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The concept of a Digital Gap Benchmarking Model for SMEs as a tool for optimizing digitalization processes

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Aim: This study investigates the digital gap in enterprises (particularly SMEs) and introduces the Digital Gap Benchmarking Model as a solution to bridge this gap and enhance their digital transformation processes.

Design / Research methods: The research employs a narrative literature review of studies on enterprise competitiveness within digitalization contexts with predefined inclusion criteria. In addition, based on the concept of the digital gap for SMEs, the authors proposed original concept of a Digital Gap Benchmarking Model as a tool for optimizing the digitalization process in SMEs.

Conclusions/findings: The study identifies the digital gap along three key dimensions: digital potential, digitalization strategy, and position in the digitalization process. Additionally, benchmarking was identified as a key tool to assess and monitor digital transformation progress, helping SMEs close the digital gap and enabling to pinpoint weaknesses and strategically enhance their digital maturity.

Originality/value of the article: While many studies have examined the importance and impact of digital transformation, few have focused on how to assess and bridge the digital gap. This study addresses this gap by identifying the digital gap and proposing the Digital Gap Benchmarking Model as a tool to support SMEs in closing this gap.

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JEL: L20, L21, M15, M21

1. Introduction

Digitalization has become a critical driver of competitiveness and sustainable growth for Small and Medium-sized Enterprises (SMEs). In today's rapidly evolving business landscape - accelerated by technological advancements and the transformative impact of the COVID-19 pandemic - SMEs are increasingly leveraging digital technologies to enhance operational efficiency, innovate business models, and gain competitive advantages. The reorganization of global supply chains, shifts in sourcing strategies, the implementation of remote work, and the expansion of e-commerce services are among the main post-pandemic changes, highlighting the onset of digital transformation in companies (Gorynia, Kuczewska 2023). This transformation extends far beyond the mere adoption of digital technologies, although they play a crucial role in the process (Dethine et al. 2020; Saarikko et.al 2020; Vial 2019). It necessitates fundamental changes in how business processes are perceived and managed, making a digitalization strategy an essential component of a company's overall growth strategy. As digitalization reshapes industries, SMEs need to assess their digital maturity and identify areas for improvement.

Numerous researchers and organizations monitor trends in the development of modern digital technologies that are particularly significant for SMEs. The European Commission (2020, 2021, 2023) has identified three advanced technologies as crucial for Europe's future: the Internet of Things (IoT), Blockchain, and the next-generation Internet. According to the McKinsey report (2023), leading trends include artificial intelligence (AI), cloud technologies, advanced connectivity (5G/6G), blockchain, and immersive reality technologies (VR). Deloitte (2023) similarly identifies trends related to AI, cloud computing, decentralization, and blockchain. Moreover, Wynn and Jones (2022) categorized key technologies using two acronyms: SMAC – Social media, Mobile, Analytics/Big Data, Cloud and BRAID – Blockchain, Robotics,

Automation of knowledge work/artificial intelligence, Internet of Things, and Digital fabrication.

Following Alcácer and Cruz-Machado (2019), digital technologies at the core of the Fourth Industrial Revolution (Industry 4.0) are driving significant organizational changes in companies. These technologies enable firms to gain additional competitive advantages (Gorynia 2009; Kuczewska 2020). Enhanced and rapid communication (Felici et al. 2020) fosters greater collaboration between companies (Stallkamp, Schotter 2021; Dutta et al. 2020), strengthens relationships between businesses and their customers, and ultimately accelerates the internationalization process (Hanell et al. 2020). Moreover, advancements in Big Data analytics (Günther et.al 2017; Hilbert 2016), business intelligence techniques, artificial intelligence (AI) (Nishant et al. 2020) machine learning (ML), automation and robotization, the Internet of Things (IoT) (Radoglou Grammatikis et al. 2019), and blockchain (Rotundu 2022; Albekov et al. 2017) contribute to improving business processes, operations, product design, and manufacturing services (Haddud, Khare 2020; Feliciano-Cestero et al. 2023; Lecerf, Omrani 2020; Liu et al. 2020).

