypes, high levels of travel, and an aggressive ethos within procurement functions. The glass ceiling effect persists, as men tend to be clustered in higher-level management roles while women struggle to reach higher positions. Furthermore, women entrepreneurs, particularly in smaller firms, face challenges in accessing funds and resources, limiting their market share and performance. Discrimination in lending terms and lack of expertise, knowledge, and awareness of opportunities further hinder women’s success as suppliers.

Collaborative efforts and supportive policies are required to address these barriers and promote gender equality in procurement activities.

Figure 5
Framework of current and future themes on procurement research addressing gender equality



Source: own compilation

Similarly, the studies on team diversity highlight the influence of gender diversity on decision-making processes, including the increasingly important sustainability and ethical aspects of supplier relationship management. The studies emphasize the need for diversity-oriented policies to support the career progression of all employees, man or woman, and promote inclusive practices that support socially responsible procurement.

While for the studies focusing on skill sets, there are mixed views on the gender-based advantages for procurement, however, several studies showcase the gender differences in decision-making, such as communication and negotiation abilities, in purchasing and sales professionals. The research indicates that gender can impact perceptions, preferences, ethical considerations, and negotiation characteristics in buyer-seller relationships. Overall, the inclusion of both genders in procurement teams is seen as beneficial, as women perform better in supply chain collaboration exercises and demonstrate higher ethicality. The presence of diverse genders in teams can lead to improved outcomes and a broader range of perspectives.

Finally, the literature focusing on supplier diversity and gender emphasizes how the challenges such as limited access to resources, wage discrepancies, occupational segregation, and complexity of the contracting process hinder women’s participation in procurement activities and their representation. Measures like training, clarity on rules, and government support are suggested to address these challenges. Furthermore, cases such as the Women into Construction Project in the UK demonstrated how public procurement could mitigate gender disparities, reduce the gender pay gap, and provide employment opportunities.

Based on our analysis, one of the emerging themes is the promotion of social objectives by promoting supplier

diversity, of which gender equality is a critical component, although the theme needs to be explored more by future research. In their approach, many of these papers address not just understanding the nature of inequalities but to gain insight into how to address problematic areas.

This review also revealed that the literature fails to address an additional topic: how procurement as a policy tool can support social/gender-related aims. In this respect, procurement naturally deals with the contracting partners, i.e., the suppliers. However, internal processes and opportunities for internal efficiency gains could also be the subject of research, of which gender is a natural subject. This is particularly true for public procurement, as public procurement research typically focuses on legal and efficiency issues rather than on the human factor or organizational aspects. Also, limited research focused on how companies are addressing these issues. They also have policy tools for internal management (e.g., glass ceiling) and suppliers (e.g., supplier codes of conduct). It could be of importance to see a full picture of these tools and their effectiveness in both sectors. Future research could also be advantageous to show how to use these differences in personality and skills for the advantage of the business and society.

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CONSUMER REACTION TO DYNAMIC PRICING – THE MODERATING EFFECT OF PRICE POSITION

FOGYASZTÓI REAKCIÓ A DINAMIKUS ÁRKÉPZÉSRE – AZ ÁRPOZÍCIÓ MÉRSÉKLŐ HATÁSA

This research examines the relationship between dynamic pricing, fair pricing perception, and willingness to buy, and tests the moderating effect of price position. Dynamic pricing strategies and price position were applied as stimuli in a quasi-experimental setting, and 387 undergraduate students were surveyed about their airline ticket buying behaviour. Results show that dynamic pricing has a significant effect on perceived fair pricing and, through this, on the willingness to buy. In addition, the price position moderates the association between a dynamic pricing strategy with a decreasing trend and fair pricing perception. In the case of a relative higher market price, this effect is stronger. This study contributes to the existing literature in this field, as it provides a comprehensive categorization of various forms of dynamic pricing, establishes the conceptual framework of this research field, empirically approves the effects of these subcategories, and identifies the moderating role of price position.

Keywords: dynamic pricing, fair pricing, price position, willingness to buy

A kutatás a dinamikus árazás, a méltányos árazás észlelése és a vásárlási hajlandóság közötti összefüggéseket vizsgálja, valamint teszteli az árpozíció moderáló hatását. A dinamikus árazási stratégiák és az árpozíció stimulusként jelentek meg a kvázi kísérletben, ahol 387 egyetemi hallgatót kérdeztek meg repülőjegy-vásárlási magatartásukról. Az eredmények azt mutatják, hogy a dinamikus árazás jelentős hatással van a méltányos árazás észlelésére és ezen keresztül a vásárlási hajlandóságra. Ezen túlmenően az árpozíció moderálja a csökkenő árváltoztatási trendet alkalmazó dinamikus árazási stratégia és a méltányos árazás közötti összefüggést. A relatív magasabb piaci ár esetén ez a hatás erősebb. A tanulmány hozzájárul a témában meglévő szakirodalomhoz, mivel azonosítja a dinamikus árazás különböző formáinak alkategóriáit, meghatározza e kutatási terület fogalmi kereteit, empirikusan alátámasztja ezen alkategóriák hatásait, valamint azonosítja az árpozíció moderáló szerepét.

Kulcsszavak: dinamikus árazás, méltányos árazás, árpozíció, vásárlási hajlandóság

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The concept of fairness has already been extensively researched in the literature and examined in the context of pricing (Kahneman et al., 1986; Campbell, 1999, 2007; Armstrong & Kotler, 2000). Xia et al., 2004; Haws & Bearden, 2006; Choi & Mattila, 2009; Tsaousoglou et al., 2019; Seele et al., 2021). Fairness might refer to the “extent to which outcomes are deemed reasonable and just, and transaction fairness might refer to the extent to

which sacrifice and benefit are commensurate for each party involved” (Bolton et al., 2003, p. 475). Many authors emphasize the importance of comparison when we try to capture the nature of fairness in the context of pricing (Haws & Bearden, 2006; Xia et al., 2004). Social comparison is central to most theories of justice that deal with attitudinal or behavioural outcomes (Major & Testa, 1989). The theory of social comparison, written by Festinger in

1954, became the most well-known in the literature. The backbone of this theory is the finding that people turn to those with whom they can identify and make continuous comparisons to evaluate their own opinions (Festinger, 1954). Later, Xia et al. (2004) extended the social comparison theory to pricing, in which great emphasis is laid on comparing transactions and prices paid for products. According to Xia et al. (2004), the degree of perceived similarity between individual transactions is high, and little differentiated information is available for consumers by which they could justify the differences between prices. This may be the case, for example, when consumers compare the prices of a specific airline with the prices of other airlines. Consumers are most likely to believe that they are entitled to equal prices. If they perceive that they are being offered the same flight ticket at different prices, they tend to judge these price differences as unfair.

Xia, Monroe, and Cox define price fairness as “a consumer’s assessment and associated emotions of whether the difference (or lack of difference) between a seller’s price and the price of a comparative other party is reasonable, acceptable, or justifiable” (Xia et al., 2004). The internal reference price (Internal Reference Price, IRP) can also be considered as consumer expectations for a given price of a product or service (Urbany et al., 1988; Gyulavári et al., 2011). Parducci’s range-frequency theory (1965) is also often applied to explain perceived price fairness. In this context, the base of the comparison is provided by the surrounding price stimuli. According to the range-frequency theory, a certain price is judged better or fair in a positively skewed distribution of price stimuli appearing in the given context, while certain values are judged worse or unfair in a negatively skewed one.

However, the comparison can be interpreted in a broader sense and should not just be narrowed down to the price itself. According to some authors, customers often perceive the fairness of prices in light of the principle of dual entitlement. According to this theory, consumers judge the fairness of a price based on the reference price and the reference profit (Kahneman, Knetsch, & Thaler, 1986; Haws & Bearden, 2006). Companies are entitled to a fair profit, and the price increase caused by costs is considered fair, while purely profit-oriented price increases are considered unfair (Kahneman et al., 1986). According to this, the company cannot raise prices in such a way that consumers do not notice some kind of change in the cost structure; otherwise, they will feel it is unfair. For consumers, cost-based pricing is therefore socially acceptable corporate behaviour, and they feel frustrated when, for ex-

ample, sellers temporarily raise prices due to demand during Easter (Gyulavári et al., 2012). In another study (1999), Campbell extended the principle of dual entitlement and put assumed motivation at the centre of his investigation. The term “assumed motivation refers to the fact that in the event of a company’s price increase, consumers try to deduce what the motive behind the company’s decision might have been and form an opinion on this basis. Perceived price fairness is formed depending on whether consumers evaluate this assumed motivation as negative or positive. When establishing his theory, Campbell (1999, 2007) built on attribution theories, which assume that individuals, including consumers, try to explore and interpret logical and psychological mechanisms of action when they interpret phenomena.

Meanwhile the price fairness concept had been elaborated to a great extent, but less attention was paid to the pricing process in the marketing literature. As a reflection on the procedural dimension of fairness that appeared in the academic discussion, pricing practices, such as dynamic pricing, came more and more into focus in the marketing field. Furthermore, the implementation of dynamic pricing strategies gained new momentum when online commerce and new technologies emerged (Haws & Bearden, 2006). At the same time, the perception of price fairness increasingly included the evaluation of companies’ pricing processes themselves, in addition to the price. This change triggered several studies that investigated the effect of dynamic pricing’ effect on fair pricing (Lee, 2011; Weisstein, 2013; Omarli et al., 2018).

In a broader sense, dynamic pricing is a temporary price change technique that simplifies a pricing decision by breaking it down into a series of decision steps over time, and by companies applying them in a specific period, taking into account sudden changes in the market in the direction of supply and demand, price changes in competitors, and other factors in order to increase the company’s profit. In many cases, the researchers use dynamic pricing and price changes interchangeably. Of course, one can consider the latter as a special version of the former, but dynamic pricing is a much more complex phenomenon and could take many forms (for a summary, see Table 1). These variants can be identified in three dimensions. Price volatility refers to the magnitude of price changes, and is mostly measured by the variance of the values. One can distinguish high, low, and mixed volatility. Another characteristic of dynamic pricing is the trend of price changes, which can be increasing, stagnating, or decreasing. During a given time, a mixture of the three options can oc-

Table 1

Dimensions of dynamic pricing practises

Dimension	Interpretation	Typical variants (Further categories are possible)
Price volatility	Magnitude of price changes	High/medium/low
Trend of Price Changes	The direction of price changes	Increasing/stagnating/decreasing
Intensity of Price Changes	The frequency of price changes during a time interval	Frequent/infrequent/pulsing

Source: own table

cur as well. When we talk about dynamic pricing, we can observe a diverse intensity of price changes, too. Time is also a very important issue on this topic. Consumers feel it is more unfair if prices change within a very short period than if it all happens over a longer period of time. The frequency of the price changes can be high, low, or pulsing. This latter dimension appears in the literature as the temporal proximity of price differences (Haws & Bearden, 2004).

