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The impacts of dynamic capabilities on SMEs' digital transformation process: The resource-based view perspective

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Keywords: digital transformation; digital literacy; cyber-security; dynamic capabilities of the resource-based view; SMEs

Abstract

Research background: SMEs' concern for the digital literacy of their workforce, their interest in increasing digital literacy among employees, and securing their digital platforms, have been major issues in their digital transformation process. To reduce those obstacles, the dynamic

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capabilities of SMEs included in the Resource-based View (RBV) might be an effective solution since they help companies be more competitive and proactive against the threats they face in the digitalization process.

Purpose of the article: This research aims to investigate whether SMEs' dynamic capabilities positively contribute to their digital transformation process.

Methods: In line with the proposed relationships, this paper analyzes SMEs from Czechia by running Ordinal Logistic Regression analyses. The research sample is created by stratified random sampling and purposive sampling methods. The research data is collected via telephone surveys.

Findings & value added: This research does not find a positive relationship between the dynamic capabilities of SMEs and the digital transformation process. While the results related to digital literacy are negatively associated with digital transformation, no significant relationship exists between security actions and the digital transformation of SMEs. This paper extends the scope of RBV on the digital transformation of SMEs by analyzing various dynamic capabilities of SMEs that have not been included in a sole study. Moreover, the perceptions of SME executives are considered by this research to provide effective solutions for the problems they face in digital transformation. Having a joint venture agreement with well-experienced IT companies, having a network with partner firms, looking for funding opportunities in the EU, participating in some practical training, and providing internships for bachelor students might enable SMEs to hit their targets in digital transformation.

Introduction

Digital transformation has been a phenomenon process for companies to manage their operations effectively. This process is crucial for businesses, individuals, policymakers, and other institutions (Sun *et al.*, 2022a; 2022b). For this reason, the expenses for digital transformation technologies have increased in the last five years and reached 1.85 trillion US dollars in 2022 (Statista, 2022).

Digital transformation can be identified as a process of using new technologies for business operations (Vial, 2019). Digital transformation also causes organizational changes due to implementing digital technologies into business processes (Warner & Wäger, 2019). In this regard, businesses aim to be adapted to the changing conditions in the digital world that consists of the Internet of Things (IoT), artificial intelligence, blockchain, machine learning (Cetindamar-Kozanoglu & Abedin, 2020), big data analytics, mobile technologies, and other IoT tools (George *et al.*, 2021). For instance, the Internet of Things enables users to transfer data and communicate autonomously using multi-device systems (Andronie *et al.*, 2023). Thus, firms that follow those trends and implement new strategies to change become successful in the digital transformation process (Cetindamar-Kozanoglu &

Abedin, 2020), which increases their competitiveness (Neumeyer *et al.*, 2020), innovativeness, performance, and productivity (Hwang & Kim, (2022). Moreover, the digital transformation process makes businesses implement the outcomes of Industry 4.0, including the creation of networks, digital technologies, robotics, and 3D printing. This fact also increases firms' ability to make innovative business activities and to develop information technologies (Małkowska *et al.*, 2021). However, smaller firms, including SMEs, face more obstacles in this transformation process due to a lack of interest in the digital literacy of their employees and a lack of activities regarding digital literacy and security (Oggero *et al.*, 2020; Ollerenshaw *et al.*, 2021; Rupeika-Apoga & Petrovska, 2022).

Digital literacy is a competency that enables using digital tools such as smartphones, laptops, and tablets (Neumeyer *et al.*, 2020). Digital literacy is also an ability to access, manage, examine, and assess information to create new knowledge and contact with other users (Sariwulan *et al.*, 2020). Awareness (Ključnikov *et al.*, 2020a) and knowledge of entrepreneurs regarding technological developments can enable them to quickly adopt digital tools (Oggero *et al.*, 2020). Moreover, digitally literate people become able to explore new processes, business models, and customer-based solutions that allow businesses to increase their competitiveness and innovativeness. Digital innovations substantially support the regional development of structurally disadvantaged industrial regions (Ključnikov *et al.*, 2020b). The easier adoption and usage of digital technologies can be achieved via digital literacy (Neumeyer *et al.*, 2020). Cyber-security activity is another barrier that might affect the digital transformation process of SMEs. Cybersecurity can be defined as procedures that individuals, businesses and organizations might implement to protect and secure their privacy and data when using information technology (Rupeika-Apoga & Petrovska, 2022). Problems in the cybersecurity of businesses can create more cost and negatively impact firms' operations and reputation (Yudhiyati *et al.*, 2021). It is also crucial for the digital competitiveness of companies, because when companies reduce their security concerns by taking actions for the security of digital technologies, their usage and adoption of new technologies increase (Lutfi *et al.*, 2022).

Firms improving their dynamic capabilities can reduce those digital literacy and security barriers and become more successful in digital transformation, because firms having those abilities can easily take the required actions in their digital transformation process. According to some studies,

firms with improved dynamic capabilities have achieved more success in implementing digital technologies in their operations (Warner & Wäger, 2019). Dynamic capabilities belong to the Resource-based view since it enables firms to use their resource-based characteristics for survival (Vial, 2019; Danneels, 2012). Those capabilities also make firms gain competitive advantages against their rivals (Lutfi *et al.*, 2022) and increase their profitability (Danneels, 2012). Dynamic capabilities also stimulate the development of organizational abilities of businesses that firms need in changing conditions (Wai *et al.*, 2020).

