Dynamics of related and unrelated digital diversification in established firms: Strategies, programs, process, and outcomes

Martin Andreasson a, Solmaz Filiz Karabag a,b,*, Johan Simonsson c, Girish Agarwal d

a Department of Management and Engineering, Linköping University, SE-581 83 Linköping, Sweden
b Department of Civil and Industrial Engineering, Uppsala University, 752 37 Uppsala, Sweden
c Unit of Integrated Product Development and Design, School of Industrial Engineering and Management, Royal Institute of Technology KTH, Linstedtsvägen 30, 114 28 Stockholm, Sweden
d CIOO Piab AB, Vendevägen 89, 182 32 Danderyd, Sweden

ARTICLE INFO

Keywords:
Digital diversification
Related vs unrelated
Digitalization programs
Strategy implementation
Management involvement
Established manufacturing firms

ABSTRACT

Research on digital transformation focuses on business models and technological innovation but it often lacks a detailed exploration of how firms develop, execute, and evaluate related and unrelated digital diversification strategies. To address this gap, this study employs a multiple case study approach to uncover the varied processes and outcomes of implementing digital diversification programs in established firms. The findings reveal that established firms frequently refine and adjust their digital diversification strategies to achieve desired results. Specifically, related digital diversification strategies benefit from well-defined market segments, clear technological focus, and robust senior management support. In contrast, unrelated digital diversification strategies thrive through extensive exploration and experimentation with novel digital technologies and markets, reduced senior managerial intervention and increased middle- and lower-level management involvement. Semi-related digital diversification strategies, which incorporate elements of both related and unrelated approaches, often encounter tensions owing to conflicting traditional and new program execution methods, posing significant realization challenges. Key factors identified as instrumental in the success of digital diversification strategies include technology, markets, management & organization, and program execution. The study concludes by discussing the managerial and academic implications and offers recommendations for future research in this domain.

1. Introduction

Disruptive digital technologies, such as artificial intelligence (AI), digital platforms, cloud technologies, and data analytics (Ghosh et al., 2022), have created unanticipated opportunities for born-digital firms and challenges for established firms (Vial, 2019). These technologies triggered the emergence of successful born-digital firms such as Amazon and Google, which created new markets and later diversified into several existing markets (Birkinshaw, 2022; Menz et al., 2021), threatening established firms’ businesses. Thus, established firms have been competing with the existing products of their traditional competitors and the digital products of born-digital firms in the same market, potentially challenging established firms’ market positions.

To seize new digital opportunities, respond to born-digital firms, and avoid being locked into shrinking markets (Siachou et al., 2021), established firms strategically engage in digital transformation (Warner and Wäger, 2019) and broaden their business scope through digital diversification (Fernandez-Vidal et al., 2022; Zhou et al., 2021). Firms diversify into related (close to the current product and market segments) or unrelated (distant from the current product and market segments) businesses (Ansoff, 1957). Digital diversification also involves adding digital features to existing products and innovating new digital products, services, and solutions in existing or new markets (Aversa and Hueller, 2023; Pizzo et al., 2022).

Digital diversification opens extensive growth opportunities (Aversa and Hueller, 2023). However, firms that are unable to realize their digital diversification strategies also run the risk of failing to transform digitally (Loonam et al., 2018). As suggested in previous research (Sebastian et al., 2020), while most firms can define and formulate their strategies, they struggle to implement and create positive outcomes from

a Corresponding author at: Department of Management and Engineering, Linköping University, SE-581 83 Linköping, Sweden.
E-mail addresses: martin.andreasson@liu.se (M. Andreasson), solmaz.filiz.karabag@liu.se (S.F. Karabag).

https://doi.org/10.1016/j.techfore.2024.123300
Received 25 April 2023; Received in revised form 25 December 2023; Accepted 21 February 2024
0040-1625/© 2024 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).
them. In the digital context, Tabrizi et al. (2019) reported that 70% of firms engaged in digital transformation failed to reach their intended outcomes, and McKinsey (2018) reported that the success rate of firms’ digital transformations dropped from 20% in 2016 to 16% in 2018. This implies discrepancies between firms’ digital diversification intentions and the achieved results (Annarelli et al., 2021) in practices and actions.

The literature on digital diversification that tries to explain its theoretical and empirical foundation can broadly be categorized into two groups. The first group comprises theoretical studies that lay the foundational theories and conceptual frameworks of digital diversification (Aversa and Hueller, 2023; Menz et al., 2021). The second group includes empirical research, which delves into practical applications and outcomes of digital diversification. This group explores successful digital diversification cases, such as those involving business model innovation and marketing activities, and often identifies a positive correlation between digital diversification and firm performance (e.g. Ferreira et al., 2019; Truant et al., 2021; Wen et al., 2022). For example, Xie et al. (2021) investigated the role of big data in aiding Chinese listed firms’ international and business diversification and innovation outcomes.

