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Digital Maturity and Digital Transformation Strategy among Greek Small and Medium Enterprises

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Abstract: The proposed study aims to investigate the digital transformation of Greek small and medium enterprises (SMEs), with a particular focus on their digital maturity and the strategic and organizational factors contributing to digital transformation. The research issue of digital transformation has been attracting considerable interest among academics and business practicians since COVID-19 accelerated the procedure of implementing Industry 4.0 principles all over global economies. Quantitative research on 147 Greek SMEs revealed the most important issues on how these businesses implement digital transformation, factors accelerating or decelerating the process, barriers and expected outcomes. The results indicate that digital maturity, digital transformation strategy and digital business models are strongly interconnected, while the main barriers of successfully implementing them is a lack of funding, cultural issues and the management's engagement with the whole procedure. Greek SMEs are regarding digital transformation as a part of their customers' satisfaction rather than as a holistic procedure of reshaping their operation. In almost 20% of Greek SMEs, there is no person who is responsible for the digital transformation procedure, while key drivers are suppliers and customers rather than competitors and the government. The results can be valuable for stakeholders who are enabled to the digital transformation process from both the business and academic points of view, while there exist aspects that can contribute to policy makers/motivation developers on the state's level as well.

Keywords: digital transformation; small and medium enterprises; SMEs; Greece; quantitative research; digital maturity; factors of digital transformation

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1. Introduction

Until recently, the research literature on Greek SMEs mainly concentrated on external economic shocks, such as the financial crisis of 2008 (Cucculelli and Peruzzi 2020). However, it only recently became clear that a "green and digital agenda" is crucial since natural disasters (earthquakes, fires, etc.) or incidents such as the COVID-19 pandemic have severe impacts on business activity. Due to its uniqueness, the current crisis has already been characterized as a black swan event for entrepreneurship (Cowling et al. 2020), resulting in substantial changes in business, lifestyle, culture and the social interactions of entrepreneurs (Ratten 2020) and strongly affecting the access to finance and the survival of SMEs (Brown et al. 2020).

SMEs tend to be more vulnerable than large companies in exogenous shocks that put markets at risk due to a lack of resources, known as the liability of smallness (Eggers 2020). Under such circumstances, SMEs, for years and years after the shock, are reluctant to invest their limited resources in innovative projects with uncertain outcomes (Lee et al. 2015) or

in other activities that will increase their financial leverage (Thorgren and Williams 2020). On the other hand, small firms, who know their customers' needs better, may develop the ability to recognize, evaluate and exploit opportunities in times of crisis (Beliaeva et al. 2020) and/or the flexibility to respond successfully to any crisis using valuable information based on the close relationships between customers and managers/owners (Eggers 2020).

Such a condition led the Industry 4.0 framework to reshape from a pure technological orientation (Baur and Wee 2015) to a more business- and human-centered orientation (Kargas et al. 2022a) where intangible business assets are recognized as significant pillars of development (Gkika et al. 2022). That is why digital transformation passed from manufacturing and mass production to less traditional economic activities, such as the ones that most SMEs are involved in (Kargas and Varoutas 2020).

Researchers should take into account that the manufacturing sector is less advanced in smaller economies, a fact that decelerates the implementation of Industry 4.0 technologies in other sectors and deprives the development of a possible competitive advantage at a macro level of analysis (Laitsou et al. 2020). The SMEs in these countries belong to economic sectors with unique characteristics. Limited resources, financial pressure and the absence of IT departments make it even more difficult for SMEs to meet the requirements (Fenton et al. 2019).

The proposed research aims to contribute to the evaluation of the digital transformation progress in Greek SMEs as a source for sustainable development in the global economic environment and as an opportunity to develop innovation.

A quantitative research methodology was adopted, and a self-administered questionnaire was used to collect data from a sample of 147 SMEs across various industries in Greece. The results revealed a moderate level of digital maturity among Greek SMEs, with considerable variation across the sample. The most digitally mature businesses were found to have invested significantly in strategic planning and organizational alignment, which underscored the importance of these factors in successful digital transformation. In terms of technology, the study found that Greek SMEs are primarily utilizing cloud services, mobile technologies and social media for their digital transformation efforts. Yet, emerging technologies such as Artificial Intelligence, Big Data analytics and the Internet of Things were also identified as increasingly influential.

This study contributes to enlightening new eras of business development for Greek SMEs by exploiting arising digital transformation opportunities. The results indicate that while Greek SMEs are making notable strides in their digital transformation journeys, there is still space for improvements. Businesses should continue to invest in strategic and organizational factors to boost their digital maturity. Embracing a wider range of digital technologies, including emerging ones, could also provide significant benefits. The findings of this study contribute to a deeper understanding of the digital transformation process in Greek SMEs, offering valuable insights for businesses and policy makers.