Price position is defined, following Grewal and Lindsey-Mullikin (2006), as the relative positioning of a firm's price(s) compared to the price(s) of a competing firm. Consumer responses to a specific price depend on where that price stands in comparison to other prices, and customers tend to have a more favourable opinion of a product or service when other comparable offers are priced higher than it is. According to the range-frequency theory (Niedrich, Sharma, & Wedell, 2001), consumers can find out both the range and the frequency of price changes by looking at historical data and analysing it. The position of the current selling price influences the customers' perception of the pricing as fair or not. The price's position typically influences consumer reactions to a price compared to other prices (e.g., Adaval & Monroe, 2002; Grewal & Lindsey-Mullikin, 2006). For instance, consumers evaluate goods or services more fairly when other comparable offerings are priced higher, whereas lower costs have the reverse effect (Adaval & Monroe, 2002). Parducci's (1965) range-frequency theory is based on the idea that a judgment about a given price is formed as the result of a comparison of the relative position of the price and other price stimuli in a given context. It includes two dimensions: range theory and frequency theory. According to the former, the judgment made about a given price is influenced by the minimum and maximum price of the given offer, as well as how far the given price falls from them. The frequency theory examines the frequency distribution of price stimuli and accordingly states that the consumer judges the prices in this light. The question here is not how far a given price falls from the extreme prices, but how much lower and more expensive the price is within that range. According to Niedrich and his colleagues, the role of prices that occur with exceptionally high frequency is also prominent in the distribution of prices. Consumers tend to interpret such prices as a reference price and compare a given price to it (Niedrich et al., 2009).

Price changes can lead to different price positions. In the event of a price increase, the previously cheapest product may remain the most favourable offer on the market, but it may also lose this position. The price position is defined as the relative position of a given price of a company compared to that of its competitors in a given situation. This may force the consumer to make an extra effort, which they may feel is unfair. However, if the price rises to a new position and thus new offers can be evaluated as more favourable by the customer, this will, even more, prompt the consumer to start a new, possibly more intensive search for offers that may not have been considered before. This can cause even stronger resentment about

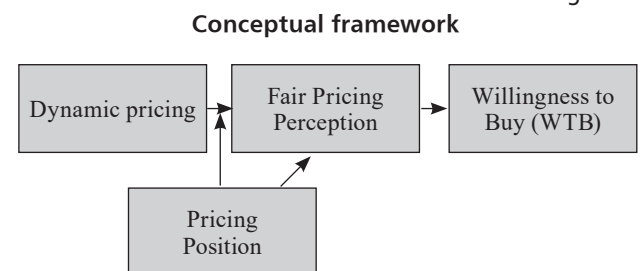
how pricing is done. In addition, it can increase the perceived risk for consumers that, in the case of further price increases, the relative positions of the offers will change even more drastically, which can increase the feeling of time pressure.

Consumers often react to price related stimuli with a fast, emotional response, followed by a more calculated, rational response (Monroe et al., 2015). These reactions can take many diverse forms. To include all of them into our model and explore the exact interrelationship between them is beyond the scope of the current study. For this reason, we selected the most researched concept in price fairness context, namely the willingness to buy (WTB).

Conceptual model and hypothesis development

The conceptual framework of the research has been developed based on the literature review (see Figure 1). The main chain of effects represents the well-established relationship between dynamic pricing, fair pricing perception, and willingness to buy constructs. These were further developed by including the subdimensions of dynamic pricing for a more detailed analysis and getting a deeper understanding of the mechanism on the one hand. On the other hand, we investigated the moderating effect of price position, which was assumed to provide more insight into how these effects work in reality.

Figure 1



Source: own compilation

Although price increases are generally viewed negatively by consumers (Xia et al., 2004), they are a frequently used tool, and companies often decide on both larger and smaller price changes in order to increase sales. Martin et al. (2009) examined the effects of price increases and found that if the price increase is small and its reasons can be proven to be outside the company's decision-making authority, consumers consider it fairer than non-justifiable reasons within the company.

Due to the frame for the purchase, the consumer may feel that in the case of any price change, a reconsideration is needed to evaluate whether it is worth buying the product at the new price level. This causes constant pressure for them to spend time collecting information and to make further cognitive efforts to get a satisfactory solution at the end of the process. This inconvenience compared to the situation of stagnating prices makes consumers more demanding and cannot see a return for their effort. As a

result of dynamic pricing practices, consumers may pay different prices for the same product. On the other hand, comparisons with other consumers have a greater impact on the perceived fairness of prices than comparisons with other sellers or with one's own experience (Xia et al., 2004). Just as consumers may perceive dynamic pricing as a special case of price discrimination (Carroll & Coates, 1999), they may be uncomfortable with having to pay more than others for the same product. Kahneman et al. (1985), the principle of double entitlement also supports the fact that price changes strengthen the feeling of unfairness in consumers.

H₁: Dynamic pricing with increasing trend of price changes negatively affects the fair pricing perception

In the case of a price decrease, the opposite effect can occur. The consumers perceive that they can benefit from the change(s). Some of them could also interpret this as unfair, but the asymmetry between the evaluations of situations where consumers benefit or are disadvantaged is well established in the literature (Xia et al., 2004). Mazumdar and Jun's (1992) research shows that consumers view multiple price decreases, which refer to price volatility, more favourably than a single price decrease, while consumers view multiple price rises more negatively than a single price increase.

H₂: Dynamic pricing with decreasing trend of price changes positively affects the fair pricing perception

From a procedural standpoint, it is critical that prices are perceived as unfair when consumers are unable to understand how a price is determined. The procedure should be obvious; otherwise, they will become confused and frustrated. In practice, consumers do not appear to prefer price volatility caused by changes in supply and demand (Kahneman et al., 1986). The reason is similar to the one we referred to in the case of price increases. They perceive an additional gain on the supply side without any incremental value creation, while they do not perceive any change in the cost structure. On the other hand, this process makes the pricing unpredictable and demands additional effort from the consumers to reduce the risk of the decision. However, a one-time large price increase often strongly discourages sales, so companies try to avoid this effect by increasing their prices in many small steps (Tewari, 2015).

H₃: Dynamic pricing with high volatility negatively affects the fair pricing perception

When consumers perceive unfairness in pricing, they may react differently, becoming angry, complaining, spreading negative word of mouth, or punishing the seller by switching to a competitor. Understanding and predicting the impact of prices on purchase willingness has always been a focus of interest for marketing researchers (Huppertz, et al., 1978; Dodds et al., 1991; Campbell, 1999; Maxwell, 2002). There are many works in the literature that deal

with the effect of fair pricing on the willingness to buy. Based on their own regression model, Dodds, Monroe, and Grewal (1991) found a positive correlation between consumer perceived value and purchase willingness. According to a study by Huppertz, Arenson, and Evans (1978), perceived high prices were considered unfair by customers and led consumers to leave the store or file a complaint. Draganska and Jain (2006) point out that retailers do not charge higher prices for different-flavoured products for strategic reasons, as this would increase the elasticity of demand due to perceived unfair pricing. It has also been pointed out that unfair pricing makes consumers less likely to shop at that store (Campbell 1999), thus affecting their willingness to buy. In this research, we want to examine the effect of perceived fair pricing on the willingness to buy in a dynamic context. We set up the following hypothesis regarding this:

H₄: Fair pricing perception positively affects the willingness to buy

In general, the higher the price, the higher the unfairness the consumer perceives. In the opposite situation, a similar effect can also be observed, as the lower the price, the higher the perceived fairness, but the magnitude of the effect of a fair situation is smaller than in the case of an unfair one due to the asymmetry discussed above (Xia et al., 2004). When a company decreases the price when it is relatively high, the reason why consumers feel it unfair starts to diminish, and the behaviour of the company is slowly moving from the zone of unfairness to the one of neutrality. However, this change between "zones" does not happen when the price is relatively lower than the ones of the competitors. In this latter situation, the consumers feel fairness, which does not change when the prices begin to decrease. For this reason, we claim that the price position has a moderation effect on the association between dynamic pricing and fair pricing perception.

H₅: Price position moderates the association between dynamic pricing with decreasing trend of price changes and fair pricing perception. The higher the relative price position of the offer of an airline company in the market, the stronger the relationship between dynamic pricing with decreasing trend of price changes and fair pricing perception

Methodology

The research model and the moderation effect have been tested with the method of standard questionnaire survey. The questionnaire was edited using Qualtrics software and sent to the potential respondents online. Three hundred and eighty-seven undergraduate students majoring in business management participated in the research and filled out the questionnaire completely. Of course, the sample cannot be considered representative of the entire population, but it provides usable results for younger travellers, especially

in terms of not analysing absolute values but associations. Within the framework of the questionnaire, subdimensions of dynamic pricing and price position were stimulated (3x2x2 quasi-experimental arrangement), i.e., respondents were confronted with different scenarios and their reaction was measured. Two subdimensions of dynamic pricing appeared in the experimental setup, the trend of price changes (increasing, stagnating, and decreasing) and the volatility (high, low). In the case of the trend of price changes, the three-outcome questions were transformed into two binary variables (increasing/not increasing and decreasing/nor decreasing). There were two outcomes for the price position (high/low). The three stimuli resulted in a total of twelve different stimuli. The sample was randomly assigned to these so that the respondents were only faced with one scenario, and gave their evaluation based on it. An example of the scenario used can be found in Annex 1. In the course of the research, the respondents came across hypothetical prices for eight different dates, during which the price of the examined airline changed. The respondents were asked to evaluate the price-change behaviour of the investigated airline.

The reactions to the stimuli were characterized by fair pricing perception and willingness to buy, which concepts were measured separately with a three-item reference scale. In the case of fair pricing perception, we used the scale of Martin, Ponder, and Lueg (2009). The authors used separate items for fair price and fair pricing. In our research, we primarily considered the measurement of the latter to be important, i.e., how consumers perceive dynamic pricing as a process in itself. Therefore, the scale we used consisted of the following three items:

- the pricing applied by the company is fair,
- the pricing applied by the company is justified,
- the company follows unfair pricing practices.