Moreover, the executives are interested in improving the digital literacy of their workers and digital security aspects of SMEs to guarantee and protect the digital transformation process of their businesses, while those dynamic capabilities and activities are related to the abilities of companies to effectively use their human and technological resources (Neumeyer *et al.*, 2020). This fact has also been confirmed by several researchers who define the digital literacy of employees and security actions of companies as the dynamic capability of businesses (Vial, 2019; Warner & Wäger, 2019; Cetindamar-Kozanoglu & Abedin, 2020). In this regard, this paper aims to investigate the impacts of the dynamic capabilities of SMEs on their digital transformation process. Thus, the research question is: “How do SMEs’ dynamic capabilities affect their digital transformation process?”. To investigate the impacts of dynamic capabilities on digital transformation, the researchers selected a sample that consisted of 330 SMEs from Czechia, created data by performing telephone surveys, and analyzed the research data by running Ordinal Logistic Regression analyses.

According to Eurostat EU’s Digital Intensity Index (2021), 56% of SMEs in EU countries reached the basic level of digital intensity, while Czechia has a better ranking than most of the EU members. Moreover, Czech SMEs have better rankings in most digitalization parameters than SMEs of Visegrad countries (Esses *et al.*, 2021). However, Czechia ranks 19 among the EU members regarding the Integration of digital technologies that include some actions such as electronic information sharing, the usage of social media, big data, cloud, artificial intelligence, e-invoices, and online sales (European Commission, Digital Economy, and Society Index, DESI, 2022). Furthermore, 76% of Czech enterprises faced obstacles when hiring ICT specialists to fulfill related positions; this rate is the highest among EU members, while the average is 55% (European Commission, DESI, 2022). According to the European Union’s Eurobarometer Index (2021), 28% of

European SMEs have faced cybercrime issues at least once in 2021. Czech SMEs have more intensively perceived these issues than the EU average. In this regard, it will be noteworthy to analyze the impacts of digital literacy activities, cyber security, and digital literacy concerns of SMEs on their digital transformation process and to find solutions for these issues. For this reason, prospective readers will be interested in reading the outcomes of this unique research.

This paper makes three contributions to the literature and the theory. First, this paper defines the scope of major obstacles that SMEs face in the digital transformation process by including three main issues in a study. Many researchers have separately examined enterprises' major issues in the digital transformation process (Rupeika-Apoga & Petrovska, 2022; Lutfi *et al.*, 2022), and do not concentrate on the SMEs segment (Oggero *et al.*, 2020; Ollerenshaw *et al.*, 2021). Thus, this study emphasizes the main challenges of the digital transformation process in the context of SMEs. Second, this paper extends the RBV theory's scope to SMEs' digital transformation process. Many researchers have already analyzed the importance of dynamic capabilities in companies' digital transformation (Warner & Wäger, 2019; Vial, 2019). However, those researchers separately analyze the impacts of dynamic capabilities on digital transformation. This paper is the first one that focuses on three crucial dynamic capabilities of SME executives and SMEs, such as their concern for the digital literacy of their workers, digital literacy, and cyber security activities of SMEs. Since these capabilities are related to the firms' human and technological resources, this paper brings SMEs' human and technological sources together. It looks at their impacts on the digital transformation process. Another contribution lies in the focus on the perceptions of firms' executives regarding the analyzed variables. Since managers and owners take very active roles in SMEs' management, the authors believe that the executives' directives for their employees' digital literacy and the executives' decisions for companies' security and digital literacy activities in the digital transformation process might be more understandable from the executives' point of view.

The remaining part of the article is structured in the following sequence. First, the empirical results of previous studies and the research hypotheses will be expressed in the Literature Review section. Next, the details regarding methodological approaches, sample characteristics, data collection, and analyses will be clarified in the Research Methods section in detail. Then, the researchers will explain the paper's results with the hypotheses testing

in the Results section. In the fourth section, the researchers will discuss the results and provide some policy implementations and solutions for SMEs regarding the problems of their digital transformation process. Lastly, the researchers will conclude the most important points of this research and define the limitations of the research, and make recommendations for further studies.

Literature review

A lack of digital literacy and digital skills of employees has been identified as a major barrier in the digital transformation process of SMEs (Rupeika-Apoga & Petrovska, 2022; Lutfi *et al.*, 2022). Furthermore, a lack of digitally literate workers is also an alarming issue in implementing effective digital technologies into work operations (Weill *et al.*, 2019). Ollerenshaw *et al.* (2021) analyze Australian SMEs and highlight that a lack of digital skills causes many issues for those firms to adopt digital technologies. Similarly, Neumeyer *et al.* (2020) also interpret that when the literacy of employees is lower, companies have a lower degree of absorptive capacity and face higher costs and risks in their operations. Moreover, firms that ignore the digital literacy of workers fail in digital transformation (Murawski & Bick, 2017; Nadeem *et al.*, 2018). By observing Polish SMEs, Ziółkowska (2021) claims that insufficiently skilled employees lacking technical knowledge are one of the barriers for SMEs in their digital transformation process. Krajčík (2021) also emphasizes the issues in Czech SMEs' digital transformation process, such as the shortage of skilled employees.