2. Literature Review

Digital transformation is related to the implementation of digital technologies in order to expand existing business models, to transform organizational structures, to alternate how resources are used and to reevaluate relationships with stakeholders (Brynjolfsson and Hitt 2000; Frank et al. 2019; Loebbecke and Picot 2015; Vial 2019). The concept has gained research interest over the years since various sectors started to enter the Industry 4.0 era. These sectors included the service industry (Diener and Špaček 2021), manufacturing (Llopis-Albert et al. 2021), the healthcare sector (Ricciardi et al. 2019) and education (Jackson 2019). Most studies investigated the relationship between digital transformation and organizational success parameters, such as innovation (Appio et al. 2021), efficiency (Gebayew et al. 2018; Kraus et al. 2021), competitive advantage (Cahyadi 2020), value creation for customers (Wolpert and Roth 2020), quick decisions regarding customers and competitors (Corso et al. 2018), cost reduction (Saini 2018), etc.

Even though academic research provides strong enough evidence of the positive effects of implementing digital transformation, businesses still face difficulties and uncertainties, since the implementation is complex and costly (Matt et al. 2015). Most significantly, it requires changes since it involves designing new processes, creating new tasks, developing new business models (Reis et al. 2018), integrating new technologies (Chaparro-Peláez et al. 2020; Loske and Klumpp 2022) and cultivating new collaboration and digital cultures (Krasonikolakis et al. 2020), even leading to new performance measures (Allen 2019; Nadkarni and Prügl 2021). However, not all enterprises or sectors have adopted digital transformation (e.g., SMEs) due to investment difficulties and a lack of effective business models (Filotto et al. 2021).

Digital transformation rose as a result of both internal and external business factors (Bulovic and Covic 2020). As far as internal factors are concerned, it includes, among others, transforming processes to compete globally and increase competitiveness (Helmy et al. 2017), increasing innovativeness, expanding research and development, increasing business value (Kane et al. 2015) and recruiting/developing talented employees (White 2012). Moreover, issues such as organizational culture and climate can also contribute to organizational change towards the digital era (Isensee et al. 2020), while agility seems to enhance new forms of strategic management (Kargas and Aretos 2023; Troise et al. 2022). All of these seem to be strongly related with the overall strategic orientation that a company has and, of course, with the digital transformation methodology that is implemented in the internal process and the operation as a whole (Pelletier and Cloutier 2019).

Moreover, a series of external factors are reshaping the concept of digital transformation. Such factors include product/service personalization according to customers' needs (Von Leipzig et al. 2017), a work force's new skills (Kargas et al. 2022b), new technologies (e.g., Artificial Intelligence, Augmented and Virtual Reality, Blockchain, Robotics, etc.), reshaping operations and business models (Helmy et al. 2017; Kargas and Loumos 2023) and big data analytics that provide new business opportunities and business models (Kostakis and Kargas 2021; Reinsel et al. 2018).

COVID-19 was another external factor, and a more recent one, that affected all kinds of economic and business activities worldwide (Goodell 2020), including SMEs as well (Greene and Rosiello 2020). Even though the business community was initially shocked by COVID-19's consequences, it soon enough faced the whole situation as an opportunity (Beliaeva et al. 2020), accelerating businesses' digital transformation. By digitally transforming their operations, SMEs achieved organizational efficiency, cost savings, competitive advantages and internationalization, ensuring their viability and growth even under pandemic crisis circumstances (Fauzi and Sheng 2022). Most significantly, the SMEs realized during the COVID-19 period that digital transformation is a strategic priority for long-term viability and growth and should not be regarded as a luxury that is required occasionally under crisis conditions (Donthu and Gustafsson 2020).

Such a framework increased the research on the relationship between digital transformation and SMEs. Teng et al. (2022) conducted qualitative research on the impacts of digital technology, employees' digital skills and digital transformation strategies on SMEs. Moreover, the researchers gathered data from Chinese enterprises in order to assess the impact of digital transformation on financial performance. Their results provide evidence that digital transformation is positively related to performance and mediate the effects of digital transformation strategies on performance (Teng et al. 2022).

Another study (Scuotto et al. 2021) conducted research on a total of 2,156,360 European SMEs to investigate the relationship between individuals' digital capabilities and SMEs' digitalization growth and innovation. Internal digital capabilities have proven to be of high significance so that businesses can respond quickly to market changes and to tackle complex digital transformation tasks. The results indicate that recruiting employees who are digitally literate can be a competitive advantage.

In a more specific study, Alraja et al. (2021) concentrated on how leaders affect digital transformation when it comes to technological, organizational and environmental

decisions. With a sample of more than 60 SME leaders, they concluded that all of the above-mentioned factors are of high importance when it comes to the ability of SMEs to digitize their business processes (Alraja et al. 2021). In a more quantitative analysis, Isensee et al. (2020) studied the digital transformation of SMEs and its relationship with organizational culture and sustainability. By analyzing data from more than 800 research papers on the topic, they revealed that SMEs' digital transformations are directly affected by the SMEs' (a) strategic orientation, (b) internal capabilities, (c) management and (d) attitudes on the subject (Isensee et al. 2020).

A series of other studies (Gaweł et al. 2023; Westerlund 2020) put emphasis on the relationship between the digitalization of SMEs and their internationalization. Their perspective of research varies from understanding how native digital SMEs internationalize their operations to how non-digital SMEs can internationalize through a digital transformation procedure. The results can provide helpful insights into how digitalization can facilitate internationalization and moreover reveal differences between native digital and non-digital SMEs. As far as these differences are concerned, it should be mentioned that there are differences in the degree of usage (a) of Information and Communication Technologies (ICT), (b) of internal resources (e.g., the digital literacy of employees) and (c) of value chains.