Consumers can react to perceived unfairness in several ways. Their search intensity may increase as they look for alternative offers, their loyalty may decrease, they may engage in negative word-of-mouth advertising, etc. Among the many possible reactions, we chose the willingness to buy in the frame of our research, so we applied the scale used by Dodds, Monroe, and Grewal (1991) and adapted it to the airline industry. The scale included the following items:

- if you want to buy a plane ticket in such a situation, I think it is possible to buy the ticket of Airline (X) at the price after the price change,
- the probability that I would buy the ticket of Airline (X) is quite high,
- the chance that I would buy a ticket for Airline (X) is low.

In the case of both fair pricing perception and willingness to buy (WTB) constructs, we applied a five-point Likert-type scale, ranging from completely disagreeing (1) to completely agreeing (5). The data were analyzed with SPSS Statistics 27 and SPSS AMOS 27 software. The measurement scales were tested by confirmatory factor analysis, and adequate fit indica-

tors have been obtained (CFI: 0.964, TLI: 0.954, RMSEA: 0.57), which show that the indicators adequately represent the measured concept. Four out of five hypotheses have been tested with structural equation modeling (SEM), where three subdimensions of dynamic pricing, price position, fair pricing perception, and in addition, willingness to buy constructs, were included in the model. The fit of the model proved to be acceptable (CFI: 0.950, TLI: 0.926, RSMA: 0.93), so the results are suitable for analysis.

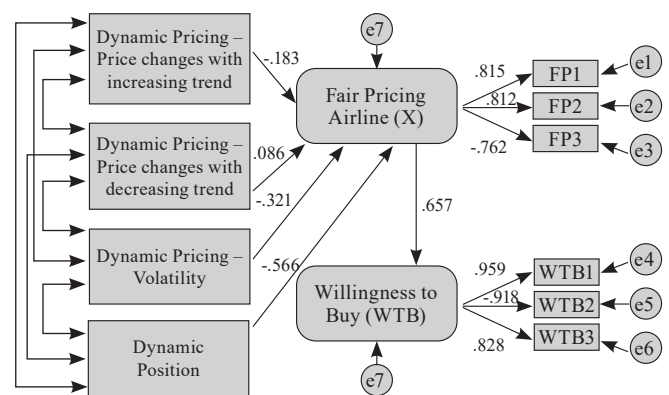
The moderating effect of price position was tested with hierarchical regression analysis. In the first step, only the direct effects were entered; the interaction effects (that is, the product of the moderator variable and the independent variables, respectively) were also entered into the model in the second step.

Results

As can be seen from Table 2, all explanatory variables included in the analysis exert some degree of influence in the model. The perceived fair pricing was mostly influenced by the relative position of the airline's offer ($\beta = -0.566$). Of course, the higher the price compared to other offers, the less they felt it was fair. Volatility also has a relatively strong effect on fair pricing perception ($\beta = -0.321$). Based on the results, the volatility, that is, the higher variance in prices, leads to a lower level of fairness perception. The trend of price changes also has an influence on the model, but to a lesser extent than the former two. The increasing trend of price changes has a stronger effect than the decreasing one ($\beta = -0.183$, $\beta = 0.086$, respectively). Fair pricing perception is closely connected with the willingness to buy, representing the strongest association of the structural part of the model ($\beta = 0.657$).

Figure 2

The research model and its estimated parameters



Source: own calculations

As it was assumed that price position not only effects fair price perception by itself, but also moderates the relationship between the company's dynamic pricing practice and fairness perception, this moderation effect was also tested. Due to the direct effect on the dependent variable, hierarchical regression analysis was applied. The results are summarized in Table 2.

Table 2

Testing moderating effect of price position

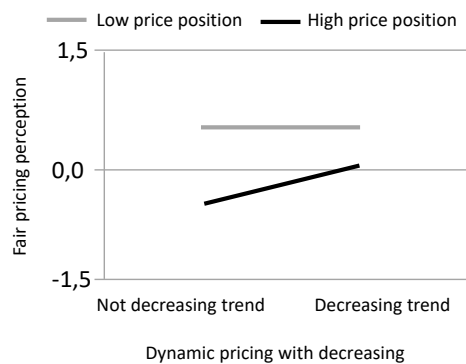
List of independent variables		Dependent variable Fair Pricing Perception			
		Initial model		Extended model	
		β^l	t-value	β^l	t-value
Main effects	Dynamic pricing with increasing trend	-.113**	-2,338	-.113**	-2.050
	Dynamic pricing with decreasing trend	.071	1,463	-,063	-.948
	Dynamic pricing - volatility	-.308***	-7,290	-.325***	-5,642
	Price position	-.446***	-10.563	-.579***	-6.979
Interaction effects	Price position x Dynamic pricing with increasing trend	–	–	.030	,418
	Price position x Dynamic pricing with decreasing trend	–	–	,217***	2,874
	Price position x Dynamic pricing - volatility	–	–	.037	,511
R ²		.319		.335	
n		387		387	

* $p < 0,10$; ** $p < 0,05$; *** $p < 0,01$

Source: own compilation

Figure 3

The graphical representation of the moderating effect of price position



Source: own compilation

We obtained similar results to those obtained in the SEM analysis when we analysed the initial model, including only the direct effects. Price position and volatility are the two independent variables that effect the fair pricing perception to the greatest extent ($\beta = -0.446$, $\beta = -0.308$, respectively), whereas the increasing trend of price changes has a weaker influence on it ($\beta = -0.113$). The decreasing trend of price changes seems to be the less influential construct in the model ($\beta = 0.071$). The variable included in the initial model explains 31.9% of the variance of the fair pricing perception.

In the next step of the analysis, we also entered the interaction variables, which were produced by multiplying the dynamic pricing subconstructs separately by price position. The variance explained increased to 33.5%. This change proved to be significant (Sig. F change = 0.023). Among the interaction constructs, the one that includes a decreasing trend in price changes proved to have the

Table 3

Evaluation of hypotheses

Hypothesis	Independent variable	Dependent variable	Moderator variable	Standardized regression coefficient (β)	Empirical significance level (p-value)	Evaluation of the hypothesis
(H) ₁	Dynamic Pricing – Price changes with increasing trend	Fair Pricing Perception	–	-.183	.000	Accepted
(H) ₂	Dynamic Pricing – Price changes with decreasing trend	Fair Pricing Perception	–	.086	.074	Accepted
(H) ₃	Dynamic Pricing – Volatility	Fair Pricing Perception	–	-.321	.000	Accepted
(H) ₄	Fair Pricing Perception	Willingness to buy (WTB)	–	.657	.000	Accepted
(H) ₅	Fair Pricing Perception	Willingness to buy (WTB)	Price Position	.217	.004	Accepted

Source: own calculations

strongest effect ($\beta = 0.217$). The two others seemed to have negligible influence ($\beta = 0.03$ and $\beta = 0.037$, see Table 2).

When we look behind the moderation effect explored, we can see that in the case of a lower price position, regardless of whether prices are decreasing or not, the fair pricing perception is higher than in a higher price position (see Figure 3). However, in the case of a higher price position, the perception of fair pricing significantly rises when the price changes follow a decreasing trend.

At the end of our analysis, we tested whether the relationships we investigated are significant or not. The results are summarised in Table 3. As indicated, both the associations and the moderation effect examined proved to be statistically significant. In addition, only the direct effect of the decreasing trend of price changes can be accepted at the 90% confidence level; all the others at an even stricter condition (99%). Therefore, we can conclude that the results supported our assumptions, and we can accept all five hypotheses.

Discussion

The study examined the extent to which consumers consider the dynamic pricing practices used in the aviation market to be fair. The results of the research confirmed the assumed correlations between dynamic pricing, perceived fair pricing, and consumers' willingness to buy. One of the main contributions of this study is that it identifies the subdimensions of dynamic pricing and includes them in the research model. The price position also plays an important role in the effect of dynamic pricing. In addition to its direct effect, it moderates the association between the dynamic pricing practice and the decreasing trend of price changes and the perception of fair prices. Meanwhile, the lower price position has a more positive evaluation with regard to fairness; in the case of a higher price position, a decreasing trend of price changes has an almost similar fairness perception to a situation with a lower price position. On the other hand, implementing decreasing price changes in the context of dynamic pricing does not make much sense based on our research.

The results of the research have many practical implications in terms of companies' pricing practices. Dynamic pricing evokes negative feelings in consumers, despite the fact that this practice has been used in the industry for a long time. Perceived unfairness also negatively affects their willingness to buy, so in a competitive environment, consumers can react particularly sensitively to companies' pricing strategies of this kind. Although the research did not deal with the long-term effects, it is easy to see that not only immediate reactions can be negative, but also the brand image can be negatively affected by the regular negative stimuli that the consumer faces in relation to pricing.

An important result is that the effect of dynamic pricing on perceived fairness largely depends on the price position in which the company applies this pricing practice. Overall, companies must take into account their competitive position, the presence of substitute products, and their relative price positions when applying dynamic pricing.

Perceived unfairness not only affects short-term decisions, as our research confirmed, but it can also damage the brand's strength in the aviation market in the long term.

Among the limitations of the research, the student sample must be highlighted, which is why the results cannot be generalized to the entire adult population or to the clientele of airlines. However, in the case of university students who intensively use the services of airlines, the results can be considered reliable.

Research is one of the first steps in understanding the effects of dynamic pricing. In order to understand the complex mechanism of action, it is worth examining the effects of several moderating and mediating concepts in order to fully understand and predict the reactions of consumers. As we mentioned earlier, the role of the brand can be decisive, but the research does not yet cover this area. It is therefore important to measure the associations caused by and related to pricing when examining the brand image of airlines. Knowledge of accepted industry standards can also be an important area in understanding consumers' price reactions. When companies first appeared on the market with the practice of dynamic pricing, consumers were not used to constantly changing prices. However, since this practice was primarily used by discount airlines, which initially entered the market at low prices, consumers had a double impression of it. Based on our research, it still has negative effects. Over time, however, consumers got used to the changing prices, so the moderating effect of consumers perceived industrial norm can forecast the trend towards the chain of effects investigated in this study.

