

The Impact of Environmental Sustainability and Digitalization on SMEs' Financial Performance

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The complex relationship between sustainability, digitalization, and profitability has received less academic attention, although each of these topics is an important research area on its own. The aim of the research is to understand the effect of environmental sustainability and the usage of management information systems on profitability in the case of SMEs. Based on the answers of 315 SMEs (small and medium-sized enterprises), the article highlights that not all management systems increase profitability. The novelty of the research is that it outlines that the usage of Document Management Systems contributes to profitability while other systems don't, e.g., the usage of Enterprise Resource Planning systems is not significant, which suggests that its introduction and application no longer represent a competitive advantage; this system alone is not enough. There is an ecosystem of management information systems, the basis of which is document management. The research also highlights that focusing on environmental sustainability has no effect on profitability in the case of Hungarian SMEs, neither in the short term nor in the long term. Thus, it is not a competitive advantage.

1. Introduction

Organizational growth has long captivated the attention of researchers, encompassing various dimensions. In recent years, sustainability and digitalization have emerged as popular and trending topics in this field (Bohnsack et al., 2022), while firm performance remains an evergreen subject of interest. Extensive research has been conducted on the utilization of digital business technologies and their advantages for SMEs, e.g., how digital platform capability affects SMEs' financial performance (Cenamor et al., 2019) or what the broader developmental benefits are of using digital technologies (Galindo-Martin et al., 2019). Similarly, the impact of sustainability has been extensively explored (Eccles et al., 2011) and has even been linked to digitalization in previous studies (Szabó et al., 2020). The research areas of sustainability, digitalization, and firm performance hold significant importance and are increasingly relevant in today's context. However, understanding and empirically testing the complex relationship among them is still at an early stage (Broccardo et al., 2023). Previous literature sheds light on how digitalization enhances the firm's sustainability performance and profitability. However, the joint effect of sustainability and digitalization on companies' financial performance has not yet been addressed. The present research fills this gap.

According to previous research (Horváth and Szabó, 2019), SMEs and MNEs start digitalization with different chances and resources, and social responsibility and sustainability practices also differ in the case of SMEs and MNEs (Mousiolis et al., 2015). In this paper, the relationship between the previously mentioned dimensions is investigated in the context of SMEs. The relevance of the research is supported by the fact that the contribution of SMEs is extremely important to the growth of GDP, foreign trade, and job creation. Their competitiveness is of paramount importance both at the national and international levels. More than 99% of enterprises operating in Hungary are small and medium-sized, and SMEs provide employment opportunities for nearly two-thirds of those employed in the business sector (KSH, 2018). Previous research (Szabó et al., 2020) points out that Hungarian SMEs behave similarly in the field of digitalization and sustainability as companies in other countries of the CEE region, which supports the generalizability of the findings.

2. Literature Review

2.1 Sustainability, and its Effect on Financial Performance

Over the past few decades, sustainability has become a 'hot topic'; e.g., there is an emphasis on circular economy and waste management (Ramirez et al., 2023), and the use of renewable energy resources has also increased (Pierro et al., 2023). The importance of corporate sustainability in business has grown significantly, too. However, it is a question of whether investing in sustainability really pays off or whether companies follow these practices for other – e.g., ethical – reasons. Recent trends indicate that focusing solely on short-term profit maximization is no longer sufficient. Instead, businesses must consider broader human and environmental aspects to remain competitive (Eccles et al., 2012). Consequently, companies are increasingly recognizing the value of integrating environmental and social considerations as contributors to financial performance. Although there is usually a trade-off between profit and the aspiration for reducing the ecological footprint, recent articles suggest that it is possible to create a Pareto-optimal solution (Alberti and Garrido, 2017) and optimize for the economic and environmental performance at the same time (Ahmed et al., 2021).