Garzoni et al. (2020) went one step beyond studying how hot digital technologies have changed the growth of SMEs when it comes to digitally transforming existing businesses. The results indicate that digital awareness, digital search, digital collaboration and digital transformation are the four main levels of involvement (Garzoni et al. 2020). Finally, there exists a series of more focused studies that put emphasis on specific subjects of digital transformation such as business models, innovation performances, (Bouwman et al. 2019), decision making processes (Kilimis et al. 2019), etc., trying to reveal crucial aspects of the transformation process and the key factors that can accelerate it.

3. Methodology

A quantitative approach was selected in order to gather data regarding Greek SMEs' digital transformations. The quantitative approach was preferred since more objective and reliable data could be collected (Kumar 2011). Research was based on a similar study conducted by the German Hellenic Chamber of Industry and Commerce in 2021 (German-Hellenic Chamber 2022), which was changed appropriately to serve the current research goals. The proposed research questionnaire was selected since it has been already applied successfully in Greek SME environments and its results received acceptance and recognition from stakeholders including national authorities.

Researchers collected data for a period of 4 months, between September and December 2022. A sample of 147 Greek SMEs were involved in answering the online questionnaire, consisting of 31 questions. The questionnaire was separated in 3 sections, with the first section involving demographic questions, such as sex, age, educational background, working department (if any), company size (number of employees) and business sector that the company is involved in. The other two sections gather data regarding the following:

1. SMEs' digital maturity, with 6 questions;
2. SMEs' strategy and organization, with 5 questions.

As far as digital maturity is concerned, the research questionnaire reveals how far SMEs have gone in digital transformation and whether a digital business model exists. Moreover, emphasis is put on the factors (e.g., management, technology, products, platforms, engagement, etc.) and persons (e.g., chief technology officer, chief operations officer, etc.) that lead the digital transformation procedure. Finally, the drivers/accelerators of digital transformation are enlightened. Regarding the existence of a digital transformation strategy, the barriers (e.g., low funds, regulations, etc.) and key drivers (e.g., culture, agility, technology etc.) are researched, while expected outcomes from the whole procedure are revealed. Finally, the biggest challenges that SMEs are facing during the digital transformation procedure are evaluated.

A 5-point Likert parametric scale was used in order to evaluate the responders' agreement/disagreement on each question. Research questions under each section are presented in Appendix A. As far as the sample is concerned, a random sample of SMEs located in Athens, Greece was selected, providing random data with each subject of the research having the same probability of selection (Taherdoost 2016).

4. Results

Greek SMEs cover a large variety of the business sector, since the whole economy is not characterized by large companies. Just to indicate the most significant industries in which Greek SMEs operate, the following should be included: accommodation, wholesale and retail, construction, education, financial services, food production, manufacturing, clothing, insurance services, services/business, engineering, health services, transportation, and technology.

A total of 147 respondents participated in the research, with each one representing a distinct SME. All respondents were participating in each company's high management or had an ownership status on the SME. Most of the respondents held a job status characterized as "chief officer" (e.g., chief operations officer, chief technology officer, etc.), while all of the respondents were ex ante aware that the questionnaire was related to digital transformation in order to assure their appropriateness to participate. Out of the total 147 respondents, 55% were males and 45% were females, while their ages ranged as follows:

- 4.1% of respondents were between 18 and 24 years old;
- 59.2% of respondents were between 25 and 34 years old;
- 32.7% of respondents were between 35 and 44 years old;
- 4.1% of respondents were between 45 and 54 years old.

The highest percentage of participants (44.9%) held a bachelor's degree, followed by 30.6% participants who held a master's degree, while 20.4% were high school graduates and 4.1% held a PhD degree. As shown in Figure 1, the highest percentage (34.7%) of the participants worked in the service industries, followed by 22.4% who worked in technology, 6.1% who worked in transportation, 4.1% who worked in distributive transactions, 2% who worked in tourism and a percentage of 2% who worked in agriculture, horticulture and forestry. Finally, 28.6% of the participants chose the "other" option, and the participants specified their responses as working in the industries of telecommunications (9), cleaning products (3), household products and decoration (6), television (6), consulting (6), distributions (6), shipping (3) military (3), health (8) and construction (3).