Numerous case studies on digital transformation in SMEs illustrate how these enterprises leverage digital technologies to enhance competitiveness, improve customer experience, achieve sustainable growth, and optimize marketing, sales, and product development processes. Over time, digital technologies have significantly reconfigured their business models, enabling SMEs to evolve from small-scale operations into major market players (Gorynia et al. 2024b; Kuczewska et al. 2023a; Kuczewska et al. 2023b). Nevertheless, while most existing studies have highlighted the importance, scope, and tools of digital transformation, its impact on business operations and constituted a solid theoretical basis from which the concept of the digital gap can be derived (Vial 2019; Wasterman et.al 2014; Matt et.al 2015, 2016; Hess et.al 2020; Kane et.al. 2015, 2017; Bharadwaj et.al 2013; Sebastian et.al. 2017), the issue of how to describe the progress and scope of digital transformation - specifically how to identify and bridge the digital gap - has not been explored in as much depth.

Notably, benchmarking has emerged as a powerful tool in this context, supporting the evaluation and enhancement of operational business processes. By systematically

identifying, learning from, and implementing best practices, benchmarking facilitates continuous improvement and strategic realignment. Previous research has demonstrated that benchmarking not only drives performance optimization but also serves as a catalyst for adapting to dynamic market conditions (Ahmed, Rafiq 1998; Kyrö 2003; Anand, Kodali 2008; Meybodi 2015).

To address this gap, the research aim of this study is to develop the digital gap concept and propose support for enterprises (particularly SMEs) in bridging this gap through the implementation of the Digital Gap Benchmarking Model. Thus, this study attempts to answer the following research questions:

Q1: How can the digital transformation process in SMEs be assessed and how can the digital gap be defined?

Q2: How can SMEs be effectively supported in bridging the digital gap and optimizing digital transformation processes?

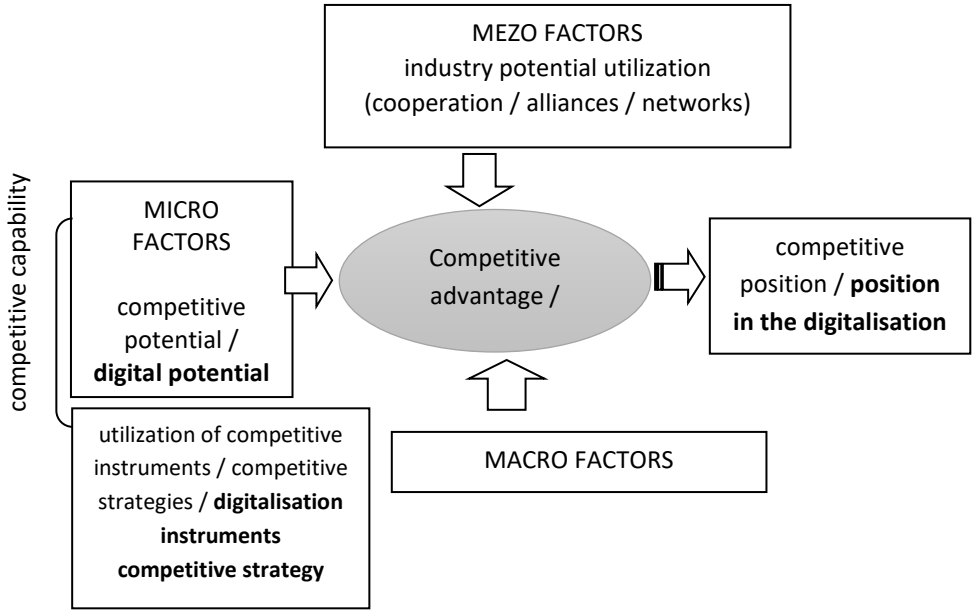
By integrating insights from the literature with empirical evidence, this study endeavours to provide a comprehensive conceptual framework that not only identifies the digital gap along key dimensions: digital potential, digitalization strategy, and position in the digital transformation process, but also demonstrates how benchmarking can support the adoption of best practices to enhance digital maturity and competitiveness.