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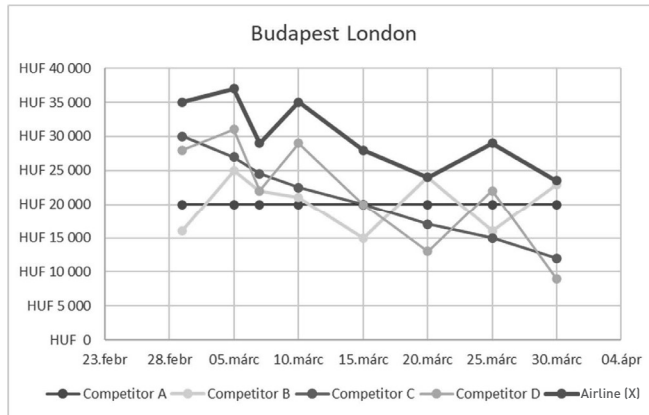
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Appendix I.

Example of the scenarios used in the research

(Scenario #1: price changes: decreasing trend; volatility: high; price position: above the average)



Source: own compilation

EVALUATING DOMINANT “HEALTHY WORKPLACE MODELS” FROM THE PERSPECTIVE OF POSITIVE PSYCHOLOGY PRINCIPLES

MEGHATÁROZÓ “EGÉSZSÉGES MUNKAHELYMODELLEK” ÉRTÉKELÉSE A POZITÍV PSZICHOLÓGIAI ALAPELVEK SZEMPONTJÁBÓL

Through systematic research of the existing literature, this paper identifies the most dominant theoretical frameworks in the healthy workplace research field and evaluates them from the perspective of the PERMA model (positive emotion, engagement, relationships, meaning, and accomplishments) of positive psychology. Building on the conclusions of an in-depth analysis a synthesized model, the *Comprehensive Model of Healthy Work and Happiness* is developed, aiming to connect the strengths of the existing influential healthy work models and the perspectives of positive psychology. This model provides a novel theoretical framework to guide both empirical researchers and business practitioners working toward healthy workplaces.

Keywords: healthy workplace models, employee well-being, work stress, healthy organizations, healthy society, positive psychology, PERMA model, Comprehensive Model of Healthy and Happiness

A tanulmány szisztematikus szakirodalmi kutatás révén azonosítja az egészséges munkahelyekre irányuló kutatások legdominánsabb elméleti kereteit, melyek értékelésére a pozitív pszichológia PERMA-modellje (pozitív érzelmek, elkötelezettség, kapcsolatok, értelemteliség, teljesítés) szerint kerül sor. A mélyreható elemzés következtetéseire építve egy új szintetizált modellre tesznek javaslatot a szerzők. Az *Egészséges Munka és Boldogság Átfogó Modelljét* azzal a céllal dolgozták ki, hogy összekapcsolja a meghatározó egészségmodellek erősségeit és a pozitív pszichológia perspektíváit. Ez a modell új elméleti keretet kínál az egészséges munkahelyekért dolgozó empirikus kutatók és vállalati szakemberek számára.

Kulcsszavak: egészségesmunkahely-modellek, alkalmazotti jóllét, munkahelyi stressz, egészséges szervezetek, egészséges társadalom, pozitív pszichológia, PERMA-modell, egészséges munka és boldogság átfogó modellje

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The topic of workplace health has drawn significant attention from both key policymakers, researchers, and business practitioners starting at the early twentieth century and especially during the rebuilding years following the Second World War, which included the newly formed World Health Organization (WHO) in this discourse and activities. Despite several decades of active political, academic, and business oriented discussions and an overwhelming number of diverse contributions, the chal-

lenge of establishing widely available healthy workplaces remains a largely unsolved problem.

Arguments are particularly strong for the business case of healthy work based on the lost performance in corporations and public healthcare costs (Avramchuk & Carpion, 2017). However, in the last years we can observe a clear shift towards the creation of immaterial values, like employee commitment and health as a resource (Stocker, 2013). An abundance of scientific literature can be iden-

tified on the role of immaterial factors in value creation, strongly influencing the research areas of sustainable organizations (Wolters, 2013), knowledge management (Sutjaritwattana, 2012) and management control, measurements, and reporting (Velte & Stawinoga, 2017).

‘Developing healthy work and workplaces has become an important topic for organizations and researchers alike’ (Kelloway & Day, 2005, p. 223). Work can be not just the causal factor in mental or physical illness but also a potential health resource protecting from ill health and a key contributor to human flourishing and happiness (Kelloway & Day, 2005). The emphasis of our research is on expanding the field of research and practice of healthy workplace practices toward the inclusion of positive psychology principles. This broadening of the analytical perspective will strengthen the importance of preventive and proactive practices and accentuate responsibility taking at a personal, organizational, and societal level.

The purpose of our research is to identify dominant workplace health models in the academic literature and to evaluate them from the perspective of positive psychology. By using the PERMA model as our main measure of criteria, we therefore aim to advance the impact of positive psychology and provide empirical researchers and practitioners synthesized, conceptual, and theoretical foundations for a more well-rounded understanding and creation of healthy workplaces.

The next section of the article presents a conceptual overview of the important terms related to healthy workplace models. Following this, the methodology of our literature research and the selection process of dominant theoretical frameworks will be introduced and explained. In the final part of the paper, four models will be analysed in-depth from the perspective of positive psychology. The Seligman (2011) PERMA model was selected as the key positive psychology evaluation criteria due to its extensive impact on both the academic and practical discourse and the uniquely strong empirical support for the model as demonstrated by research data from a wide range of different organizational contexts (Khaw & Kern, 2015). Finally, we present a new synthesized theory for healthy work and happiness, incorporating the strengths of the currently dominant workplace health models and the PERMA model. We hope that this new model will provide researchers with a more comprehensive framework for empirical studies while also offering practitioners good guidance to proactively design healthy workplaces.

Creating healthy workplaces: a conceptual overview

One of the key reasons behind the shortcomings in the research topic of healthy workplaces is conceptual fragmentation. A plethora of different theoretical approaches, concepts, and practical applications can be identified that are often loosely defined and inconsistently applied (Bakker & Demerouti, 2007). For this reason, in the next section of our paper, we will attempt to distinguish and define the key terms and concepts applied in our work.

Health and well-being

A wide range of health definitions can be found in the literature on workplace health management, although there is scholarly consensus that health is a multidimensional construct that encompasses physical health, mental health, and social well-being. Burton (2010) argues that *‘any definition of a healthy workplace should encompass the WHO definition of health’* (Burton, 2010, p. 15), that is, *‘A state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity’* (WHO, 2006, p.1). Physical health refers to the absence of illness and the presence of physical fitness and vitality, while mental health involves the ability to cope with stress and emotional challenges and maintain a positive outlook on life. Social health is related to the quality of social relationships and connections, as well as the ability to participate in social activities and networks.

Well-being is a broader concept that includes subjective experiences of happiness, satisfaction with life and fulfilment, as well as objective indicators such as income, education, and health status (Diener et al., 2010). Warr (2007) defines work-related well-being as the overall quality of an employee’s experience and functioning at work. Well-being is also a multidimensional construct that encompasses various domains of life, encompassing physical, emotional, social, and spiritual dimensions. It consists of hedonic and eudaimonic aspects and is influenced by various factors, including genetics, environment, lifestyles, and social support.

Stress and workplace stress

Stress is a physiological and psychological response to perceived threats or challenges (Selye, 1956). Selye’s seminal work is an important starting point for our research by highlighting the opportunity for positive experiences and outcomes at work through the notion of *‘eustress’*. Stress is a natural and necessary response that helps people cope with difficult situations, but chronic stress (distress) can lead to adverse health outcomes, including cardiovascular disease, depression, and anxiety (Cohen et al., 2007). Over the years, various definitions have been applied to the stress phenomenon (Holmes & Rahe, 1967; Lazarus & Folkman, 1984). A key contribution to properly applying the concept of stress to healthy workplaces is provided by Kahn and Byosiere (1992) who propose defining and understanding stress as an interactive process in which *“...environmental conditions and events induce personal consequences...”*. The above-mentioned general definitions of stress have been further developed for understanding conditions and events related to work; thus, the concepts of job stress and workplace stress were introduced and studied extensively through various models of workplace stress (Karasek, 1979; Edwards et al., 1990; Siegrist, 1996).

Healthy work and healthy workplaces

Healthy work is safe and fulfilling and allows people to achieve their potential. It involves a balance between job demands and resources, opportunities for development and growth, and supportive relationships with colleagues

and supervisors. Healthy work also includes work-life balance, flexible work arrangements, appropriate recognition, and rewards for achievements. Healthy work can improve physical and mental health, increase job satisfaction, and improve productivity and performance (Burton, 2010).

'Healthy workplaces are those in which individuals flourish and organizations prosper' (Cartwright & Cooper, 2009, p. 231). As defined by Sauter, Lim, and Murphy (1996, p.250), a healthy workplace is an organization that *"maximizes the integration of worker goals for well-being and company objectives for profitability and productivity."* In a healthy workplace, *"individuals can implement strategies that enable them to accentuate the positive and metabolize the negative with regard to their emotional experiences in order to increase organizational well-being"* (Cartwright & Cooper, 2009, p.225). Healthy workplaces are essential for promoting employee well-being and productivity. The World Health Organization (Burton, 2010) defines a healthy workplace as one that promotes the physical, mental and social well-being of employees and creates a productive environment that delivers high-quality products or services.

Healthy organizations

Healthy organizations are those that prioritize sustainability, ethics, and social responsibility. They operate with transparency, accountability, and respect for human rights, and prioritize the well-being of their employees, customers, and communities. They have a positive impact on the environment, promote diversity and inclusion, and contribute to the social and economic development of their region (Porter & Kramer, 2011). Healthy organizations also prioritize innovation, collaboration, and continuous learning and improvement (Grant & Ashford, 2008). By focusing on these values, healthy organizations can create a positive impact on their stakeholders and society. The importance of the complex and multidimensional nature of the responsibility for developing workplace health has been emphasized by advanced models suggested by leading institutions, such as the Harvard Culture of Health model (Sorensen et al., 2021).

Healthy society

Healthy societies are those that provide the conditions for individuals and communities to thrive physically, mentally, and socially. They prioritize health equity, social justice, and the reduction of health inequalities (Marmot, 2005). They provide access to quality healthcare, education, and social services, as well as safe and supportive physical and social environments. Healthy societies also promote economic growth, environmental sustainability, cultural diversity, and prioritize the protection of human rights and the empowerment of marginalized groups.