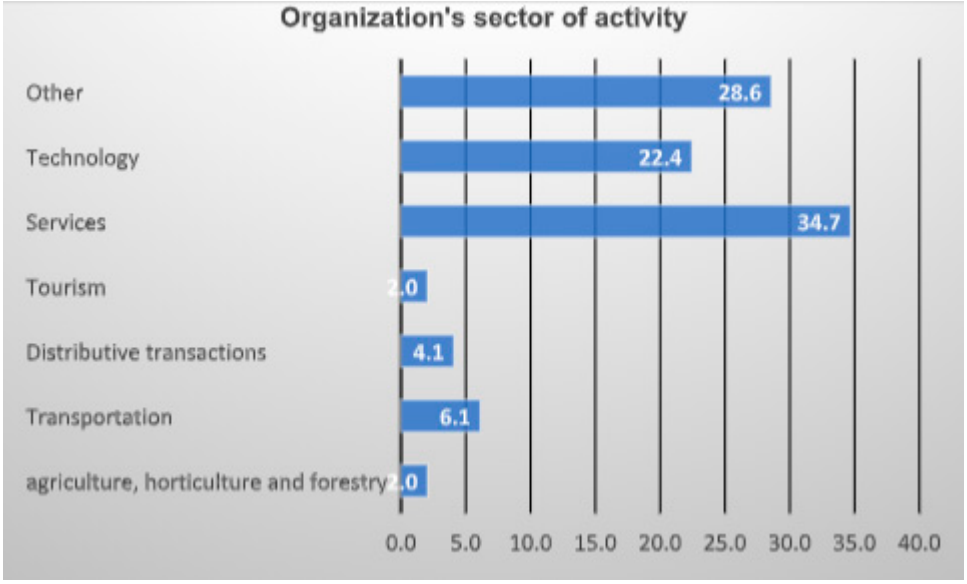

Figure 1. Sector in which the organization operates.

As far as digital maturity, over 60% of respondents felt that their companies were quite or very mature, while only 14.3% felt that their companies were not very mature or not mature at all. Moreover, there exists another 24.5% that evaluated their companies as somewhat mature, indicating small but not significant progress. The results are supported by findings regarding existing plans of becoming more digital. Almost 20% of the respondents stated that their companies had digital narratives, while another 49% declared that their companies were ahead or on schedule regarding their plans to become more digital. More than 30% stated that their companies were behind on their schedules (10.2%), did not yet start even though they had a plan (12.2%) and were now planning to develop a digital plan (8.2%).

Even though most SMEs seem to have entered somehow in the digital era, only 40.8% have a digital business model in place. The rest have partially implemented some elements (36.7%), and almost 22% are planning or not interested in developing a digital business plan. In some degree, this can be associated with the results regarding who is currently leading the digital transformation of the organization. Almost 40.8% of the respondents stated that the Chief Executive Officer was leading the digital transformation, followed by percentages of 18.4% for no one in particular, 16.3% for the Chief Technology Officer, 12.2% for the Chief Marketing Officer, 6.1% for the Chief Operating Officer, 4.1% for the Chief Digital Transformation Officer and, finally, 2% for the Chief Information Officer. The results are presented in Figure 2.

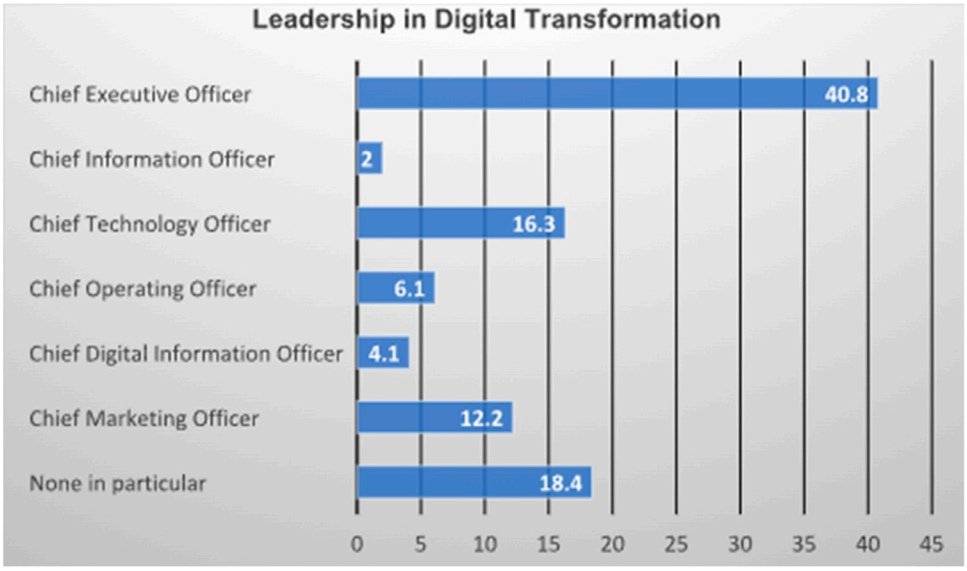

Figure 2. Leadership in digital transformation.

Most significantly, the respondents indicated the fields within which they thought the businesses should initiate the implementation of digital transformation. The results (Figure 3) show a majority of 51% who stated management and strategy, 18.4% who stated products, 12.2% who stated technology, 10.2% who stated platforms and 8.2% who stated employee engagement and HR. Management and strategy alongside appropriate products seem to be the main drivers for digital transformation.

Moreover, the respondents expressed their agreement or disagreement about the main drivers of digital transformation. As shown in Table 1 below, the average value (AV) and standard deviation (SD) were taken into account in order to evaluate how competitors, customers, suppliers, the government and other drivers affect SMEs' digital transformation. The results indicate that the most important driver of digital transformation in Greek SMEs is customers (AV = 4.14; SD = 1.05), followed by competitors (AV = 4.00, SD = 0.93). Customer needs and competitors' actions seem to affect the development and implementation of digital plans. Both of these drivers are gathering almost similar interests.