Top management support is crucial to avoid such an issue (Lutfi *et al.*, 2020; Lutfi *et al.*, 2022). By being aware of the digital literacy of their workers, firms can implement a data-driven approach to direct their workers for the tasks that employees aim to achieve. For instance, Amazon has applied this approach that enables this company to assess their workers' performance and collaborations. For these reasons, companies that run such approaches can be more effective in the decision-making process to direct, manage and motivate their employees (Westerman, 2016). By analyzing Hungarian and Slovakian SMEs, Saáry *et al.* (2022) report that SMEs both countries know the need to implement new business models in digital transformation. Moreover, managers who understand the digital literacy of their workers can also do some activities to train their workforce (Cetin-

damar-Kozanoglu & Abedin, 2020). In this regard, Bolek *et al.* (2018) analyze Slovakian managers and verify that managers' interest in creating educational activities can increase information literacy. However, Krajčík (2021) analyzes Czech SMEs and elucidates that Czech SMEs' awareness regarding digitalization is not enough. Furthermore, Lutfi *et al.* (2020) analyze SMEs from Jordan and declare that SMEs' decision-makers showing more concern for supporting their workers' literacy increase the adoption success of artificial intelligence solutions by firms. Cruz-Jesus *et al.* (2019) investigate some SMEs from Portugal and express that the top management needs to prioritize integrating the technologies by their workers to ease their CRM adoption. Similarly, Jahanshahi and Brem (2017) examine some Iranian SMEs and verify that top management teams' behavioral integrity may create an effective environment for their workers to implement more innovative solutions for their business operations. In this regard, firms showing more concern about the digital literacy of their workers can gain more advantages than others that do not, because firms putting more emphasis on the digital literacy of their workers can take efficient actions to improve the capabilities of their workers. Due to having those arguments, a research hypothesis might be set as follows:

H1: *There is a positive relationship between digital literacy concerns and the digital transformation of SMEs.*

To reduce their digital literacy concern, company executives need to care about their workforce's digital skills and take some effective actions to stimulate digital literacy among their employees (Cetindamar-Kozanoglu, & Abedin, 2020). Since the strategic decision-making process is highly dependent on the executives in SMEs, their actions to develop their workers' digital literacy ease SMEs' digital transformation process (Hassan *et al.*, 2020). For instance, company executives, such as owners or managers, can create a support system that increases firms' digital adoption success and motivates their work for technological changes (Lutfi *et al.*, 2022). By analyzing Czech SMEs, Dvůráková *et al.* (2021) infer that a lack of trained employees is one of the obstacles to SMEs in adapting digital technologies; therefore, firms make outsourcing activities to overcome this barrier.

Ollerenshaw *et al.* (2021), through the analysis of the firms in Australia, highlight that training activities created by companies can accelerate their digital transformation process. Šimberová *et al.* (2022) analyze Czech SMEs

and explain that effective knowledge management of SMEs can accomplish the digital transformation process. Wirawan *et al.* (2021) also examine SMEs in Indonesia and surmise that the organizational learning activity of SMEs for digital literacy develops their competencies and increases the performance and innovations of those businesses. Similarly, Kő *et al.* (2022) examine Hungarian SMEs and explain that to increase the digital readiness of firms, SMEs need to improve their organizational capabilities by stimulating the digital capabilities of the workforce.

Skare *et al.* (2023) observe SMEs from European countries, including Czechia, Slovakia, Hungary, and Poland, and state that human resource activities, including design and integration of digital transformation process, are crucial for those companies. Lutfi *et al.* (2022) confirm the positive association between top management support, organizational readiness, and the adoption of big data analytics by analyzing Jordanian SMEs. Similarly, Alshamaila *et al.* (2012) investigate SMEs in England and declare the positive effect of top management support on the cloud-computing adoption of those enterprises. Cruz-Jesus *et al.* (2019) also confirm the positive relationship between top management support and CRM adoption in Portuguese firms. By analyzing Slovakian SMEs, Bolek *et al.* (2018) state that firms need to implement remuneration and business practices to increase the literacy level of their workers. The empirical findings of those studies enable this research to set another hypothesis as follows:

H2: *There is a positive relationship between digital literacy activities and the digital transformation of SMEs.*

Another obstacle in adopting new technologies, such as IT systems security, has been highlighted by Dvoráková *et al.* (2021), who analyze Czech SMEs. Security has also been a concern for SMEs from other countries in their digital transformation process (Mendhurwar & Mishra, 2021; Rupeika-Apoga *et al.*, 2022; Gaitero *et al.*, 2021). When the trust of executives decreases, they might have a lack of intention to adopt new technologies (Ključnikov *et al.*, 2020c). Viruses, worms, trojans, software bombs, sabotage of services, and cyber attacks by hackers are the threats (Mendhurwar & Mishra, 2021) that cause fraud and cybersecurity issues for SMEs and increase their security concerns (Bertoni *et al.*, 2022). Data security risk, high degree of uncertainty, untraceable transactions, and information leakage that digital platforms might include have been some of the reasons for

the security concerns of SMEs (Carcary *et al.*, 2014; Hassan *et al.*, 2020). Krajčík (2021) examines Czech SMEs and surmises that a lack of sufficient tools concerning cyber-security, problems in high-speed internet access, and the deterioration of regulatory standards, including intellectual property rights, might be other reasons for the digital security concerns of SMEs.