Presently, digital environments have become essential tools for sustainability communication, with corporate websites - often with dedicated sections addressing corporate social responsibility matters (Dade and Hassenzahl, 2013) - playing a crucial and fundamental role in this regard (Siano et al., 2016). However, it is a question whether sustainability communication on websites gives a real competitive advantage, being reflected in SMEs' financial performance. *H1a: SMEs that communicate environmental sustainability on their website are more likely to have better financial performance.*

Research shows that companies focusing on sustainability can significantly outperform those competitors that do not adopt sustainability policies in terms of stock market and financial aspects, e.g., return on assets and return on equity (Eccles et al., 2011). Adopting "green" as a main part of the business can contribute to reducing (manufacturing) costs, improving market performance, gaining a competitive advantage (Danso et al., 2019), and raising the company's value (Anggraini and Tanjung, 2020). Initially, it may require some investment; however, in the long term, it could lead to a competitive advantage and increased profitability (Saxena et al., 2021). *H1b: SMEs that have a core activity related to environmental sustainability/or have environmental sustainability practices integrated into their respective core activities are more likely to have better financial performance.*

A significant body of literature examines quality certifications in connection with sustainability. ISO 14001 is recognized as the foremost Environmental Management International Standard (Fonseca et al., 2021). Emphasizing the pursuit of enhanced environmental performance beyond mere legal compliance, ISO 14001 (ISO, 2023) advocates systematic identification and management of environmental aspects, encompassing waste reduction, emissions control, resource conservation, and responsiveness to stakeholder expectations (Fonseca, 2015). Notably, ISO 14001 aligns with the environmental dimension of sustainable development (Fonseca et al., 2021). The integration of ISO 14001 principles can result in more streamlined processes, contributing to cost reductions and improved organizational performance (Fonseca et al., 2021). *H1c: SMEs that have an ISO 14001 certification are more likely to have a better financial performance.*

2.2 Digitalization and its Effect on Financial Performance

Digitalization is necessary, but which system is worth it? Many arguments can be listed, highlighting the advantages of each system. However, the main question is what the "yield" of digitalization really is; does it have any effect on the company's financial performance? New categories of management information systems are appearing constantly. Together, they form the management information systems 4.0 ecosystem, which significantly exceeds the classical ERP concept. Which systems do make up the ecosystem, and how do they contribute to the company's financial performance? The current research examines the most significant ones, namely, ERP (enterprise resource planning), CRM (customer relationship management), DMS (document management system), WF (workflow), BI (business intelligence), and SR (software robots).

The correlation between digitalization and firm performance is a subject of interest for both scholars (Caputo et al., 2019) and practitioners (McKinsey and Company, 2019). The utilization of different digital technologies can have both direct and indirect impacts on the financial and operational performance of SMEs, leading to a distinct efficiency advantage (Tarutė and Gatautis, 2014). E.g., ERP collects, stores, manages, processes, and interprets the data generated and enables them to be accessed in real time. CRM is a strategy that includes all of a company's interactions with potential and existing customers, including all related data and workflows and the automation of repetitive tasks. DMS is used for the creation and storage of documents (and related metadata); it facilitates the structuring and optimization of documents and the proper searchability of data. It greatly contributes to the reduction of transaction costs and improves the efficiency of information exchange between the company and its customers, suppliers, and partners. WF enables the electronic management, registration and coordination of individual work phases. The importance of workflow and process management