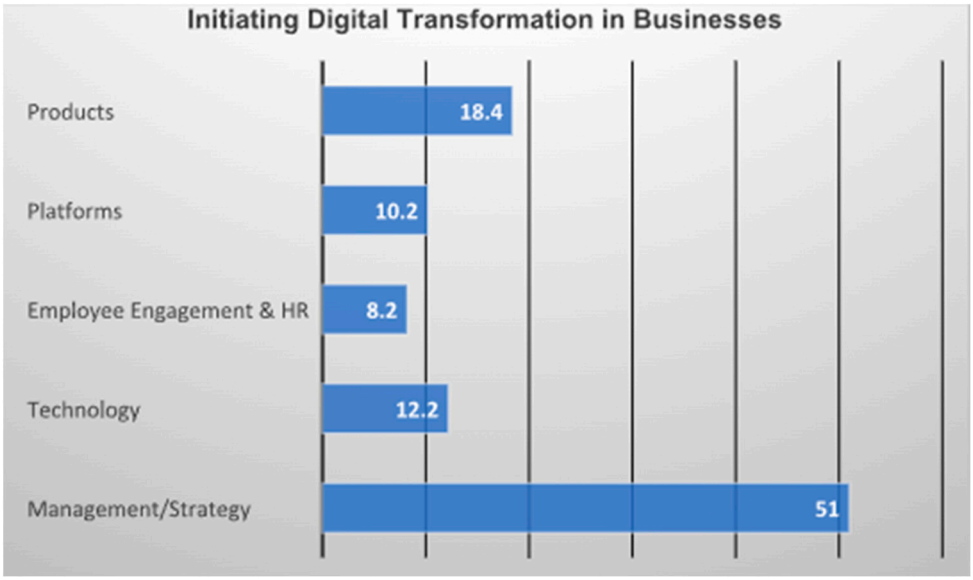

Figure 3. Initiating digital transformation in SMEs.

Table 1. Main drivers of digital transformation.

Who Do You Think Are the Main Drivers of Digital Transformation?	AV	SD	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Competitors	4.00	0.93	2.0	6.1	12.2	49.0	30.6
Customers	4.14	1.05	4.1	4.1	12.2	32.7	46.9
Suppliers	3.53	0.97	2.0	8.2	44.9	24.5	20.4
Government	3.35	1.16	8.2	16.3	22.4	38.8	14.3
Other	3.08	0.86	4.1	16.3	51.0	24.5	4.1

The next most significant drivers are suppliers (AV = 3.53; SD = 1.16), since the Greek economy is heavily dependent on foreign suppliers. Their digital transformation makes it inevitable for Greek SMEs to adapt to a new digital business era. Finally, the participants' responses for factors such as the government (AV = 3.35; SD = 0.86) and other factors (AV = 3.08; SD = 0.86) tended towards neutrality, indicating that there exists a national progress in the digital economy's indexes (Laitsou et al. 2020).

Even though the above-mentioned results regarding digital maturity are promising, the next section of questions related with "Strategy and Organization" provides a clearer picture about which is the actual situation of SMEs' digital transformation. Only 34.7% of the respondents stated that there exists an operational digital strategy, while the rest of the respondents recognized that some steps have been taken (32.7%) under a strategic plan or that such a plan exists at the moment (32.6%).

Not surprisingly, the most significant factor when developing a digital transformation strategy (Table 2) is technology (AV = 4.57; SD = 0.78), followed by management (AV = 4.45; SD = 0.76), flexibility (AV = 4.43; SD = 0.67), investments (AV = 4.41; SD = 0.78), knowledge sharing (AV = 4.33; SD = 0.67), culture (AV = 4.33; SD = 0.77) and, finally, human resources (AV = 3.78; SD = 1.17).

Table 2. Importance of digital transformation strategy factors.

How Important Are the Following Factors in Your Company's Digital Transformation Strategy?	AV	SD	Not Important at All	Slightly Important	Somewhat Important	Quite Important	Very Important
Digital transformation culture	4.33	0.77		4.1%	6.1%	42.9%	46.9%
Management	4.45	0.76	2.0%		4.1%	38.8%	55.1%
HR	3.78	1.17	8.2%	6.1%	14.3%	42.9%	28.6%
Knowledge sharing	4.33	0.74		2.0%	10.2%	40.8%	46.9%
Flexibility	4.43	0.67		2.0%	4.4%	42.9%	51.0%
Technology	4.57	0.67		2.0%	4.1%	28.6%	65.3%
Investments	4.41	0.78		4.1%	6.1%	34.7%	55.1%

When it comes to barriers for the effective implementation of digital transformation (Table 3), the results indicate that the most important barrier is a lack of will to change (AV = 4.40; SD = 0.88), followed by a lack of knowledge (AV = 4.18; SD = 0.96), inadequate management (AV = 4.10; SD = 0.86), low investment (AV = 4.06; SD = 1.04), a lack of infrastructure (AV = 4.02; SD = 1.12) and regulations (AV = 3.45; SD = 0.97).