Positive psychology and positive organizational research

Positive psychology has gained increasing attention in recent years and focuses primarily on the scientific study of positive human experiences, traits, and emotions, such as

happiness, well-being, resilience, gratitude, forgiveness, and flourishing in individuals and communities. This approach aims to promote positive aspects of human life, thus emphasizing the importance of positive emotions, engagement, relationships, meaning, and achievement, which are collectively known as the PERMA model (Seligman, 2011). A very important early contributor to the development of positive psychology was the Hungarian American researcher, Mihaly Csikszentmihalyi, whose theory of Flow has described and explained the conditions of a state in which *"...people are so involved in an activity that nothing else seems to matter..."* (Csikszentmihalyi, 2002, p. 4).

Positive organizational research emerged in the early 2000s and focuses on the study of positive aspects of organizations, such as employee engagement, job satisfaction, and organizational effectiveness. Positive organizational research also emphasizes the importance of positive leadership, such as transformational and servant leadership, which are characterized by empowering and supporting employees, creating a positive work environment, and fostering a sense of purpose and meaning (Avolio & Gardner, 2005). The empirical validation and development of the PERMA model has played a significant role in the direction of this research. Multiple versions of related questionnaires have been developed and tested successfully in diverse contexts (Pataki-Bittó, F., 2021; Kun et al., 2017).

One of the key constructs that have emerged from these fields is the idea of *psychological capital*, which refers to an individual's positive psychological state characterized by the presence of four core components: hope, self-efficacy, optimism, and resilience (Luthans et al., 2007). Psychological capital has been shown to be a key predictor of job satisfaction, work engagement, and performance, as well as mental and physical health (Avey et al., 2010).

The combination of the positive psychology perspective with the currently dominant healthy workplace models offers a highly promising and well-rounded framework for further research. To provide a systematically developed theoretical basis for this synthesizing effort, a methodology for identifying dominant workplace health models is presented. Their evaluation is explained using the criteria of the PERMA model.

Methodological process for selecting and evaluating healthy workplace models

As an initial step of developing our methodology, we have used the Scopus database of Elsevier, a reliable and widely accepted and utilized comprehensive collection of scholarly contributions in the field of organizational science (Anand, 2022; 2020; Tranfield et al., 2003). With the help of the Scopus database and a fine-tuned search of sources carefully developed in multiple steps, the most important publications in the field of 'healthy workplace models' were identified.

To understand the landscape of the literature on 'healthy workplace', the most important keywords of 1.

‘health’ 2. ‘wellbeing’ and 3. ‘stress’ were included. Careful attention was paid to include all possible formulations and combinations of these words, such as using the noun ‘health’ or its adjective form ‘healthy’. Similarly, no relevant articles were omitted because of diverse grammatical uses of the word “well-being”.

In accordance with the aims of the research, all articles were traced that explore this phenomenon in a workplace context. Since the expressions used in this specific field of research on health are multitudinous, a broad research approach was adopted and all relevant and frequently used terms were included, such as 1. ‘work’ 2. ‘workplace’ 3. ‘organization’ and 4. ‘occupation’. The research included all versions of these terms paying attention to the noun (“occupation”) and adjective forms (“occupational”) of expressions and different versions of spelling.

The research expressly targeted the discovery of models and conceptual frameworks in the field of ‘healthy workplaces’. As such, the aforementioned combinations of keywords were supplemented with the appropriate synonyms. Thus, the keywords of 1. ‘model’, 2. ‘theory’ and 3. ‘framework’ were used during the Scopus search. All possible versions of these expressions were covered by including both singular and plural forms.

Following the primary recommendation of the methodological literature, we carried out our first search within the category ‘Article title, Abstract, Keywords’ of the Scopus database (Anand, 2022; Tranfield, 2003). In total, 42 combinations of the previously introduced keywords were used in our search attempt connected with an ‘OR’ logical command. As a result of this search, we identified 207 direct hits (academic records) that specifically included or mentioned some kind of ‘healthy workplace model’ in their titles, abstracts, or keywords.

Based on the relevant guidelines of methodological recommendations (Anand, 2022; Tranfield, 2003), we then continued to refine our research with the inclusion of academically justified filters. Our first search results were thus filtered according to the ‘language’ to include only English articles, according to the ‘source type’ to include only journal articles, and according to the ‘document type’ to include only articles, reviews, and editorials. The application of these filtering measures consequently reduced the number of articles to 167 direct hits.

In the next step of focusing our search we narrowed the results down by filtering them through the relevant subject areas. We limited our Scopus search to the scientific disciplines most relevant from the perspective of organizational science. Business, Management and Accounting, Psychology, Social Sciences, Arts and Humanities, Health Professions, and Multidisciplinary subject areas were included in the final stage of the search process. Concluding the refinement of our search in this way, we reached a final number of 94 Scopus indexed academic journal articles.

As a final step of the search process, the analysis was supplemented with an overview of Hungarian academic articles covering the topic. We concentrated the Hungarian language-based part of our research on the items available in the Corvinus University Budapest library search engine

and carried out targeted research for the journals *Budapest Management Review (Vezetéstudomány)*, *New Personal Review (Munkaiügyi Szemle)*, and the *Journal of Mental Health and Psychosomatics (Mentálhigiéne és Pszichoszomatika)* as the most relevant Hungarian academic journals.

We found a very limited number of academic articles that focus theoretically or philosophically on applying workplace health models (Dankó et al., 2022; Lázár, 2018; Jakab & Lázár, 2007). However, a significant number of studies were identified that apply work stress models or investigate employee health in various specific contexts through empirical studies (Hornýák, 2019; Gál-Inges & Németh, 2015). In addition, we found a separate group of studies discussing methods, viability, and measurements of workplace health promotions (Bencsik, 2022; Gorgeinyi-Hegyes et al., 2021; Szabó & Juhász, 2019a; Szabó & Juhász, 2019b; Péter et al., 2015), with a significant part of this literature focusing on the impact of physical activity and sport (Ács et al., 2020; Laczkó et al., 2022).

Analysing the literature from Hungarian scholars investigating the workplace health topic, we concluded that the researchers generally apply the same theoretical frameworks already identified in our earlier Scopus-based research. There is an emphasis on applying existing theories to specific contexts or vocational groups, and towards workplace health promotion. Most of these academic contributions are beyond the scope of our research, as we intend to focus on evaluating workplace health models that provide a comprehensive examinations or explanations of this phenomenon.

Limitations of our methodological approach

In designing our literature analysis of workplace health models, we followed the guidelines recommended by Anand (2022) and Tranfield et al. (2003) and carried out limited research appropriate to the scope of our investigation. A significantly broader analysis could have been carried out by including additional databases like Google Scholar and without the application of the specified filters. According to the aforementioned guidelines, the application of the Scopus database and the recommended filters does not cause any significant decline in the quality of analysis.

The robustness of the analysis of the research literature could have been further advanced by checking the bibliography of the identified articles for further relevant articles and by additional bibliographic analysis of all citations, corrected by repeated use of the same authors. Such a detailed bibliographic analysis was beyond the scope of this paper; however, we recommend that further conceptual studies should expand upon our research in this direction.

Evaluation of dominant healthy workplace models from a positive psychology perspective

According to the methodological process detailed above this section discusses the results of our systematic analy-

Table 1

Name of "Workplace Health Model"	Original Authors and Year of Publication	Number of times applied in selected literature (in order of frequency)	Central Concepts of Model (Beyond basic stress process concepts)	Inclusion of Positive Psychology Components according to the PERMA model				
				Positive Emotion	Engagement	Relationships	Meaning	Accomplishments
Job Demand-Control Model (JDC) Demand-Control-Support Model (DCS)	Karasek, 1979 Karasek and Theorell, 1990 Johnson and Hall, 1988 Karasek et al., 1998	21	Job Demands, Job Control (Dec. Latitude), Social Support	No	Yes	Yes (in advanced model)	No	Yes
Effort-Reward Imbalance (ERI)	Siegrist, 1996	16	Work Effort, Work Reward, Overcommitment	No	Partly	No	No	Yes
Job demands-resources (JD-R) Framework, Extended versions of Job demands-resources Framework	Demerouti et al., 2001 Bakker et al., 2003	8	Job Demands, Job Resources, Exhaustion, Cynicism	Yes	Yes	Yes	No	Partly
Workplace Psychosocial Safety Climate (PSC)	Dollard and Bakker, 2010	4	Psychosocial Safety Climate, Demands, Resources, Psychological health problems, Engagement	Yes	Yes	Yes	No	Partly
WHO's Healthy Workplace Framework	Burton (WHO), 2010	4	Psychosocial Work Environment, Physical Work Environments, Personal Health Resources, Enterprise Community Involvement, Leadership Engagement, Worker Involvement, Ethics and Values	Yes	Yes	Yes	Yes	Partly
Challenge-Hindrance Occupational Stress Model (CHM)	Cavanaugh et al., 2000	4	Hindrance Stressors, Challenge stressors	Yes	Yes	No	No	Partly
Name of „Workplace Health Model"	Original Authors and Year of Publication	Number of times applied in selected literature (in order of frequency)	Central Concepts of Model (Beyond basic stress process concepts)	Inclusion of Positive Psychology Components according to the PERMA model				
				Positive Emotion	Engagement	Relationships	Meaning	Accomplishments
Equity Theory and Organisational Justice Theory (OJ)	Adams, 1963 Greenberg, 1987 Cropanzano and Greenberg, 1997	3	Inputs, Outputs, Referent Other, Fair Balance Distributive Justice, Procedural Justice, Interpersonal Justice, Informational Justice	No	No	Yes (in advanced model)	No	Partly
Person-Environment Fit Model	French et al., 1982 Caplan, 1983	2	Objective/Subjective Person Objective/Subjective Environment Objective/Subjective Fit Contact with Reality Accuracy of Self-assessment	No	No	No	No	No
Posttraumatic Stress Disorder Model	Norman, 1982 APA's DSM-III, 1987	2	Alterations in arousal, Avoidance, Negative alterations in cognition and mood, Intrusions Psychological health problems, Engagement	Partly (in the inverse form)	No	No	No	No
Occupational Wellbeing Framework	Milbourn, 2020	2	Meaningful Activity, Participation, Subjective Experiences, Accomplishment, Pleasure, Coherence, Companionship, Competence, Identity	Yes	Yes	Yes	Yes	Yes
Additional Workplace Health Models identified in our research that were not evaluated in detail due to their lesser influence or empirical application among the reviewed articles: A Shortened Stress Evaluation Tool (ASSET), Burnout Management Model, CDC Prevention Workplace Health Model, Cognitive-Behavioural Theory, Cognitive Phenomenological Theory of Stress and Coping, Comprehensive Model of Bullying, Copenhagen Psychosocial Questionnaire Model, Dual Work Stress Model, Emotional Overload Theory, Extended Stress Model, Generic Work Stress Model, Integrative Occupational Stress-Model, Job Insecurity Climate Model, Health Model of Rational Emotive Behavioural, Health Action Process Approach, Healthy Organization Theory, Organizational Health Inventory Model, Nordic Occupational Health Model, Online Workplace Health and Well-being Evaluation Tool, Organisational Health Framework, Prevention Pyramid of Gant, Psychological Risk Assessment Framework, Reciprocity Theory, Safety Citizenship Behaviour Model, Theoretical Framework of Occupational Stress for IS Professionals, Work Stress Theoretical Framework, Workplace Bullying Model,								

Source: own creation

sis of Scopus indexed articles covering various models of healthy workplaces. In the first stage of our research project, we used a consistent, step-by-step approach to identify and select the relevant academic articles and the most dominant models for our evaluation.