technologies is increasing nowadays, as cooperation between geographically distant people and computer systems is needed. BI is a set of methods that improve the decision-making process using fact-based systems. SRs are suitable for automating processes that can be standardized in the case of often repetitive, monotonous – often office – activities. The aforementioned digital systems improve the efficiency and effectiveness of companies (Björkdahl, 2020), help to make operations transparent, and facilitate the effective monitoring of tasks, documents, and processes. They also enable employees to engage in higher value-added activities and create more value. Regarding operational efficiency, digital resources can reduce transaction costs and production expenses (Mithas and Rust, 2016), leading to improved internal efficiency through better organizational practices and workflows (Trittin-Ulbrich et al., 2021). Furthermore, digitalization allows businesses to collect and analyze data, resulting in improved consumer experiences and the ability to predict consumption and behavioral patterns (Morgan-Thomas et al., 2020). Additionally, it helps companies gain economies of scope (Adner et al., 2019). However, according to McKinsey and Company (2019) and Mithas and Rust (2016), guaranteed profits from digitalization are not assured. This is due to the “dark sides” of digitalization (Dąbrowska et al., 2022), which have a negative effect on firm performance (Cappa et al., 2021). These refer to the complexity and coordination costs (Dąbrowska et al., 2022) and risks associated with digitalization (Trittin-Ulbrich et al., 2021). In general, the combined impact of the positive and negative aspects of digitalization on firms’ financial performance is not fully understood yet (Dąbrowska et al., 2022). The following hypotheses were formulated: *H2: SMEs that use digital systems (H2a: BI, H2b: ERP, H2c: CRM, H2d: WF, H2e: DMS, H2f: SR) more likely to have a better financial performance.*

3. Methodology

3.1 Sample Characteristics

Our objective was to investigate hypotheses and explore relationships between various phenomena. To achieve this, we used a quantitative survey, resulting in 335 valid responses. According to the definitions provided by the European Commission (2021), the breakdown of companies participating in the survey was as follows: 5.9 % (20) of companies included were classified as large enterprises, 19.1 % (64) as medium-sized enterprises, 60.3 % (202) as small enterprises, and 14.6 % (49) as micro-enterprises. In alignment with the focus of our research, we focused on a sample of 315 micro, small, and medium-sized enterprises (referred to as SMEs), while excluding large enterprises from the study.

3.2 Measures

Dependent variable: financial performance, measured by pretax profit margin (profit before tax divided by turnover).

Independent variables:

Sustainability was measured by three dichotomous variables, according to previous literature:

- Is environmental sustainability communicated on the website? (Dade et al., 2013; Siano et al., 2016)
- Is the core activity of the company related to environmental sustainability? (Arora and De, 2020)
- Does the company have the ISO 14001 certificate? (García-Ouvedo et al., 2019)

The current research focuses on environmental sustainability. Thus, out of the 17 sustainable development goals, clean water and sanitation (6), affordable and clean energy (7), climate action (13), life below water (14) and life on land (15) were considered.

Digitalization was measured by digital system usage (“Which of the following systems and solutions does your company use?”). The research focuses on office digitalization. Thus, BI, ERP, CRM, WF, DMS, and SR were included. Participants had three options to choose from (None/ A domestically developed system / A system developed abroad). Following descriptive statistics, we proceeded to recode the data by creating a binary variable (the company either uses the given digital system or not).

Control variables: firm size, measured by turnover and staff headcount (Broccardo et al., 2023).

Once the database was compiled and cleaned, and variables were coded, the relevant sample of companies, namely SMEs, were filtered. Subsequently, linear regression was employed to examine the hypotheses. The data filtering and analysis processes were carried out using IBM Statistical Package for Social Sciences (SPSS) 27.0 software.

4. Results

Linear regression analysis with enter method was applied to examine which variables influence companies’ financial performance. The effect of sustainability, digitalization and the control variables on companies’ financial performance was analyzed. A complex model, containing all items, was also created. All models are significant ($p < 0.001$).

Table 1: The effect of sustainability, digitalization and control variables on SMEs' financial performance

Items	Model 1	Model 2	Model 3	Model 4	Hypothesis	Decision
<u>Sustainability items</u>						
Communicating environmental sustainability on corporate website	0.147*			0.018	H1a	reject
The core activity of the company is related to environmental sustainability	0.084			0.028	H1b	reject
ISO 14001 certificate	0.177**			0.072	H1c	reject
<u>Digitalization items</u>						
BI		0.094		0.099	H2a	reject
ERP		0.124		0.088	H2b	reject
CRM		0.023		0.044	H2c	reject
WF		0.020		0.002	H2d	reject
DMS		0.393***		0.353***	H2e	accept
SR		-0.053		-0.051	H2f	reject
<u>Control variables</u>						
Turnover (thousand HUF)			0.032	-0.730	-	-
Staff headcount			0.356***	0.098	-	-
Adjusted R ²	0.097	0.278	0.138	0.281		

* The value is significant at the $p < 0.05$ level.
 ** The value is significant at the $p < 0.01$ level.
 *** The value is significant at the $p < 0.001$ level.