Table 3. Main barriers to digital transformation.

What Are the Main Barriers to Digital Transformation?	AV	SD	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Low investment	4.06	1.04	4.1%	1.1%	14.3%	36.7%	40.8%
Lack of knowledge	4.18	0.96		9.2%	14.3%	28.6%	49.0%
Lack of infrastructure	4.02	1.12	4.1%	8.2%	12.2%	32.7%	42.9%
Regulations	3.45	0.97	4.1%	8.2%	40.8%	32.7%	14.3%
Inadequate management	4.10	0.86		8.2%	8.2%	49.0%	34.7%
Lack of will to change	4.40	0.88	2.0%	2.0%	8.2%	28.6%	59.2%

Moreover, as shown in Table 4 the respondents believed that digital transformation's outcomes are mainly related with improved customer satisfaction (AV = 4.51; SD = 0.76) and increased operational speed and flexibility (AV = 4.43; SD = 0.81), while at a second stage, these outcomes bring increased market share (AV = 4.31; SD = 0.89), increased revenues (AV = 4.31; SD = 0.98), reduced time to develop new products and services (AV = 4.22; SD = 0.96), reduced operating costs (AV = 4.18; SD = 1.0) and an improved number of top talents that are recruited and retained (AV = 3.61, SD = 1.18).

Table 4. Expected outcomes of digital transformation.

What Are the Most Important Outcomes Your Organisation Expects to Achieve Out of the Following as a Result of Its Digital Transformation?	AV	SD	Not Important at All	Slightly Important	Somewhat Important	Quite Important	Very Important
Increased revenue	4.31	0.98	4.1%		12.2%	28.6%	55.1%
Increased market share	4.31	0.89	2.0%	2.0%	10.2%	34.7%	51.0%
Reduced operating costs	4.18	1.00	4.1%	2.0%	12.2%	34.7%	46.9%
Increased operational speed and flexibility	4.43	0.81	2.0%	2.0%	2.0%	38.8%	55.1%
Improved customer satisfaction	4.51	0.76		4.1%	4.1%	28.6%	63.3%
Reduced time to develop new products/services	4.22	0.96	2.0%	4.1%	12.2%	32.7%	49.0%
Improved number of top talents recruited and retained	3.61	1.18	8.2%	8.2%	22.4%	36.7%	24.5%

Finally, the biggest challenges when implementing digital transformation were internal operations (53.1%), followed by a lack of appropriate external skills (34.7%), cultural resistance (8.2%) and, finally, financial reasons (4.1%).

A Reliability Analysis was conducted to assess the reliability and internal consistency of the set of items used in the questionnaire. The most commonly used reliability test in the SPSS is the Cronbach's alpha, while a commonly accepted threshold for reliability is 0.70 or higher. The proposed results (Table 5) indicate an accepted threshold for reliability, with Cronbach's alpha being 0.776 for the itemset of 32 questions.

Table 5. Reliability statistics.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.776	0.870	32

Based on such strong reliability, the authors put research emphasis on understanding how the respondents' perceptions about the digital maturity of a firm (Question DM1) and digital transformation strategy development (Question SO1) are cultivated. At a first stage, non-parametric correlations were calculated in order to define which relationships are statistically significant. The results are revealed in Table 6, where only the statistically significant relationships are presented, while the non-significant results are concealed. As far as these statistically significant relationships are concerned, the proposed results indicate the following:

- There is a strong, positive relationship between digital maturity and the existing digital transformation strategy;
- Digital maturity and digital transformation strategy are strongly and positively affected by the existence of a digital business model;
- The person leading the digital transformation process plays a significant role in both digital maturity and the digital transformation strategy;
- Management and technology play crucial roles in the development of a digital transformation strategy, while platforms and products have less significant roles;
- Cultivating digital maturity and a digital transformation strategy is positively related with customers, while competitors and the government are not statistically significant, and only suppliers positively affect the digital transformation strategy;
- Agility and technology are the two most significant internal factors when it comes to digital maturity and digital transformation strategy, alongside management and knowledge sharing, which only have positive impacts on the digital transformation strategy;
- Funding and investment issues are the most significant barriers to further digitalization;
- Increased customer satisfaction is the only statistically significant outcome that Greek SMEs expect when developing their digital transformation strategies.

Two distinct one-way ANOVAs were run in SPSS for each one of digital maturity (DM1) and digital transformation strategy (SO1). As far as digital maturity is concerned, the value of F is 7.698, which reaches significance with a p-value of 0.000, while the R Square value is 0.675 and is marginally accepted. The digital transformation strategy demonstrates an F value of 20.181 with a p-value of 0.000, with the R Square being 0.845, which is a rather high degree of predictiveness. Out of these ANOVA analyses, useful equations arise regarding how each one of the dependent variables is developed. The following equations only present the variables that affect the dependent variable in a statistically significant way.