All those factors are the major threats affecting SMEs' digital transportation process. SME executives can negatively perceive those factors and become reluctant to apply digital technologies. For these reasons, firms implementing cybersecurity protections in their digital networks and programs can be more successful in digital transformation. In this regard, Maroufkhani *et al.* (2020) examine Iranian SMEs and state that security affects the digital transformation process of SMEs, including big data adoption. By analyzing Slovakian SMEs, Bolek *et al.* (2018) infer that firms need to improve their workers' abilities by providing education for information security. Skafi *et al.* (2020) also analyze Lebanese companies and verify that a positive relationship exists between the security actions of firms and their adoption of big data. Moreover, Lutfi *et al.* (2020) investigate Jordanian SMEs and confirm that insecure feelings have a negative impact on the adaption of big data analytics. On the other hand, Hassan *et al.* (2020) examine German SMEs and vindicate that security is one issue that decreases SMEs' technology adoption. Thus, firms taking steps for cybersecurity issues are more likely to gain success in their digital transformation process. These pieces of evidence enable this paper to set another hypothesis as follows:

H3: *There is a positive relationship between cyber-security activities and the digital transformation of SMEs.*

Research methods

This research aims to determine whether or not SMEs' dynamic capabilities, such as their concerns for the digital literacy of their workers and for digital literacy and cyber-security activities, positively affect their digital transformation process. Before collecting the data, the research team performed a pilot telephone survey and directed questions to a sample that consisted of 20 respondents. The research team aimed to increase the con-

struct's response rate, validity, and reliability by doing so. This pilot survey was implemented in the Moravian-Silesian Region of Czechia. The research team revised the questionnaire depending on the respondents' comments in this pilot survey. Thus, some phrases that might cause misunderstandings and grammatical errors were changed in line with the respondents' comments. The number of firms included in the sample was determined depending on the proportion of the active SMEs in the Moravian-Silesian Region of Czechia to the total number of SMEs operating in the Czech Republic. The ratio information was gained from the Czech Statistical Office. The sample is purposively selected based on the size, sector, and geographical coverage. Then, the research team called 330 owners and managers of SMEs. Thus, the respondents were the executives of those businesses.

The survey consists of various questions that aim to discover SMEs' characteristics and assess those enterprises' digital literacy, digital transformation, digital capabilities, and digital adoption. To hit this paper's target, the researchers used four survey questions presented in Table 1. For example, when the researchers asked digital literacy activities of SMEs, the scholars directed the respondents to think about their companies' training activities for employees, companies' collaborations with mentors, and companies' communications with their workers. Moreover, the respondents are informed about digital literacy, including employees' abilities regarding using computers, information, media, communication, and cyber-security systems.

To scale the responses of survey participants, the researchers applied a four-point Likert Scale. The scale used for independent variables of the research models, namely, digital literacy of employees, digital literacy, and cyber-security activities of SMEs, is as follows: "1-strongly disagree", "2-disagree", "3-agree", "4-strongly agree". Thus, the higher volumes indicate more concerns of SMEs regarding digital literacy and digital security issues of their companies. Regarding the dependent variable of the research models, namely, digital transformation, a four-point Likert scale is applied by the researchers as follows: "1-very poor", "2-poor", "3-good", and "4-very good" and "4-very good" is the reference level of the dependent variable.

As mentioned above, the research models' dependent and independent variables are scaled by a four-point Likert Scale and ranked. For this reason, the researchers use Ordinal Logistic Regression Analysis in SPSS statistical program within the logit function. According to Harrell (2015), ordinal regression has an algorithm that evaluates continuous and latent

variables. The algorithm also shows the changes in cutoffs of dependent and independent variables. Cutoffs can also be called levels in those variables, and a four-point Likert scale consists of three cutoffs for the independent variables as follows: Cutoff 1 represents the responses between “strongly disagree” to “disagree,” while Cutoff 2 shows the responses between “disagree” to “agree.” Finally, Cutoff 3 indicates the answers between “agree” to “strongly agree.” A similar approach is also used for the cutoffs of the dependent variable. All those levels (cutoffs) are also presented in Table 4, Table 5, and Table 6, which indicate the results of the 1st, 2nd, and 3rd research models, respectively. The models are formulated as follows:

$$\text{Logit} (P(Y \leq j)) = \beta_{j0} + \beta_{j1}X_1 \quad (1)$$

where:

- Y Dependent variable (Y₁: Digital transformation, same in all research models)
- J Categories j=1 refers to “1-very poor”, j=2 refers to “2-poor”, j=3 refers to “3-good”, and j=4 refers to “4-very good”.
- X₁ Independent variable (X₁: Digital Literacy concern of SMEs in the 1st research model, X₁: Digital Literacy activities of SMEs in the 2nd model and Cyber-security activities of SMEs in the 3rd research model)
- B_{j1} Regression coefficients, β₀ = Constant term, P = Probability.