2. Research methodology – the concept of the digital gap

The presented concept of the digital gap stems from the application of enterprise competitiveness and strategic management concepts, specifically in the context of enterprise digitalization. The starting point of this analysis is the broader concept of a company's competitive strategy, which integrates all aspects of its operations. Adopting this comprehensive perspective on the digital gap helps avoid a common mistake in strategic management – analyzing individual components of a company's activities in isolation. It is essential to recognize that digitalization is not an end in itself, nor the primary goal of a company. Rather, it is a crucial tool for achieving the fundamental objective, which is ensuring the company's survival and long-term prosperity, which is only possible through sustained competitiveness.

Furthermore, it is essential to precisely define the concepts of competitive potential and competitive position. Competitive potential can be understood in both a narrow and a broad sense. In the narrow sense, it encompasses all resources currently utilized or potentially available to an enterprise. In a broader sense, it includes additional elements such as corporate culture, resources, organizational structure, strategic vision, and the enterprise's inherent decision-making approach (strategy formulation process). Competitive position, on the other hand, should be understood as the outcome of the competitive process. It results from the application of a specific competitive strategy (a set of competitive instruments) to a given competitive potential (a set of resources). The most fundamental and concise indicators of an enterprise's competitive position are its market share and financial standing (Fałkowski et al. 2023).

Scheme 1. The concept of enterprise competitiveness versus the concept of the digital gap



Source: Authors' elaboration (Gorynia 2002; Fałkowski et al. 2023; Kuczewska 2020; Gorynia et al. 2024a).

To define and operationalize the concept of the digital gap (Fałkowski et al. 2023; Gorynia et al. 2024a), the concept of the competitive gap was utilized and analogously renamed the digital gap. This allowed for the identification of three dimensions of the digital gap: digital potential (equivalent to competitive potential), position in the digitalization process (equivalent to competitive position), and instruments of digitalization (equivalent to competitive instruments). These dimensions collectively form the digitalization strategy, which refers to the use of digital technologies in SMEs (Scheme 1).

The position in the digitalization process is, in other words, the competitive position of a company within the digital realm, viewed through the lens of the differences (advantages/strengths and gaps/deficits/weaknesses) that emerged as a result of the competitive process in the past. The digital position, as understood in this way, can be described by the following variables:

- the relative profitability (i.e., compared to industry competitors) of digitalization efforts (the ratio of results achieved to the digitization expenditure incurred),
- the scale of digitalization expenditure relative to that of key competitors,
- the level of digitalization costs (relative to major competitors),
- the characteristics of the digital technologies used compared to those of competitors,
- the awareness of the company's digitalization achievements in the market and the associated perception of the company by stakeholders.

Digital potential encompasses a range of factors related to the resources available to a company in the process of digitalization of its operations, while also including a broader set of variables. In this broader sense, a company's digitalization potential consists of the following elements:

- the resources utilized in the digitalization process,
- the company's culture concerning digitalization,
- the integration of digitalization into the company's organizational structure,
- the role of digitalization in the company's strategic vision,
- the company's digitalization behavior (strategy development process).

A company's digitalization strategy arises from the digitalization strategy formulation process. It consists of two sub-processes: the formulation of a strategic vision for digitalization and the implementation of that vision. External and internal factors influence a company's behavior, guiding it either toward a planned course (successful execution of a clear strategic vision for digitalization) or a strategic drift (resulting from either the absence of a clear strategic vision for digitalization or the inability to implement it). The conclusion drawn from these observations is that a company's digitalization strategy can also be considered a type of resource, functioning as an element of the competitive potential of digitalization.

Considering the factors influencing the size of a company's digital potential, both from internal resources and the competitive environment, it is possible to identify the digital gap of SMEs. The scale and dimensions of the digital gap, as well as a company's ability to "bridge" it, determine the long-term, sustainable, and hard-to-replicate digital position of SMEs (Scheme 2).

Scheme 2. Identification of the digital gap in SMEs

Source: Authors' elaboration (Fałkowski et.al 2023).