Source: Own edition based on survey data

The final model (Model 4) suggests that the usage of DMS ($\beta=0.353$ and $p<0.001$) is a significant predictor of a company's financial performance in a positive way. According to the results of Model 4, only the following hypothesis was accepted: H2e: SMEs that use DMS are more likely to have a better financial performance. In line with this, the final research model is the following (Figure 1).

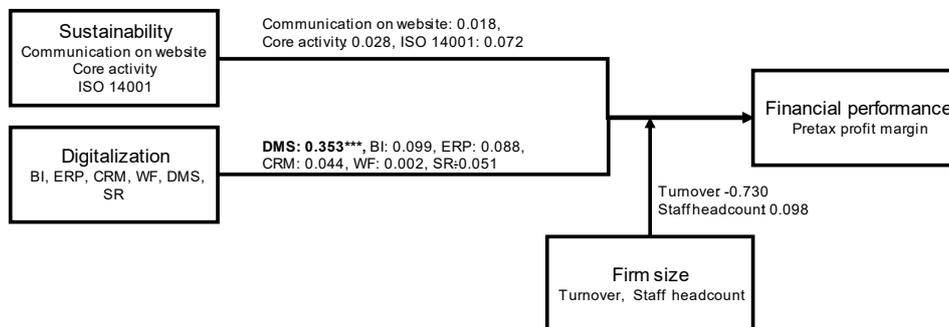


Figure 1: Final research model, source: own edition

5. Discussion

The results show that DMS contributes significantly to the company's financial performance, i.e., it creates clear efficiency gains. Document management encompasses the entire operation of the company. Documents represent the administrative operation of the company, and if these documents are properly managed, well connected and organized into a system, the efficiency of the organization is greatly improved. According to the analysis, ERP is not significant, which suggests that "the time has passed over this system"; its introduction and application no longer represent a competitive advantage; this system alone is not enough. Nowadays, ERP is not what enterprise management is all about and CRM is not what customer management is all about: they can only capture a part of the complex task. We can talk about an ecosystem, the basis of which is document management. BI, WF and SR are not yet widespread enough. They are currently in the "investment phase", thus, they do not have a clear effect on SMEs' financial performance. These systems' present role is small, but according to our expectations, this will change greatly the upcoming years. In order to achieve this, it is essential that the company's document management is appropriate. The research also emphasizes that not just for large companies but even for SMEs, digitalization - especially the introduction of a DMS - can bring many advantages.

In order to create a customized digital solution that meets individual needs, the first step is to create an organizational and digital maturity audit. The "transition" can be successful if we first map – and if necessary, improve - the company's specifics and adapt the digital solutions to them. In order to achieve this effectively, it is essential to involve external experts. Previous research suggests that focusing on (environmental) sustainability can create a competitive advantage in the long term. In contrast to this, the present analysis – by using a Hungarian SME sample - shows that it does not contribute to the financial performance of firms, neither in the short term (represented by the item "Communicating environmental sustainability on corporate website"), nor in the medium term (represented by the item "ISO 14001 certificate"), nor in the long term (represented by the item "The core activity of the company is related to environmental sustainability"). The research points out that the size (measured by turnover and staff headcount) of SMEs do not influence the model, which suggests that in this size range, managers think similarly, and they behave much more like entrepreneurs than professional managers. However, we only researched SMEs; we suppose that the practice of MNEs and large corporations is different.