A 5% significance level is used to test the research hypotheses and the assumptions of Ordinal Logistic Regression. In the case of having P values that are lower than the selected level of significance, the researchers will support the hypotheses. As already set in Literature Review section, the hypotheses assume a positive relationship between the dependent and independent variables. Thus, null hypotheses assume the opposite, a negative or non-existence of the relationship between the dependent and independent variables.

On the other hand, the researchers also analyze the assumptions of Ordinal Logistic Regression by considering the volumes from Model Fitting, Goodness of Fit, and Test of Parallel Lines indicators that are depicted in Table 2. As indicated in Table 2, P values (“Sig.” in the table) of the research models for the Model Fitting indicator are lower than the 5% significance level (0.000 for all of the research models). This result confirms that when an independent variable is added to a research model of this paper,

the research models become capable of making better predictions for the dependent variables. In other words, the financial literacy of employees, financial literacy, and cyber-security activities of SMEs are good at predicting the changes in the digital transformation of those enterprises. The values from Cox&Snell and Nagelkerke statistics are also presented in Table 2 to indicate the overall model fit. Both indicators represent the percentage of the changes in the dependent variable. For instance, when the digital literacy of employees is included in the first research model, this independent variable represents 17.7% (the volume from the Nagelkerke indicator) of the changes in the digital transformation of SMEs. Similar explanations can also be made for the second (20.4% of the variabilities in digital transformation can be explained by the addition of digital literacy activities of SMEs into the second model) and the third research models (40.6% of the changes in digital transformation have occurred due to adding cyber-security activities of SMEs into the third research model).

Another indicator included in Table 2 is the Test of Parallel Lines, which measures whether the slope coefficients of the three cutoffs are similar. Unlike testing Model Fitting, P values (“Sig.” in the table) must be higher than the 5% significance level to verify this assumption. P values for the 1st and 2nd, and 3rd research models are greater than this significance level (0.056, 0.135, and 0.334, respectively). The results from Model Fitting, Goodness of Fit, and Test of Parallel Lines prove that this paper does not invalidate the assumptions of the Ordinal Logistic Regression Test; therefore, it is suitable to use this test for data analyses.

Table 3 illustrates the sample profile that includes 330 SMEs working in both manufacturing (165 firms, 50% of the entire sample) and service (165 firms, 50% of the entire sample) industries. Concerning the firm size, 110 firms (33.33% of the whole sample) are categorized under micro-segment, while 110 businesses (33.33% of the whole sample) are categorized under small-sized enterprises. The remaining 110 enterprises (33.33% of the whole sample) are larger than the others; thus, they are classified as medium-sized enterprises. Other details regarding the characteristics of the respondents are also presented in Table 3.

Results

The results of this paper regarding 1st research model are presented in Table 4. As indicated in this table, p values (“Sig.” in the table) for the cut-offs of the independent variable (digital literacy concern of SMEs) are lower than the 5% level of significance (p values < 0.005). Hence, SMEs’ concern for the digital literacy of their workers is a significant predictor of digital transformation. However, since the coefficients of the cutoffs (Estimate in the table) are negative (-2.161, -2.173, and -1.091, respectively), SMEs having lower volumes from the independent variable of the first research model are more likely to have a higher stage in the digital transformation process. In this regard, a negative association exists between the concerns of SMEs regarding their employees’ digital literacy and their digital transformation. For this reason, this paper fails to support the H1 hypothesis that assumes a positive association among those variables.

Odds ratios are also presented in Table 4 to indicate the changes in odds when a unit change in the SMEs’ concern for digital literacy occurs. The odds ratio also refers to “how many times higher the odds of occurrence are for each one-unit increase in the independent variable” (Ho, 2013). Furthermore, it also evaluates the strength of the relationship between SMEs’ digital literacy concerns and digital transformation. Since the coefficients of the cutoffs are negative, one unit decrease (from cutoff 3 to cutoff 2) in SMEs’ digital literacy concern 0.336 times greater the odds of occurrence to have a higher level in the digital transformation process for SMEs with a 95% confidence interval between -1.578 to -0.605. Thus, having a higher stage in digital transformation process 0.336 times is likely to occur for SMEs with lower digital literacy than those with more concerned SMEs.

On the other hand, odd ratios can be interpreted by another indicator. If the odd ratio is higher than 1, the odds of the event is more likely to occur when the predictor variable increases. Since 0.336 is lower than 1, being in a greater stage of the digital transformation process is less likely to occur when SMEs’ concern for digital literacy increases.