The ANOVA results partially support the above-mentioned correlations regarding digital maturity. Digital maturity is affected positively (Equation (1)), in a statistically significant way, by the existence of a digital business model and the existence of a digital strategy. Moreover, there is a positive impact of the willingness to change among Greek

SMEs and the prospects of increased revenues. In contrast, governmental actions and technology have negative impacts.

Table 6. Kendall's tau correlations.

		DM1	**SO1**
DM1	Correlation Coefficient	1000	0.607 **
	Sig. (2-tailed)		0.000
DM3	Correlation Coefficient	0.604 **	0.797 **
	Sig. (2-tailed)	0.000	0.000
DM4	Correlation Coefficient	−0.183 **	−0.237 **
	Sig. (2-tailed)	0.007	0.001
DM5	Correlation Coefficient		−0.167 *
	Sig. (2-tailed)		0.016
DM6 Customers	Correlation Coefficient	0.150 *	0.215 **
	Sig. (2-tailed)	0.034	0.002
DM6 Suppliers	Correlation Coefficient		0.143 *
	Sig. (2-tailed)		0.041
SO1	Correlation Coefficient	0.607 **	1000
	Sig. (2-tailed)	0.000	
SO2 Management	Correlation Coefficient		0.246 **
	Sig. (2-tailed)		0.001
SO2 Knowledge Sharing	Correlation Coefficient		0.178 *
	Sig. (2-tailed)		0.014
SO2 Agility	Correlation Coefficient	0.201 **	0.193 **
	Sig. (2-tailed)	0.006	0.009
SO2 Technology	Correlation Coefficient	0.186 *	0.279 **
	Sig. (2-tailed)	0.012	0.000
SO3 Low Investments	Correlation Coefficient	−0.159 *	−0.214 **
	Sig. (2-tailed)	0.025	0.002
SO4 Increase Customer Satisfaction	Correlation Coefficient		0.178 *
	Sig. (2-tailed)		0.015
SO5	Correlation Coefficient	0.148 *	
	Sig. (2-tailed)	0.041	

N = 147. ** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

$$\textbf{\textit{Digital Maturity}} = 0.346 * \textit{Digital Business Model} - 0.236 * \textit{Goverment} + 0.036 * \textit{Digital Strategy} + 0.550 * \textit{Agility} - 0.522 * \textit{Technology} + 0.267 * \textit{Willigness to Change} + 0.683 * \textit{Revenues} \quad (1)$$

As far as digital transformation strategy is concerned (Equation (2)), the results indicate that (a) digital maturity, (b) a digital business model, (c) customer satisfaction, (d) technology and (e) management play positive and statistically significant roles. In contrast with the correlation results, there exist three variables that have negative impacts, namely digital transformation culture, low investments/funding and the person that leads the digital transformation process.

$$\begin{aligned} \textit{igital Transformation Strategy} = {} & 0.640 * \textit{Digital Business Model} - 0.051 * \textit{Person Leading Transformation} - \\ & 0.445 * \textit{Digital Transformation Culture} + 0.448 * \textit{Management} + 0.437 * \textit{Technology} - 0.345 * \\ & \textit{Low Investements} + 0.392 * \textit{Customer Satisfaction} + 0.207 * \textit{Digital Maturity} \end{aligned} \quad (2)$$

5. Discussion

The results presented in the previous section provide evidence of several digital transformation issues when it comes to SMEs, particularly in the Greek business environment. Not surprisingly, there exists a strong, positive relationship between digital maturity and the existing digital transformation strategy. Moreover, both digital maturity and the digital transformation strategy are affected by the existence of digital business models. Such evidence supports the existing results for traditional industries (Remane et al. 2017), manufacture (Luz Martín-Peña et al. 2018) and SMEs (Bouwman et al. 2019) as well.

Moreover, the results support the idea that entering a digital era is not merely about technology, even though technological advances are gaining high attention among Greek SMEs. The results support existing findings that management (Appio et al. 2021; Kraus et al. 2022), agility (AlNuaimi et al. 2022; Burchardt and Maisch 2019; Mangalaraj et al. 2023) and knowledge sharing (De Bem Machado et al. 2022; Yang et al. 2023) positively affect digital transformation. As far as agility is concerned, agile management styles inspired by the software development sector seem to gain interest even from non-ICT sectors such as SMEs (Kargas and Aretos 2023). Products and digital platforms are gaining less attention since the majority of Greek SMEs are service-oriented.

Greek SMEs seem to connect digital transformation with customer satisfaction. Such a customer-oriented approach is not something new (Gil-Gomez et al. 2020; De Miguel et al. 2022; Von Leipzig et al. 2017) but there seems to be an overconcentration on this aspect, neglecting all other influences or possible outcomes. It should be noted that customer satisfaction is essential for maintaining the existing customer base but cannot ensure that new customers will be gained. Such an aspect reveals that digital transformation for Greek SMEs is a viability strategy rather than a growth and international business pattern. Competitors are not statistically significant players to force or motivate SMEs to undergo digital transformation, but suppliers are. Such an aspect is expected since the Greek economy mainly relies on importing goods and services. Many suppliers of Greek SMEs are located abroad, forcing national businesses to adopt digital tools and strategies in order to maintain existing cooperation. The government seems to negatively affect Greek SMEs towards their digital transformation processes, indicating a lack of financial/regulatory/administrative motives from the state's authorities.