6. Conclusions

The paper addresses a research gap by investigating the complex relationship between digitalization, sustainability, and financial performance in the case of Hungarian SMEs. According to previous research, Hungarian SMEs behave similarly in the field of digitalization and sustainability as companies in other countries of the CEE region, which supports the generalizability of the findings. By relying on the data of 315 SMEs, the article points out that digitalization positively affects companies' financial performance, while the contribution of sustainability is not proven. An important value of the research is that it distinguishes between different digital systems according to their contribution to financial performance, which gives clear guidelines to practitioners on what type of system they should invest in. The analysis could not prove the importance of investments in sustainability issues from a financial point of view. Further examination is recommended by taking into account different contexts. It is also a future research direction to investigate what other – if not financial - reasons (e.g., ethical aspects) motivate companies to focus on and invest in sustainability.

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References

- Adner R., Puranam P., Zhu F., 2019, What is different about digital strategy? From quantitative to qualitative change. *Strategy Science*, 4, 253–26.
- Ahmed R.O., Al-Mohannadi D.M. Linke P., 2021, Multi-objective resource integration for sustainable industrial clusters. *Journal of Cleaner Production*, 316, 128237.
- Alberti F.G., Garrido M.A.V., 2017, Can profit and sustainability goals co-exist? New business models for hybrid firms. *Journal of Business Strategy*, 38, 3-13.
- Anggraini D., Tanjung P.R.S., 2020, Company Value: Disclosure Implications of Sustainable Supply Chain, Profitability and Industrial Profile. *Int. J Sup. Chain. Mgt*, 9, 648-655.
- Arora P., De P., 2020, Environmental sustainability practices and exports: The interplay of strategy and institutions in Latin America. *Journal of World Business*, 55, 1-13.
- Björkdahl J., 2020, Strategies for digitalization in manufacturing firms. *California Management Review*, 62, 17–36.
- Bohnsack R., Bidmon C.M., Pinkse J., 2022, Sustainability in the digital age: Intended and unintended consequences of digital technologies for sustainable development. *Business Strategy and the Environment*, 31, 599-602.
- Broccardo L., Truant E., Dana L.-P., 2023, The interlink between digitalization, sustainability, and performance: An Italian context. *Journal of Business Research*, 158, 113621.
- Cappa F., Oriani R., Peruffo E., McCarthy I., 2021, Big data for creating and capturing value in the digitalized environment: Unpacking the effects of volume, variety, and veracity on firm performance. *Journal of Product Innovation Management*, 38, 49–67.
- Caputo F., Cillo V., Candelo E., Liu Y., 2019, Innovating through digital revolution: The role of soft skills and Big Data in increasing firm performance. *Management Decision*, 57, 2032–2051.