Concerning the results of the 2nd research model, Table 5 is depicted in Annex. P values for the cutoffs of the digital literacy activities of SMEs (the independent variable of the 2nd research model) are lower than a 5% level of significance as presented under the column of “Sig.” (Litactofcom = 1: 0.000, Litactofcom = 2: 0.0000, Litactofcom = 3: 0.0019). Thus, the digital literacy activity of SMEs is a significant variable in predicting digital trans-

formation. However, the coefficients (Estimate in the table) of the cutoffs of this independent variable are negative (-2.547, -1.711, and -0.626, respectively). In this regard, higher volumes from this indicator indicate lower success levels in the digital transformation of SMEs; therefore, the analyses confirm a negative relationship between the digital literacy activities of SMEs and their digital transformation process. Due to this result, this paper fails to support the H2 hypothesis that presumes a positive relationship between the second research model's dependent and independent variables.

When it comes to the volumes of the odds ratio in Table 5, since the coefficients of the cutoffs are negative, a decrease in SMEs' digital literacy activities by one unit (from cutoff 3 to cutoff 2), 0.535 times increases the odds of occurrence to have a higher digital transformation stage for SMEs with a 95% confidence interval between -1.151 to -0.102. Since 0.535 is lower than 1, when the digital literacy activities of SMEs increase, the odds of being in a higher success level of digital transformation decrease for them. Thus, SMEs with lower digital literacy activities are more likely to be in a greater stage of digital transformation than SMEs with more digital literacy activities.

Regarding the results of the 3rd research model, Table 6 is illustrated in Annex. Different from the previous results, P values for the cutoffs of the independent variable (namely, cyber-security activities of SMEs) are not significant (Security = 2: $0.360 > 0.05$, Security = 3: $0.272 > 0.05$). This result confirms that the cyber-security activities of SMEs do not affect their digital transformation process since this variable is not a significant predictor of the dependent variable. For this reason, a positive association between the cyber-security actions of SMEs and their digital transformation process does not exist. Hence, the H3 hypothesis is not supported.

Discussion

As already substantiated by the analyses, this research does not confirm the positive association between the dynamic capabilities of SMEs (including digital literacy concern of SMEs, digital literacy, and cyber-security activities of SMEs) and their digital transformation process. Therefore, the results of this paper are not compatible with the studies of Murawski and Bick (2017), Nadeem *et al.* (2018), Bolek *et al.* (2018), focused on digital literacy

concern-digital transformation relationship, Lutfi *et al.* (2022), Alshamaila *et al.* (2012), Cruz-Jesus *et al.* (2019), Ollerenshaw *et al.* (2021), focused on digital literacy activities-digital transformation relationship, Hassan *et al.* (2022), Skafi *et al.* (2020) focused on security activities-digital transformation relationship, that analyzes enterprises from various markets such Germany, Slovakia, Lebanon, England, Australia, and Portugal. As already mentioned in Literature Review section, those studies confirm the positive association between digital literacy concern, digital literacy, and security activities of SMEs and their digital transformation, respectively. Moreover, this paper's results are not parallel with the results of Skare *et al.* (2023) since the researchers substantiate the positive association between digital transformation and digital literacy concerns of SMEs operating in some other European countries such as Austria, Belgium, Croatia, Denmark, Finland, France, Greece, Ireland, Italy, the Netherlands, Poland, Portugal, Spain, and Sweden. By analyzing Chinese enterprises, Lei *et al.* (2023) also verify the positive association between workers' digital literacy and digital transformation; therefore, this study also opposes the findings of Lei *et al.* (2023). These scholars support their findings with a strong argument, that is, the existence of strong government support, including subsidies.

The reason why this paper differs from other studies and does not find any positive relationship between digital literacy, security activities, and digital transformation might be related to the efficiency of the activities that the examined SMEs have done. Czech SMEs have a very fragile structure regarding financing; thus, they more intensively perceive financial risk because of having high rejection rates, especially in the last few years (OECD, 2022). For this reason, SMEs in this study might be reluctant to invest substantially in digital literacy and cyber-security activities. As a result, their digital literacy and security activities budget might not have been enough to stimulate and develop their digital transformation process.

For instance, SMEs can seek support from EU programs created for enterprises' digital transformation. According to European Commission (2022), seven main EU budget programs provide financial and educational support for the digital transformation of SMEs, namely, Digital Europe Programme, Horizon Europe, Connecting Europe Facility – Digital, InvestEU, Creative Europe MEDIA, EU4Health, Recovery, and Resilience Facility. In this regard, using those opportunities, SMEs can directly apply or look for options to increase and stimulate their digitalization process.

Although Czech SMEs rank first in social media usage, e-commerce sales, and functionalities of websites in comparison with other Visegrad countries (Esses *et al.*, 2021), more political implementations need to be generated by policymakers. In this regard, Czechia has collaborations with European Union regarding digitalization. Mutual actions concerning cybersecurity, the usage of new technology, the protection of data, high-speed internet infrastructure, and the developments in artificial intelligence have been taken by both parties. Moreover, the Czech government has prepared strategic documents that certify the developments in digitalization and Czechia's directives in line with the EU trends. According to the strategic plan, SMEs need to effectively manage digital literacy issues in their organizations to minimize the threats in the digital transformation process. In this regard, Czech SMEs can stay competitive and accelerate their digitalization process. Furthermore, the digital skills of workers also need to be improved by the initiatives of SMEs (Šimberová *et al.*, 2022).