In the table below (Table 1) we present the results of this analysis, including the names of the workplace health models, their original authors, and year of publication. Here, we chose to mention not just the primary author(s), but some additional seminal authors acknowledged in the literature as well.

In addition to the names of the models and original authors, the third column of Table 1 also includes the number of times the given workplace health model was applied as a central component of analysis among the 94 English-language articles investigated. This criterion was chosen to establish the order in which the models are presented in the table; thus, the theory with the highest frequency of application is presented in the first row of the chart. In the last row of page two of Table 1, a comprehensive list of all additional workplace health models identified is included. These models were not evaluated in detail due to their lesser influence or empirical application among the reviewed articles, or due to their specific emphasis on health promotion or individual behavioural change.

The third column of the table contains the central concepts for each workplace health model, going beyond the classic terminology of the general stress process (e.g., stressor, appraisal, coping, performance). The five columns on the left side of the table represent our evaluation of the models from the perspective of the PERMA model. We applied as our evaluation criteria the five components of this model (positive emotion, engagement, relationships, meaning, and accomplishments) due to their uniquely robust empirical support gleaned from research data from a broad array of different organisational contexts (Khaw & Kern, 2015). Our in-depth analysis aims to indicate whether a specific workplace health model directly includes or addresses these PERMA model elements. In so doing, we selected in the appropriate cells ‘Yes’ if the original author’s core explanation for the specific workplace health model directly included the respective component. We selected ‘Partly’ if the component was directly included in the description of the model, but in a significantly narrower interpretation than the understanding of the PERMA model. If only the upgraded models included the investigated component, we signalled this in parentheses and for those cases in which a model completely missed a PERMA component or was only indirectly connected to it, our evaluation was indicated as ‘No’.

Our systematic analysis of the selected articles clearly identified the most dominant models related to workplace health in the literature. Two models, the Demand-Control-Support Model (Karasek & Theorell, 1990) and the Effort-Reward Imbalance Model (Siegrist, 1996), often referred to as ‘balance models’ (Bakker & Demerouti, 2006) were proven to be the most widely used, with 21 and 18 cases, respectively. This can be explained by the number of years academic authors had a chance to apply them, just

as with their relative simplicity, which allows for a more general and flexible combinatory utilization in empirical research. Although serious concerns have emerged about the relevance of these models in specific contexts (Bakker & Demerouti, 2006), from the observed academic practice an obvious preference of researchers for the inclusion of these models could be concluded. A frequently followed research approach in workplace health studies is to use one or both popular models, analysing the organizational stress process through these (Szilas, 2019) and supplementing them with some clinical measures of physical or mental health outcomes.

The third most significant model for workplace health according to our analysis is the Job Demands-Resources Framework (Demerouti et al., 2001). The development of this model aimed to correct the shortcomings of the two models mentioned above, explicitly in the area of various resources of coping and health. Dollard and Bakker (2010) continued to broaden this model and created a new model, the Workplace Psychosocial Safety Climate Model (PSC), even more explicitly centred upon organizational policies and procedures and focusing especially on psychosocial risks and a favourable organizational climate. These two models are listed as the third and fourth most frequently applied approaches to explain health in the workplace and are expected to gain popularity over the coming years due to their broader and more positive conceptual construct.

The fifth healthy workplace model in our analysis is the WHO Healthy Workplace Framework (Burton, 2010), which was developed from a distinctively different intellectual origin. At the same time, it is interesting to note, that the date of the first publication of the model is identical with the Workplace Psychosocial Safety Climate Model (Dollard & Bakker, 2010), and there is a significant overlap between the central concepts of the two models (Psychosocial Environment/Risk, Resources and Engagement). The WHO model, however, offers an expanded scope and an improved applicability to the development of pragmatic organizational interventions and health promotion programs (Bencsik, 2022; Gorgenyi-Hegyes et al., 2021; Szabó & Juhász, 2019a; Szabó & Juhász, 2019b).

The Challenge-Hindrance Occupational Stress Model of Cavanaugh et al. (2000) is listed as the sixth most frequently appearing model in our literature research. This fundamentally binary model differs from the “balance” models in its emphasis on an *a priori* differentiation of stressors as challenges or obstacles. The model has been applied in a significant number of empirical studies and received strong criticism suggesting that even the core idea of an *a priori* differentiation of stressors should be avoided (Mazzola & Disselhorst, 2019) due to the highly subjective nature of the stress process and personal assessment (Lazarus & Folkman, 1984).

The next item on our list refers to the category of papers that are identified as affording a central role to Organizational Justice Theory (Greenberg, 1987) or the Equity Theory of Adams (1963). The latter theory is a seminal work in the field of organizational justice research (Szilas, 2011); therefore, we have handled these as one closely re-

lated group of research. This approach can also be considered a ‘balanced model’, however, in contrast to Siegrist’s focus on organizational justice ‘overcommitment’, it emphasizes the importance of a ‘referent other’. Furthermore, the two models have influenced somewhat different groups of academic researchers. The Effort-Rewards Imbalance Model of Siegrist (1996) has gained popularity primarily in the medical and public health literature, whereas Organization Justice Theory has become an important conceptual framework in organizational science (Greenberg, 1987).

The model next in ranking is the Person-Environment Fit Model (French et al., 1982). Although this approach has been an influential model in general stress research and has inspired many academics over the years (Edwards & Cooper, 1990; Edwards et al., 1998), its empirical application lags substantially behind the workplace health models described above. This could be explained mainly by the insufficient explanation of the model given to the dimensions of the person and the environment, which requires the expansion of the framework toward other content theories (Edwards et al., 1998).

The subsequent model in our collection is the Posttraumatic Stress Disorder Model (Norman, 1970) which is a very important conceptual framework centring around a concrete psychiatric diagnosis officially first introduced in 1987 (DSM-III, 1987). The original application of the PSDM is closely related to veterans of the Vietnam War (Norman, 1982). Since it was introduced, this model has been most influential in the literature that examines health in military organizations and professions. The applicability of the model tends to increase to a larger number of social and organizational contexts, focusing more on the consequences of traumatic events than generally on health in organizations (Ehlers & Clark, 1999).

The final workplace health model evaluated in our chart is the Occupational Wellbeing Framework (Milbourn, 2020). This model stands out from the list due to its novelty and congruence with the PERMA model. We see significant potential in this model, even though its application has been limited to Australia and particularly community spaces targeting the elderly (Milbourn, 2020; Vyas & Quental, 2023). A more accurate explanation and operationalization of the model could make this a preferred framework for workplace health researchers who want to include positive psychology principles.

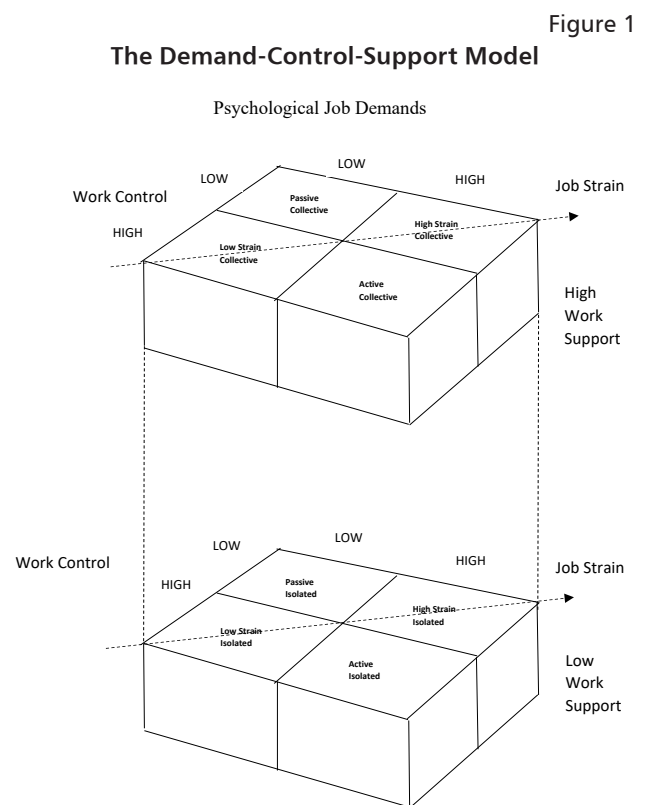
In the next section of our paper, four impactful and empirically significant models of workplace health will be subjected to a more in-depth analysis. We selected the Demand-Control-Support (DCS) model of Karasek and Theorell (1990) and the Effort-Reward Imbalance (ERI) model of Siegrist (1996), since these ‘balance models’ have become the first generation of workplace health models and to date have a global impact. We also selected for detailed analysis the Workplace Psychosocial Safety Climate Model of Dollard and Bakker (2010) and the WHO Healthy Workplace Framework (Burton, 2010) as their influence has increased in recent years and can be considered the

second generation of successful workplace health models, broadening their theoretical constructs towards resources and positive organizational and health outcomes.