3. Results: the concept of a Digital Gap Benchmarking Model

Benchmarking is an ongoing process of identifying best practices, learning from them, and applying those practices to achieve optimal performance and sustainable competitive advantage (Kuczewska 2006, 2007). It is a dynamic process of comparing selected areas – or even the overall strategy – of an organization with the best practices achieved by other organizations in the same or completely different sectors (Kuczewska, Morawska 2016). Benchmarking catalyzes change; it is an ongoing, systematic search for and implementation of best practices that lead to optimal performance (Weeks 2019). Moreover, it is a dynamic method that enables continuous improvement in the organization and efficiency of a company's many processes without having to wait for the evaluation of the results achieved (Ahmed, Rafiq 1998; Codling 1998; Kyrö 2003; Anand, Kodali 2008; Meybodi 2015).

Benchmarking can be fundamentally gap into internal and external benchmarking based on the scope and extent of its implementation. Internal benchmarking is confined to a particular company or its networked subsidiaries. In contrast, external benchmarking goes beyond examining an enterprise's organizational structure, allowing the selection of a partner or best practice without restrictions regarding industry, location, or enterprise size (Kuczewska 2007; Codling 1998; Kyrö 2004; Bogan English 2004; Potoczek 2021; Saul et al. 2004 among others). Furthermore, benchmarking can be successfully applied at different levels of competitiveness, facilitating the diagnosis and implementation of best practices that contribute to building competitive advantages. In the context of internal resources and competencies, process benchmarking is most commonly employed; in competitive and location-based environments, competitive benchmarking is applied; and in the macro environment, strategic benchmarking is used (Kuczewska 2020). An analogous benchmarking methodology has been proposed by the European Commission for all three levels of competitiveness research (European Commission 1996): company benchmarking, sectoral benchmarking, and framework conditions benchmarking. This methodology enables the authors of this study to develop a concept of a Digital Gap Benchmarking Model based on a decomposed definition of enterprise competitiveness. Moreover, the contemporary concept of the Fourth Industrial

Revolution (4IR), as presented in The Global Competitiveness Report, emphasizes that competitiveness is not a zero-sum game. Consequently, cross-country comparisons, benchmarking tests, and the search for best practices are well justified (The Global Competitiveness Report 2018). Recent studies indicate the emergence of new benchmarking approaches, such as: competency benchmarking (Maciel, Wallendorf, 2017; Zhang, 2020; Brazinskas et al., 2021), intellectual capital benchmarking (Marti 2000) and network benchmarking (De Toni & Meneghetti 2000; Zagkas, Lyridis 2011; Tsironis, Matthopoulos 2015). Furthermore, the impact of digital technologies on organizational processes, as examined through benchmarking, has been explored in recent years by (Lokuge et al. 2019; Gurbaxani, Dunkle 2019; Härting et al. 2019).

Benchmarking is widely employed by organizations, institutions, and companies worldwide as a tool to support the pursuit of competitive advantages and best practices for optimizing business processes. Self-assessment models based on the EFQM Business Excellence Model – designed to enhance business processes and operations – have been implemented through initiatives such as PROBE (PROmoting Business Excellence) (Kuczewska 2007; PROBE 2025) and Benchmark index (formerly the UK National Benchmarking Index) (Benchmark Index 2025; Pilcher 2000). The Big Four global consulting firms also promote various benchmarking centers. Deloitte's Global Benchmarking Center (GBC) assists clients in assessing their performance relative to their peers and quantifying opportunities for improvement (Deloitte 2015). Ernst & Young's benchmarking analysis provides insights into companies' performance by comparing financial and related data from similar organizations (Ernst & Young 2024). PwC Saratoga's workforce and HR benchmarks offer industry-specific comparisons of turnover, hiring, career progression, productivity, and other parameters (PwC 2024). Lastly, KPMG's benchmarking compares selected financial, market, and operational parameters of a company with those of its competitors (KPMG 2024).