On the other hand, Ližbetinová *et al.* (2019) observe Slovak SMEs and remark on the positive effect of CRM implementation by SMEs on their sustainability. The researchers also profess that similar results can be gained from the Czech and other European SMEs operating in similar economic environments. Since Visegrad countries' business environments are quite similar (Oláh *et al.*, 2019; Ključnikov *et al.*, 2022), the EU's support might also provide benefits for Czech SMEs and for Slovak, Hungarian, and Polish SMEs. For instance, European Union also motivates SMEs to make joint investments in digital innovation. Moreover, the creation of digital innovation centers, standardization of information and communication technologies, implementation of appropriate regulations regarding cyber-security of systems, and improvements in digital skills of the workforce are some of the aims that the European Union wants to achieve among member states (Krajčík, 2021). The European Union also provides encouragement for the digital transformation process of SMEs and the usage of its tools by SMEs and aims to accelerate this process in line with the Green Deal for Europe concept. In this regard, European Commission also supports digital transformation for green transformation that targets a climate-neutral Europe by 2050 (Šimberová *et al.*, 2022). For these reasons, SME executives need to be aware of those opportunities to reduce their security and digital literacy concerns by also receiving required financial sources from those institutions.

On the other hand, the reason this paper differs from other studies regarding the relationship between SMEs' concerns for the digital literacy of their employees and digital transformation might be related to the experience of the executives analyzed in this research. The experience not only enables executives to be more concerned and interested in their workers' abilities but also causes increases in knowledge sharing among workers and executives to adopt new technologies (Hassan *et al.*, 2020). Moreover, experience makes businesses take effective actions to adopt new technologies (Afolayan & de la Harpe, 2020). Since 63.64% of the respondents in the research data have less than ten years of experience, this fact can be a good argument for why this study differs from other studies by confirming the negative association among those variables. Therefore, more practical and detailed training needs to be provided for the executives to increase their digital transformation experience of executives.

According to the Eurostat Basic Digital Skills statistic (2021), 54% of people between 16 to 74 years old in Europe have basic digital skills. However, although the volume of Czechia is greater than the average (around 60%), the country stays behind many European countries, including Denmark, the Netherlands, and Finland. Moreover, although the ranking of Czechia in the level of country preparedness to exploit digital transformation index is 29 around the world, the country's ranking for training and education is 38 (IMD World Digital Competitiveness Ranking Report, 2022). In this regard, policymakers need to emphasize the development of practical training and theoretical courses for company executives.

Conclusions

Since SMEs lack financial assets and financial resources compared to their larger rivals, the development of digital literacy among their workers and the securitization of their digital tools seem to be a rocky road in their digital transformation process. In this regard, SMEs' dynamic capabilities, such as their interest in their employees' digital literacy and their activities regarding the security of digital tools, need to be investigated in detail to provide solutions for the obstacles of the digital transformation process. For these reasons, this paper tries to find out the positive impacts of dynamic capabilities on the digital transformation of SMEs.

This paper uses data from 330 SMEs located in Czechia. Telephone surveys collected the data to achieve the research's aim. Moreover, this paper applies purposive and stratified random sampling methods to create the research sample. Finally, the researchers performed all the analyses by running Ordinal Logistic Regression Test in the SPSS program.

According to the results, this paper does not find a positive relationship between SMEs' digital literacy and security activities and their digital transformation process. The reason for that might be related to their funding opportunities. Besides looking for EU support, SMEs can have a joint venture agreement with a company with greater financial power, more digital literacy training, and some other activities to secure transactions via digital tools. With such a collaboration, SMEs receive financial and security support from their partners. Partner companies can also create a network to increase digital literacy among their employees.

On the other hand, this paper confirms the non-existence of a positive association between SMEs' concerns for the digital literacy of their employees and their digital transformation process. The experience of SME executives might be a strong argument to explain this result. In this regard, governments can collaborate with universities to provide training for company executives. Pieces of training can focus on developing the executives' skills, personal attitudes towards technological developments, the usage, and understanding of executives regarding new digital technologies, and interest in new technological trends that SMEs can implement for their operations. Moreover, managers and owners of SMEs can be trained for the obstacles that they might face during the adoption of new technologies and can be informed of the solutions to overcome those barriers. Valuable training, such as trials of some programs that SMEs might use for their operations, can be included in the executives' courses. SMEs can also collaborate with universities and provide internship programs for students who study information technologies and are good at IT programs. After the students' graduation, SMEs can hire them to increase digital literacy in their businesses. By taking such actions, SMEs can reduce their cyber-security and digital literacy concerns.