Among the most frequently applied theoretical models identified in our literature research, we decided not to include the Job Demands-Resources Framework of (Demerouti et al., 2001) as it is fundamentally an earlier, less advanced version of the Workplace Psychosocial Safety Climate (PSC) Model. In addition, we omitted detailed analysis of the Challenge-Hindrance Occupational Stress Model (Cavanaugh et al., 2000), as the serious conceptual critiques the theory has received does not give this framework a positive outlook for future empirical applications. Besides the visual representation and explanation of the selected four models, we provide a detailed discussion of their relation to the PERMA model elements (Seligman, 2011).

Evaluation of the Job-Demand Control (JDC) and Demand-Control-Support (DCS) Models

The Job-Demand Control Model (JDC) and its improved version, the Demand-Control-Support Model (DCS), were initially introduced in the academic literature by Karasek (1979). Figure 1 presents the DCS model (Karasek & Theorell, 1990; Johnson & Hall, 1998; Karasek et al., 1998) which represents the most frequently used workplace health model.



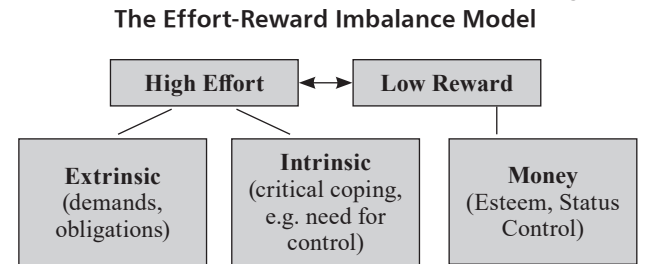
Source: Johnson & Hall (1988, p.1336)

The upgraded three-dimensional model (Johnson & Hall, 1988; Karasek & Theorell, 1990) builds on the main

strength of the ‘balance models’ by placing the focus of investigation on the relationship of three key components characteristic of the work. In this framework, the term *work control* expresses different modes of worker’s decision latitude and autonomy in their job. The level of control of *work* is analysed in combination with the *psychological demands of work* and *work support*, which the authors understand as the level of social support related to work that could be received from both peers and supervisors. The most significant conclusion of empirical research built on this model is that high *psychological job demands* do not automatically result in adverse health consequences. In combination with high levels of *work control* and *work support*, high levels of *psychological job demands* can create favourable conditions for an experience of *eustress* (Selye, 1956). Jobs that carry these characteristics are described as *active collective jobs* in the DCS model and are associated with a significantly reduced risk of negative health outcomes and high potential for personal growth and organizational performance (Johnson & Hall, 1988; Karasek et al., 1998). The relations of key components of the DCS model to the elements of the PERMA model are illustrated in Table 2.

often used in combination with the Demand-Control-Support (DCS) Model (Karasek et al., 1998). The model shows a great amount of similarity to Equity Theory (Adams, 1963) and can be considered as a valuable supplement to the already spacious field of Organizational Justice (OJ) literature (Greenberg, 1987). In Figure 2 the central idea of the model is depicted as originally argued by Siegrist (1996).

Figure 2



Source: Siegrist (1996, p. 30)

The Effort-Reward Imbalance model emphasizes the appearance of job strain out of the perceived and experi-

Table 2

The Demand-Control-Support Model and Elements of PERMA

	Directly related components of the DCS Model	Indirectly related components of the DCS Model	Explanation of connection to elements of PERMA model
<i>Positive Emotion</i>	N.A.	Work Control Social Support	The DCS model does not contain direct references to positive emotion, however, indirectly both the <i>work control</i> component (through an opportunity of focusing on personal interests and compassions) and the <i>social support</i> component (via living through experiences of being cared for) can be associated with it.
<i>Engagement</i>	Work Control Psychological Job Demands	Social Support	The DCS model’s <i>work control</i> and <i>psychological job demands</i> components are very closely and directly related to engagement via the autonomous decisions of workers to choose conditions and characteristics of their job activities most appropriate for their strengths and preferences.
<i>Relationships</i>	Social Support	N.A.	The novel <i>social support</i> component of the DCS model is very closely and directly connected to relationships, especially through feeling supported by supervisors or peers during difficult challenges and frustrations at work.
<i>Meaning</i>	N.A.	N.A.	None of the DCS model’s components strongly emphasize the importance of meaning.
<i>Accomplishments</i>	Psychological Job Demands Work Control	N.A.	Both the <i>psychological job demands</i> and <i>work control</i> components in the DCS model are directly connected to achievement. Positive outcomes, however, are more strongly associated with self-chosen, intrinsic goals.

Source: authors’ compilation

Evaluation of the Effort-Reward Imbalance (ERI) Model

The Effort-Reward Imbalance (ERI) Model (Siegrist, 1996) is the second most frequently applied workplace health model, particularly in the medical literature, but also very

encend imbalance between *effort* (a combination of extrinsic job demands and intrinsic motivation to meet these) and *reward* (which can be understood as compensation, different forms of esteem or attainable status). In cases of high effort meeting low reward in a workplace, the imbalance and lack of reciprocity will create high levels of

arousal and strain and potentially a series of empirically proven negative health consequences (Van Vegchel et al., 2005). The person-specific component introduced by Siegrist (1996) is *overcommitment*, which is defined as an excessively striving attitude towards being approved and esteemed. De Jonge et al. (2000) show that *overcommitment* is capable of functioning as a *moderator* variable, thus increasing the experienced strain resulting from an imbalance between *high effort* and *low reward*. The relations of key components of the ERI model with the elements of the PERMA model are depicted in Table 3.

Evaluation of the Workplace Psychosocial Safety Climate (PSC) Model

The Workplace Psychosocial Safety Climate (PSC) Model (Dollard and Bakker, 2010) can be considered a next-generation workplace health model, although its origins can be traced back to the DCS and ERI models. Demerouti et al. (2001) and Bakker et al. (2003) outline several significant shortcomings of these early ‘balance models’ and propose an intermediate, but empirically often utilized, upgraded model, the Job Demands-Resources (JD-R)

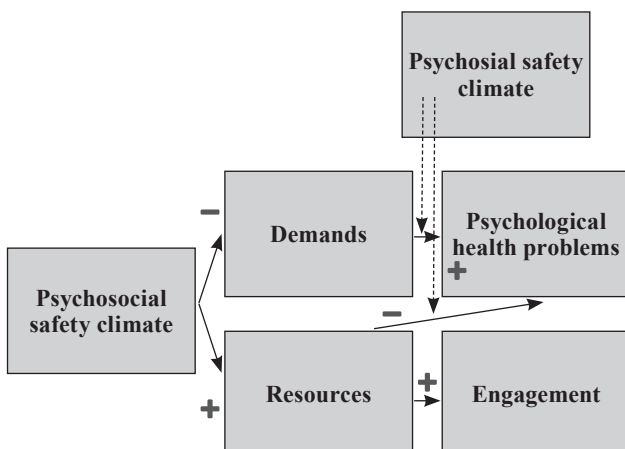
Table 3

The Effort-Reward Imbalance Model and Elements of PERMA

	Directly related components of the ERI Model	Indirectly related components of the ERI Model	Explanation of connection to elements of PERMA model
<i>Positive Emotion</i>	N.A.	Reward Over-commitment (inversely)	The ERI model does not contain direct references to positive emotion, however, indirectly both the <i>reward</i> component and the <i>overcommitment</i> can be associated with this. The model’s emphasis on <i>rewards</i> assumes their dominant role in the development of desired positive emotions. On the other side, <i>overcommitment</i> may contribute to an ill-conceived habituation of excessive attitudes detrimental for positive emotions.
<i>Engagement</i>	High Effort (Intrinsic part) Over-Commitment (inversely)	N.A.	The ERI model’s <i>high effort</i> and <i>overcommitment</i> components are both very closely and directly related to engagement. In particular, the intrinsic part of <i>high effort</i> behaviour can be strongly associated with this. <i>Overcommitment</i> may appear in practice very similar to engagement. However, from a long-term perspective, the underlying psychological needs and emotions make it expressly harmful for both the individual and the organization.
<i>Relationships</i>	N.A.	N.A.	None of the ERI model’s components emphasize strongly the importance of relationships.
<i>Meaning</i>	N.A.	N.A.	None of the ERI model’s components strongly emphasize the importance of meaning.
<i>Accomplishments</i>	High Effort (Intrinsic part) Over-commitment (inversely)	N.A.	The intrinsic part of ERI model’s <i>high effort</i> component can be directly connected to achievement, as intrinsic goals are proven to have a strong correlation with wellbeing. <i>Overcommitment</i> , on the contrary, may function as a long-term unsustainable approach unable to genuinely deliver the desired accomplishments.

Source: authors compilation

Figure 3
The Workplace Psychosocial Safety Climate Model



Source: Dollard and Bakker (2010, p.582.)

model (Demerouti et al., 2001). This development is in line with the principles of positive psychology in focusing on the availability of resources to the individual, which was elevated to a new level with the introduction of the PSC Model. This framework has placed organizational components like safety climate at the heart of the model (Dollard and Bakker, 2010). In Figure 3 we present the PSC model according to the original publication.

The Workplace Psychosocial Safety Climate Model is a framework that aims to broaden the scope of earlier models in the direction of explaining the organizational-level origins of job demands and resources. Therefore, the *psychological safety climate component* (PSC) refers to workplace policies, practices, and procedures that are fundamentally influenced by the “frame of reference” and leadership philosophy of senior management (Dollard & Bakker, 2010). The PSC precedes the components of the work context, such as *job demands* and *resources*, that predict the outcomes of workplace health and employee

participation. *The psychosocial safety climate* is related to perceived freedom from psychosocial risk and harm at work, resulting from the perceived commitment of management to associated values, principles, and practices (Rasmussen et al., 2006, p. 770). The relations of key components of the PSC model with the elements of the PERMA model are depicted in Table 4.

The model defines eight steps that are part of the continual improvement process; however, it does not directly specify recommended values and ethics, as they are considered in this model the explicit representations of the organizational culture. The relations of key components of the WHO model with the elements of the PERMA model are depicted in Table 5.