Concepts and models for assessing digital maturity and evaluating the sophistication of a company's digital transformation process have also emerged in the literature. The Maturity Model of Digital Transformation (Ifenthaler, Egloffstein 2019) is designed as a hierarchical model, implemented in educations organizations,

comprising six dimensions: infrastructure, strategy and leadership, organization, employees, culture, and educational technology. The Strategic Enabling Factors Model for Digital Maturity (Salviotti et al. 2019) posits that developing a specific set of digital capabilities leads to higher digital maturity, and organizations with greater digital maturity achieve superior corporate performance. Digital maturity refers to the extent to which organizations systematically prepare themselves to adapt to ongoing digital change. In this model, ten aspects of the value chain framework are used to measure digital maturity. The Sticky Digital Maturity Model 4.0 (Gill, VanBoskirk 2016) was developed to help organizations assess their digital readiness. Its assessment questions address the core capabilities, attitudes, and competencies that characterize a mature digital operation, focusing on three key dimensions: overall digital transformation, digital marketing, and digital business. Additionally, the Open DMAT targets any company seeking a comprehensive self-assessment. The Open DMAT (Digital Maturity Assessment Tool), used by EDIHs, provides results for an individual company without comparison to others (EDIH 2024).

Following a review of the literature (Chang et al. 2011; Gill, VanBoskirk 2016; Salviotti et al. 2019; Ifenthaler, Egloffstein 2019) and drawing on the authors' own expertise, it is possible to identify several critical factors affecting the assessment of the digital gap in SMEs. Consequently, the authors propose a concept of the Digital Gap Benchmarking Model for SMEs. Maturity models can either be descriptive (as-is assessment), prescriptive (to-be assessment) or comparative (benchmarking) (Röglinger et.al 2012). This model is based on a fundamental categorization of digital potential and digitalisation strategy, as well as on the position in the digitalisation process, which is evaluated using input (effort) and output (performance/impact) criteria (EFQM 2025, Uygur, Sümerli 2013; Benchmark Index 2025, PROBE 2025).

This framework enables the assessment of a company's performance and facilitates comparisons with other entities. Thus, our model is a comparative benchmarking model.

Scheme 3. The concept of a Digital Gap Benchmarking Model for SME

<table>
<tr><th colspan="3">DIGITAL POTENTIAL AND DIGITALISATION STRATEGY</th><th colspan="2">POSITION IN THE DIGITALISATION PROCESS</th></tr>
<tr><td>Development of a digitalisation strategy</td><td>The role of digitalisation in the company's strategic vision</td><td>Digital processes</td><td rowspan="2">Profitability compared to industry competitors</td><td rowspan="2">Expenditure on digitalisation</td></tr>
<tr><td>Digital culture</td><td>Digital competencies of employees</td><td>The company's digital resources</td></tr>
<tr><td>Digital organisational structure</td><td colspan="2">Cybersecurity</td><td rowspan="2">Uniqueness of digital technologies used compared to competitors</td><td rowspan="2">Digital success in relation to market trends</td></tr>
<tr><td colspan="2">Collaboration/alliances/ networks</td><td>Organization of supply chains in acquiring digital technologies</td></tr>
<tr><td colspan="3"></td><td>Acceptance and implementation of the digital strategy by employees</td><td>New business models</td></tr>
<tr><td colspan="3">EFFORT</td><td colspan="2">IMPACT / PERFORMANCE</td></tr>
</table>

Source: Authors' elaboration.

Both parts of the model - Digital Potential and Digital Strategy, as well as Digital Position - were defined and operationalized based on the authors' original concept of digital gap (Fałkowski et al. 2023; Gorynia et al. 2024a), the digital maturity research and models presented in the relevant literature (Vial 2019; Salviotti et al. 2019; Wasterman et.al 2014; Uygur, Sümerli 2013; Matt et.al 2015, 2016; Hess et.al 2020; Kane et.al. 2015, 2017; Yilmaz 2021; Rossmann 2018; Bharadwaj et.al 2013; Sebastian et.al. 2017) as well as benchmarking and self-assessment models (Uygur, Sümerli 2013; EFQM 2025; Suárez et.al 2013).