This paper brings various dynamic capabilities of SMEs into a study and looks at their impacts on digital transformation. Moreover, this paper also conceptualizes the major obstacles SMEs face in digitalization. By highlighting these barriers, this research also provides alternative solutions for SMEs to adopt the technologies used in the digitalization process easier

and quicker. However, although this paper contributes to the RBV theory and provides some initiatives that policymakers and SMEs can take, this paper has some limitations. For instance, this paper is only limited to the dynamic capabilities of RBV, the perceptions of company executives, and the non-financial data of SMEs from a European country. For these reasons, further studies can also include organizational capabilities and financial statements of SMEs and larger enterprises from various countries in their research. By doing so, new studies can make both country-level and firm-level comparisons. Moreover, having financial statement analyses can make further studies to indicate the financial issues of SMEs in detail. On the other hand, the survey that this study applies aims to analyze the general perspective of firm executives regarding digital transformation, digital literacy, and cyber security of their businesses. In this regard, new studies can extend such surveys by including more specific questions about the particular aspects of cyber security, digital literacy, and digital transformation to enlarge enterprises' digitalization.

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Annex

Table 1. Variables and measurements

Variables	Measurements
Digital Transformation	“ What is your company's digital transformation phase in the digital transformation process?”
Digital Literacy concerns of SMEs	“ The digital literacy of employees is important for your company.”
Digital Literacy activities of SMEs	“ The steps/activities being taken in your company to increase employees' digital literacy level. ”
Security Activities of SMEs	“ You are dealing with cyber security issues connected to digital transformation.”

Table 2. The assumption testing for ordinal logistic regression models

Assumptions	Model fitting				Goodness of fit Pseudo R-square		Test of parallel lines			
Models	-2 Log likelihood	Chi-Square	df	Sig.	Cox & Snell	Nagelkerke	-2 Log likelihood	Chi-Square	df	Sig.
Model 1	117.351	58.678	3	0.000	0.163	0.177	58.672	12.299	6	0.056
Model 2	131.789	68.607	3	0.000	0.188	0.204	63.182	10.018	6	0.135
Model 3	219.850	154.458	3	0.000	0.374	0.406	65.392	7.777	6	0.334

Note: Sig.: Significance

Table 3. Sample profile

Items	Categories	n	Share
Firm size	Micro	110	33.33%
	small	110	33.33%
	medium	110	33.33%
	Total	330	100%
Firm sector	manufacturing	165	50%
	service	165	50%
	Total	330	100%
Respondents' Education	Less than bachelors'	90	27.28%
	Bachelors' and more	240	72.72%
	Total	330	100%
Respondents' Working Experience	Up to 10 years	210	63.64%
	More than 10 years	120	36.36%
	Total	330	100%

Table 4. The results for 1st research model

Variable	Estimate	S.E.	Wald	df	Sig.	Odds Ratio	95% CI [Lower Upper]	
Dig. Trans. = 1	-2.690	0.232	134.645	1	0.000	0.068	[-3.144	-2.236]
Dig. Trans. = 2	-1.646	0.200	68.068	1	0.000	0.193	[-2.037	-1.255]
Dig. Trans. = 3	0.826	0.174	22.579	1	0.000	2.283	[0.485	1.166]
Litconofcom = 1	-2.161	0.475	20.676	1	0.000	0.115	[-3.092	-1.229]
Litconofcom = 2	-2.173	0.316	47.237	1	0.000	0.114	[-2.792	-1.553]
Litconofcom = 3	-1.091	0.248	19.329	1	0.000	0.336	[-1.578	-0.605]

Note: S.E.: Standard Error, df: Degree of freedom, CI: Confidence intervals.

Table 5. The results for the 2nd research model

Variable	Estimate	S.E.	Wald	df	Sig.	Odds Ratio	95% CI [Lower Upper]	
Dig. Trans. = 1	-2.800	0.255	120.511	1	0.000	0.061	[-3.300	-2.300]
Dig. Trans. = 2	-1.714	0.223	58.946	1	0.000	0.180	[-2.152	-1.277]
Dig. Trans. = 3	0.779	0.197	15.658	1	0.000	2.180	[0.393	1.165]
Litactofcom = 1	-2.547	0.342	55.329	1	0.000	0.078	[-3.218	-1.876]
Litactofcom = 2	-1.711	0.310	30.403	1	0.000	0.181	[-2.319	-1.103]
Litactofcom = 3	-0.626	0.268	5.476	1	0.019	0.535	[-1.151	-0.102]

Table 6. The results for 3rd research model

Variable	Estimate	S.E.	Wald	df	Sig.	Odds Ratio	95% CI [Lower Upper]	
Dig. Trans. = 1	-4.304	0.397	117.518	1	0.000	0.014	[-5.083	-3.526]
Dig. Trans. = 2	-3.062	0.372	67.643	1	0.000	0.047	[-3.792	-2.333]
Dig. Trans. = 3	0.350	0.263	1.770	1	0.183	1.419	[-0.166	0.865]
Security = 1	-3.473	0.395	77.126	1	0.000	0.031	[-4.248	-2.698]
Security = 2	-0.356	0.389	0.839	1	0.360	0.700	[-1.119	0.406]
Security = 3	-0.429	0.390	1.207	1	0.272	0.631	[-1.194	0.336]