- Cenamora J., Parida V., Wincent J., 2019, How entrepreneurial SMEs compete through digital platforms: The roles of digital platform capability, network capability and ambidexterity. *Journal of Business Research*, 196-206.
- Dąbrowska J., Almpantopoulou A., Brem A., Chesbrough H., Cucino V., Di Minin A., Giones F., Hakala H., Marullo C., Mention A.-L., Mortara L., Nørskov S., Nylund P.A., Oddo C.M., Radziwon A., Ritala P., 2022, Digital transformation, for better or worse: A critical multi-level research agenda. *R&D Management*, 52, 930-954.
- Dade A., Hassenzahl D.M., 2013, Communicating sustainability: A content analysis of website communications in the United States. *International Journal of Sustainability in Higher Education*, 14, 254-263.
- Danso A., Adomako S., Amankwah-Amoah J., Owusu-Agyei S., Konadu R., 2019, Environmental sustainability orientation, competitive strategy and financial performance. *Business Strategy and the Environment*, 28, 885-895.
- Eccles R.G., Ioannou I., Serafeim G., 2011, The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, 60, 2835-2857.
- Eccles R., Perkins K.M., Serafeim G., 2012, How to Become a Sustainable Company. *MIT Sloan Management Review*, 53, 43-50.
- European Commission, 2021, Internal Market, Industry, Entrepreneurship and SMEs. <ec.europa.eu/growth/smes/sme-definition_en>, accessed 15.05.2023.
- Fonseca L., 2015, ISO 14001:2015 an improved tool for sustainability. *Journal Industrial Engineering and Management*, 8, 37-50.
- Fonseca L., Silva V., Sá J.C., Lima V., Santos G., Silva R.B., 2021, Corp versus ISO 9001 and 14001 certifications: Aligned, or alternative paths, towards sustainable development? *Corporate Social Responsibility and Environmental Management*, 29, 496-508.
- Galindo-Martín M.-Á., Castaño-Martínez M.-S., Méndez-Picazo M.-T., 2019, Digital transformation, digital dividends and entrepreneurship: A quantitative analysis. *Journal of Business Research*, 101, 522-527.
- García-Quvedo J., Kesidou E., Martínez-Ros E., 2019, Driving sectoral sustainability via the diffusion of organizational eco-innovations. *Business Strategy and the Environment*, 29, 1437-1447.
- Horváth D., Szabó R.Z., 2019, Driving forces and barriers of Industry 4.0: Do multinational and small and medium-sized companies have equal opportunities? *Technological Forecasting and Social Change*, 146, 119-132.
- ISO, 2023, ISO 14001 and related standards - Environmental management. International Organization for Standardization, <iso.org/iso-14001-environmental-management.html>, accessed 27.09.2023.
- KSH, 2018, Characteristics of small and medium-sized enterprises. (in Hungarian), Hungarian Central Statistical Office, <ksh.hu/docs/hun/xftp/idoszaki/pdf/kkv18.pdf>, accessed 25.09.2023.
- McKinsey & Company, 2019, Digital transformation: Improving the odds of success. <mckinsey.com/business-functions/mckinsey-digital/our-insights/>, accessed 13.07.2023.
- Mithas S., Rust R.T., 2016, How information technology strategy and investments influence firm performance. *MIS Quarterly*, 40, 223-246.
- Morgan-Thomas A., Dessart L., Veloutsou C., 2020, Digital ecosystem and consumer engagement: A socio-technical perspective. *Journal of Business Research*, 121, 713-723.
- Mousiolis D.T., Zaridis A.D., Karamanis K., Rontogianni A., 2015, Corporate Social Responsibility in SMEs and MNEs, The Different Strategic Decision Making. *Procedia - Social and Behavioral Sciences*, 175, 579 - 583.
- Pierro N., Giuliano A., Giocoli A., Barletta D., De Bari I., 2023, Process Design of the Biogas upgrading to Biomethane using Green Hydrogen. *Chemical Engineering Transactions*, 100, 7-12.
- Ramirez V.N.J., Gonzales Z.I.O., Lizaraburu-Aguinaga D., Curo F.M., Pérez H.R., Benites-Alfaro E., 2023, Circular Economy: Use of Fruit Waste to Obtain Bioplastics. *Chemical Engineering Transactions*, 100, 103-108.
- Saxena K., Balani S., Srivastava P., 2021, The relationship among corporate social responsibility, sustainability and organizational performance in pharmaceutical sector: a literature review. *International Journal of Pharmaceutical and Healthcare Marketing*, 15, 572-597.
- Siano, A., Conte, F., Amabile, S., Voller, A., Piciocchi, P., 2016, Communicating Sustainability: An Operational Model for Evaluating Corporate Websites. *Sustainability*, 8(9), 950.
- Szabó R.Z., Vuksanović Herceg I., Hanák R., Hortoványi L., Romanová A., Mocan M., Djuričin D., 2020, Industry 4.0 Implementation in B2B Companies: Cross-Country Empirical Evidence on Digital Transformation in the CEE Region. *Sustainability*, 12, 9538.
- Tarutė A., Gatautis R., 2014, ICT Impact on SMEs Performance. *Procedia - Social and Behavioral Sciences*, 110, 1218-1225.
- Trittin-Ulbrich H., Scherer A.G., Munro I., Whelan G., 2021, Exploring the dark and unexpected sides of digitalization: Toward a critical agenda. *Organization*, 28, 8-25.