Finally, the most important barrier to further implementing digital transformation is recognized to be funding and investments. Such a barrier has two distinct but interrelated issues. First of all, Greek SMEs, even after almost 15 years since the recession, still face difficulties in gaining access to loans and funding (Vettas et al. 2017). This can be related to the above-mentioned issue of lacking efficient digital business models for SMEs so that they can be self-funding in digital transformation.

6. Conclusions

The development and implementation of a digital business model is the most important factor for Greek SMEs to adopt a digital transformation strategy and to reach digital maturity. Such a tension is supported by the lack of an effective culture in digital business even in the top management level, the limited funding sources when it comes to digital transformation investments and the limitations of governmental guidance/support in SMEs' digital transformations. Even though the COVID-19 pandemic accelerated digital transformation, at the moment, most Greek SMEs are associating it with customers' satisfaction and digital tools. Suppliers, most of them coming from abroad, seem to "force" Greek SMEs to digitalize their procedures, while domestic competition is not a strong source of operational and cultural change.

The current study is one of few studies focusing on Greek SMEs and their digital transformation procedures. It contributes to revealing the current situation and, most significantly, to proposing the factors that positively and negatively affect the procedure, providing the first evidence needed for business, academic and policy-making stakeholders to reevaluate the Greek digital business environment. Moreover, it should be noted that in almost 20% of Greek SMEs there is not a leading person when it comes to digital transformation, which is an issue that is most probably related with low engagement in the process. From a more practical point of view, the results indicate the need to support interventions in at least four directions: (a) culture, (b) management, (c) funding and (d) governmental support.

Starting with governmental support, it can be crucial as it can help develop interventions for all of the other directions, from directing funding opportunities to digital business to even supporting the cultivation of a more digital-oriented culture among entrepreneurs. Governmental intervention is evaluated as important, since SMEs traditionally have limited access to fundraising, especially when it comes to operational changes; moreover, SME entrepreneurs (especially middle age ones) have fewer opportunities for lifelong learning programs targeting digital transformation skills and culture. Networking workshops, mentorship programs and funding opportunities all targeting a digital transformation process can be supported from the government's side in order to further boost the Greek economy's digital competitiveness. Moreover, as far as digital culture and management issues are concerned, a more direct association between digital (soft) skills and entrepreneurial education, at least in a higher education level, could benefit the whole aspect by increasing the number of digital narrative businesses in Greece and increasing their viability/growth as well.

As a part of future research, a comparison between conventional SMEs and digital narrative SMEs under the same national business environment could provide more fruitful information regarding the factors that could enhance the digital transformation of the former ones. Moreover, expanding research to a larger sample size could further strengthen the generalizability of the findings in the Greek business context. Comparisons with SMEs located in other European Union members would be valuable as well to benchmark success stories and to evaluate state policies and managerial practices/culture that enhance the digital transformation process.

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Appendix A. Research Questionnaire

Section	Questions
Digital Maturity	DM1: How digitally mature do you consider your organization to be at the moment?
	DM2: Where do you see your own organization currently when it comes to becoming more digital? (1) We are ahead of our schedule when it comes to becoming more digital, (2) We are right on schedule when it comes to becoming more digital, (3) We are behind schedule when it comes to being more digital, (4) We have not started to become more digital yet, but are planning our approach, (5) We have not started to become more digital yet, and have more plans to think, (6) We have always been 100% digital business.
	DM3: To what extent does your company have a digital business model?
	DM4: Who is currently leading your organization's digital transformation?
	DM5: Where should businesses start with digital transformation? (1) Management/Strategy, (2) Technology, (3) Employee engagement & HR, (4) Platforms, (5) Products.
	DM6: What do you believe are the main drivers of digital transformation? (1) Competitors, (2) Customers, (3) Suppliers, (4) Government, (5) Others.
Strategy and Organization	SO1: Does your company have a digital transformation strategy?
	SO2: How important are the following factors in your company's digital transformation strategy? (1) Digital Transformation Culture, (2) Management, (3) HR, (4) Knowledge Sharing, (5) Agility, (6) Technology, (7) Funding/Investments.
	SO3: What are the main Barriers of digital transformation? (1) Low funds/investments, (2) Lack of knowledge, (3) Lack of infrastructure, (4) Regulations, (5) Inadequate management, (6) Lack of willingness to change.
	SO4: What are the most important outcomes your organization expects to achieve of the following as a result of its digital transformation? (1) Increase revenue, (2) Increase market share, (3) Reduce operating costs, (4) Increase business speed and agility, (5) Improve customer satisfaction, (6) Reduce the development time for new products/services, (7) Improve amount of better talent hired and retained.
	SO5: What are the biggest challenges that your organization has actually experienced in trying to undertake a successful digital transformation? (1) Internal procedures, (2) Cultural resistance, (3) Lack of skills, (4) Financial issues.

Source: German Hellenic Chamber of Industry and commerce Digital Transformation Committee (German-Hellenic Chamber 2022).

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