Digital potential and digital strategy

1. The role of digitalisation in the company's strategic vision - top management shared digital vision (Salviotti et al. 2019).
2. Development of digitalisation strategy (top management transformative vision) (Salviotti et al. 2019) - the proper process of developing a digitalisation strategy – support from senior directors, innovative spirit of managers, IT knowledge of managers
3. Digital culture and its acceptance by employees – user participation.
4. Digital organisational structure – the integration of digitalisation into the organisational structure of the company – experience on the information system, strength of information
5. Digital processes – compatibility of digital technologies

6. The company's digital resources – available digital technologies, complexity of IT technologies, advantage of digital technologies
7. Position in the value chain regarding the use of digital technologies
8. Digital competencies of employees – experts in internal technical support, employees expertise knowledge and IT skills
9. Organisation of supply chains in acquiring digital technologies – dependence on digital technology suppliers, support of suppliers
10. Cybersecurity and data protection.
11. Collaboration/alliances/networks with partners/competitors in the implementation of digital technologies – support and efficiency of consultants, competitive pressure, pressure from cooperative partners, customer support.

Digital position

1. Profitability compared to industry competitors – expenditure on the implementation of digital technologies.
2. Expenditure on digitalisation – investment cost vs. profit.
3. Uniqueness of digital technologies used compared to competitors – does the company possess leading technologies, and how compatible are the digital systems?
4. Digital success in relation to market trends.
5. Acceptance and implementation of the digitalisation strategy by employees – engagement in change, openness to acquiring knowledge.
6. New business models – e-commerce, e-delivery, e-procurement.

This is the first stage of our research - the conceptualization of the model. It is essential that maturity model development is conducted with complete transparency and follows a clearly defined methodology. Model evaluation and validation must be thoroughly performed before any transfer or generalization of the model can be considered. In the next phase, we will extend our research to include empirical investigations among SMEs. Based on the model, the next research phase will generate a list of benchmarks on a Likert scale (1–5), enabling companies to assess both the magnitude and direction of the digital gap (i.e., whether there is a negative

or positive gap) through comparisons with other SMEs. This will allow us to validate and refine the proposed model based on real-world data, ensuring its practical relevance and effectiveness across diverse contexts.

4. Concluding remarks

The research aimed to identify the digital gap and propose support for enterprises (particularly SMEs) in bridging this gap through the implementation of the Digital Gap Benchmarking Model. Utilizing the concept of the digital gap, this study addresses the first research question: How can the digital transformation process in SMEs be assessed and how can the digital gap be defined? The presented concept of the digital gap emerges from the application of enterprise competitiveness and strategic management frameworks within the context of enterprise digitalisation. To define and operationalize this concept (Fałkowski et al. 2023), the notion of the competitive gap was repurposed and analogously renamed the digital gap. This approach allowed for the identification of three dimensions: digital potential (equivalent to competitive potential), position in the digitalisation process (equivalent to competitive position), and instruments of digitalisation (equivalent to competitive instruments).

In addition, the authors of this study demonstrated the role and justification for employing benchmarking as a tool to support the assessment of the digital gap and monitor progress in the digital transformation process, thereby addressing the second research question: How can SMEs be effectively supported in bridging the digital gap and optimizing digital transformation processes? The evidence indicates additionally that benchmarking is an effective method for identifying the digital gap and uncovering best practices to bridge it. Defined as an ongoing, systematic process of identifying, learning from, and applying best practices to achieve optimal performance and sustainable competitive advantage (Kuczewska 2006, 2007; Weeks 2019), benchmarking can be applied at various levels: process, competitive, and strategic to facilitate the diagnosis and implementation of best practices (Kuczewska 2020; European Commission 1996). Drawing on the literature (Chang et al. 2011; Gill, VanBoskirk 2016; Salviotti et al. 2019; Ifenthaler, Egloffstein 2019) and the

authors' own expertise, a Digital Gap Benchmarking Model for SMEs is proposed. This model categorizes digital potential, digitalisation strategy, and position in the digitalisation process evaluated using input (effort) and output (performance/impact) criteria to enable performance assessment and comparisons with other entities.

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