Table 4

The Workplace Psychosocial Safety Climate Model and Elements of PERMA

	Directly related components of the PSC Model	Indirectly related components of the PSC Model	Explanation of connection to elements of PERMA model
<i>Positive Emotion</i>	Engagement Resources Psychosocial Safety Climate	N.A.	The PSC model contains direct connections to positive emotions via its positive process through <i>resources</i> and <i>engagement</i> and moderated by the component of <i>psychosocial safety climate</i> .
<i>Engagement</i>	Engagement	Resources Psychosocial Safety Climate	The PSC model has an identically named <i>engagement</i> component, which carries approximately the same meaning as in the PERMA model. The engagement component in PSC is influenced by the <i>resources</i> and <i>psychosocial safety climate</i> components as well.
<i>Relationships</i>	Resources	N.A.	The PSC model's <i>resource</i> component includes as a fundamental part the collegial, team and supervisor level support and relationships.
<i>Meaning</i>	N.A.	N.A.	None of the PSC model's components emphasize strongly the importance of meaning.
<i>Accomplishments</i>	N.A.	Resources	The PSC model's <i>resource</i> component includes autonomy and the opportunity for intrinsic goal setting that can be indirectly connected to achievement.

Source: authors' compilation

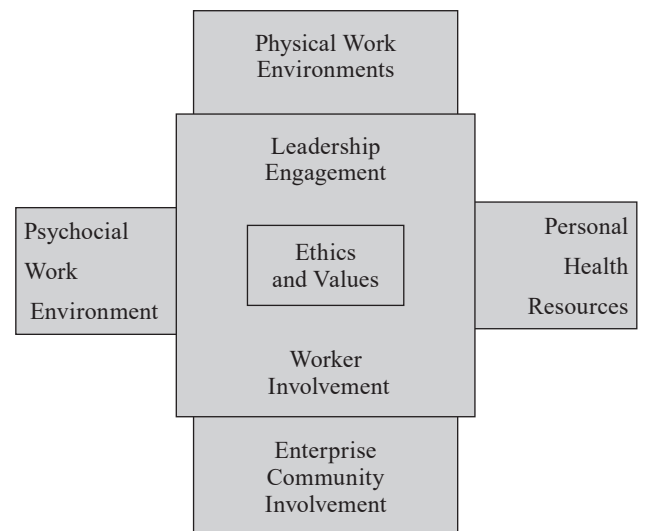
Evaluation of the WHO Healthy Workplace Framework

The WHO Healthy Workplace Framework (Burton, 2010) is one of the most influential next generation models, particularly significant in the development of workplace health promotion programs and to a slightly lesser degree in theoretical conceptualizations of healthy workplaces. Four avenues are distinguished in the model, such as *physical work environment*, *psychosocial work environment*, *enterprise community involvement*, and *personal health resources*. *Ethics and values* are at the heart of the model and are considered important parts of *leadership participation* and *worker involvement*. The model indicates that the creation of a healthy workplace is a continuous improvement process. In Figure 4 we present the original publication authored by Burton (2010) and published by the WHO.

According to the WHO Healthy Workplace Framework, the avenue of personal health resources contains all kinds of workplace health promotion activities (e.g., fitness and wellness opportunities, eating options, medical services). Enterprise community involvement includes all the activities that influence the context in which the company operates (e.g., CSR activities, controlling pollution emissions, encouraging public transportation, and bicycle usage).

Figure 4

The WHO Healthy Workplace Framework



Source: Burton - WHO (2010, p. 98)

Table 5

WHO’s Healthy Workplace Framework and Elements of PERMA

	Directly related components of the WHO Model	Indirectly related components of the WHO Model	Explanation of connection to elements of PERMA model
<i>Positive Emotion</i>	Personal health resources	Worker involvement Psychosocial work environment	The WHO model contains direct connections to positive emotions via its <i>personal health resources</i> component and indirectly through its <i>worker involvement</i> and <i>psychosocial work environment</i> components.
<i>Engagement</i>	Leadership Engagement Worker Involvement	Psychosocial Work Environment	The WHO model’s <i>worker involvement</i> and <i>leadership engagement</i> components directly connect to the element of engagement, and it is also indirectly connected to the component <i>psychosocial work environment</i> .
<i>Relationships</i>	Personal Health Resources	N.A.	The WHO model’s personal health resource component includes the collegial, team and supervisor level support and relationships.
<i>Meaning</i>	Enterprise Community Involvement	Worker Involvement	The WHO model’s <i>enterprise community involvement</i> component directly connects to the element of meaning, whereas the <i>worker involvement</i> component is indirectly associated with it.
<i>Accomplishments</i>	N.A.	Personal Health Resources	The WHO model’s <i>personal health resource</i> component through autonomy and the opportunity for intrinsic goal setting can be indirectly connected to achievement.

Source: authors’ compilation

Conclusion and Introduction of a New Comprehensive Model

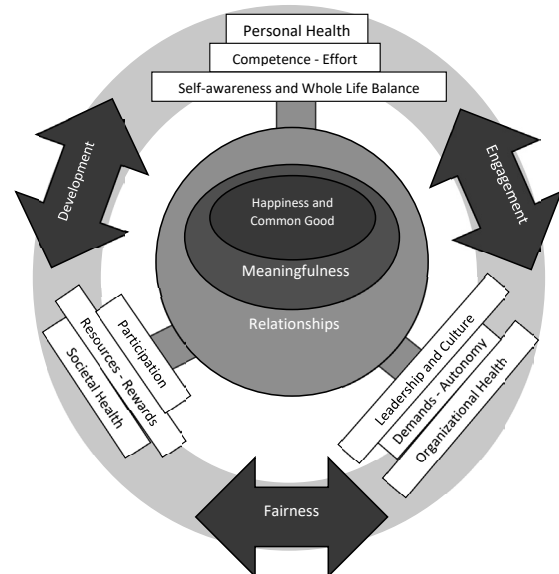
Based on our review of the most dominant healthy workplace models in the academic literature and the detailed evaluation of dominant frameworks from the perspective of positive psychology, we conclude it to be a very meaningful and forward-looking pursuit to advance the connection of these largely reconcilable and supplementary approaches. The large number of diversified models and theoretical constructs restrains advances and successful practical applications. Therefore, a significant number of scholars have attempted to create novel, combinatory or context-specific models; however, only a few of them achieved broad attention and empirical validation.

Under these circumstances, it is difficult to choose between the application of insufficiently fitting theoretical models or the development of a new synthesized model that has a relatively low probability of achieving a strong impact in a diverse scholarly literature. After careful consideration, we decided against existing models and introduce a new model in Figure 5 that incorporates a comprehensive understanding of workplace health and offers prospective users a flexible opportunity for empirical application. It goes beyond the level of theoretical development presented in the Occupational Wellbeing Framework by Milbourn (2020) which provides only a limited explanation of the interconnection between theoretical components and lacks the necessary foundations for designing effective research and measurement methods.

In this final section, we introduce our *Comprehensive Model of Healthy Work and Happiness* (Figure 5). This includes a detailed description of the components of the model and an explanation of the relations between the elements.

Figure 5

Comprehensive Model of Healthy Work and Happiness



Source: developed by Roland Ferenc Szilas

A complex and multidimensional understanding of health (WHO, 2010) creates the basis of the model as a vulnerable resource in a highly interdependent contextual framework. *Organizational (workplace) health* is hardly separable from *personal health* and *societal health*; therefore, the relations of these three components are fundamentally bidirectional as depicted in the two-way arrows in the figure. The arrows also contain in text form the main logic of connection between these health areas. Between the organization and the person, the importance of engagement is highlighted, between the organization and society the

importance of fairness is underlined, and finally between society and the person, the importance of development is emphasized.

Happiness and the *common good* are placed at the centre of the model, in line with the approach of positive psychology and emphasizing even more strongly the eudaimonic nature of this personal and societal purpose. This final aim is placed at the heart of the model and with the help of concentric onion-like shapes the psychological significance of *meaningfulness* is emphasized, while the essentially social nature of the anthropological assumptions is accentuated through the inclusion of *relationships*.

Between the three *health* components (organizational, personal, and societal) and the inner core of the model (*happiness and common good, meaningfulness, and relationships*), three bridge-like shapes create a connection, supplemented by textboxes, which contain the explanations of key dynamics and decisive responsibilities. In the area of *organizational health*, the balance of *demands* and *autonomy* is indicated as the key responsibility of *leadership*, which is mainly achievable by fostering the appropriate organizational *culture*. In the area of *personal health*, the balancing of *competence* and *effort* is depicted as the key responsibility of the individual, fundamentally attainable by a high level of *self-awareness* and *whole-life balance*. In the area of social health, the balance of *resources* and *rewards* is placed as the key responsibility of civil society and political actors, for which the prioritization of the widest range of *participation* is indispensable.

The scope of our research paper does not allow us to present a deeper explanation of this new comprehensive model; however, in the following summary part of the paper, we explain our intent for further empirical research and practical application.

Summary and opportunities for further research and empirical application

Through a fundamentally conceptual and literature-based analysis, we have investigated and evaluated the dominant models in the academic discourse addressing the topic of workplace health. After discussing and clarifying key definitions and concepts, our literature review was limited to English-language articles available in the Scopus database and supplemented with the relevant publications of scholars in the leading Hungarian scientific journals. We have identified and evaluated 94 articles according to their choice and application of workplace health models. We have presented in a summarizing table (Table 1) the ten most influential models, including the related seminal authors and the main conceptual components. We have extended our evaluation of the models to the perspective of positive psychology by analysing their connection to the elements of the PERMA model.

We have selected four models for in-depth analysis, which included a visual illustration and short explanation of these models combined with a more detailed evaluation of how the elements of the PERMA model are related to their specific theoretical components. Our conclusion

has pointed toward the importance of the development of a comprehensive healthy work model to include more robustly the insights of positive psychology and to decrease the limitations of the current conceptual fragmentation. In so doing, we have developed, introduced, and explained a new, *Comprehensive Model of Healthy Work and Happiness* (Figure 5).

This is a prospective model in an early development stage, a basis on which we aim to carry out several qualitative and quantitative research projects in various research contexts. With the help of this article, we hope to win cooperation for this exciting adventure and invite any interested researchers to join our efforts during the empirical validation and theoretical refinement of the model. The creation of widely accessible healthy work is a noble undertaking that requires close cooperation and joint responsibility on a personal, organizational, and societal level. Programs and interventions targeting health-related outcomes head in the right direction if they embrace a comprehensive thinking, and our intention is to guide and support this objective through the presented theoretical model and the empirical research work connected to it.

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