Within the empirical category, there is a focus on understanding the discrepancies between digital diversification strategies and their outcomes. These studies concentrate on aspects like technological diversification (Ceipek et al., 2021; Corrocher and Ozman, 2020) or business model innovation, offering nuanced views on the process and outcomes of digital diversification (Bouwman et al., 2019; Chaijas et al., 2019). For example, Pizzo et al. (2022) examined the strategic advantages for mature-stage sport firms diversifying into esports. However, these studies primarily focus on service sectors such as finance (Chaijas et al., 2019) and sport (Lopez et al., 2021; Pizzo et al., 2022) and may not easily translate to manufacturing-oriented firms, especially in the B2B sectors, due to their existing structural, technological and organizational challenges (Garwol, 2022; Simonsson et al., 2020). In light of these limitations, there have been calls for more research into established firms’ digital diversification strategies, particularly focusing on the execution processes, from technology and product development, and market adjustment to organizational changes (Björkdahl, 2020; Siachou et al., 2021; Simonsson, 2021). Our study aims to address this gap by enhancing the understanding of digital diversification strategies and execution processes in established manufacturing firms. More specifically, it seeks to shed light on how digital diversification programs are initiated, implemented, and evolve over time. To this end, we formulated the following research questions:

- How do established firms adjust and modify the digital technology & product and market activities to realize their digital diversification strategies?
- What factors contribute to the results of established firms’ digital diversification strategies?

To address these questions, this study employs a multiple case study approach to uncover the varied process and outcomes of implementing digital diversification strategies. We study digital diversification strategies using six strategic digital diversification programs at two established firms. This study contributes with a better understanding of how digital diversification strategies are executed within established firms from initiation to implementation, identifies how firms realize or fail to realize those strategies, and identifies what factors contribute to the results of them. The findings provide insight into established firms’ digital transformation. The remainder of this paper is organized as follows. Section 2 reviews the literature on digital diversification strategies, mechanisms, and factors that may affect outcomes. Section 3 summarizes the research methodology and its limitations. Section 4 presents detailed case descriptions of digital diversification programs. Section 5 discusses the digital diversification strategy implementation processes and factors that contribute to or hinder the realization of diversification. Section 6 offers the study’s theoretical contribution. This section also includes managerial and academic implications and suggests directions for future studies.
technology and market domains. Such unrelated diversification might mean entering a highly competitive market, can create product and market misalignment, difficulty to developing pricing strategy and lack of platform and ecosystem support. Moreover, focusing on technologies or market outside a firm’s core area can weaken the firm’s expertise in its foundational technologies over time (Ceipek et al., 2021; Kim et al., 2016).

2.2. Implementation process of digital diversification strategies

The strategy realization process is dynamic and non-linear, necessitating continuous adaptation and reassessment (Chakravarthy and Doz, 1992) and further intensified in the digital era (Chanias et al., 2019). Mintzberg and Waters (1985) highlight that strategic adjustments in response to internal or external changes are crucial for strategy realization, with missteps potentially leading to failure. Mirabeau and Maguire (2014) emphasize the role of middle managers in this process. They initiate strategic responses to address flaws in planned strategies, often adapting them autonomously to situations that senior management may not recognize. This strategy process perspective is key in understanding how strategies evolve or end over time (Langley et al., 2013). It aligns well with our study’s aim to examine “strategic events and activities within organizations” (Paroutis and Pettigrew, 2007, p. 101).

As the strategy process in the digital context is highly dynamic and uncertain (Yeow et al., 2018), firms need to adapt and reevaluate their digitalization activities along the way. This may suggest that the execution of an unrelated digital diversification strategy may lead to offerings that are related to the firm’s current products or market after the strategy execution. This could result from finding synergies with other existing products or markets or managers identifying alternative uses for the offering. Similarly, an intensity-related digital diversification strategy can lead to offerings unrelated to the firm’s existing products and markets. The literature rarely focuses on the dynamics of digital diversification and suggests what factors impact the outcomes (Chanias et al., 2019).

The outcomes of traditional diversification strategies have been widely discussed in the literature (Kim et al., 2016). Traditional diversification studies have primarily identified an inverted U-shaped relationship between the level of diversification and performance, suggesting highly related and unrelated diversification are less profitable than being somewhere in-between (Dhir and Dhir, 2015; Guerras-Martín et al., 2020), defined as semi-related diversification in this paper. Aversa and Hueller (2023) note that while digital diversification shares traits with traditional diversification, its relationship between level of diversification and performance changes. Aversa and Hueller (2023) also propose a conceptual S-shaped relationship for digital diversification, highlighting differences compared to traditional diversification. These include that digital diversification is less effective in highly related diversification, and that digital diversification is more effective than traditional diversification when relatedness decreases and digital diversification can provide positive results even in highly unrelated diversification (Aversa and Hueller, 2023). These differences are due to the digital platforms’ ability to provide synergies between seemingly unrelated markets (Adner and Kapoor, 2016). However, Xie et al. (2021) indicate that the outcomes of digital diversification are not linear, suggesting that further research is necessary to understand whether the outcomes of digital diversification are positive or negative.

Empirical research shows that digital diversification strategies may yield negative or positive results (Björkdahl, 2020; Correani et al., 2020; Xie et al., 2021). To achieve the full potential of a digital diversification strategy, firms predict, measure, revise, and control their expected outcomes as key performance indicators (KPIs) (c.f., Libert et al., 2016). While some firms use traditional KPIs, such as return on investment (ROI), cost savings, and revenue generation, to determine whether digital diversification is realized, others focus on non-financial, softer KPIs. These include enhanced customer/user experiences, more efficient production systems, stronger digital networks and collaborations, and an improved corporate image (Schräge et al., 2022).

3. Methodology

3.1. Research design

The process of executing a digital diversification strategy is highly dynamic and unpredictable (Chanias et al., 2019), and the researcher(s) have no control over the strategic intentions and implementation of the studied firms (Yin, 2018). Thus, this study required a research design that would allow for flexible data collection and an in-depth analysis of the processes and practices of the strategy. Furthermore, as the digital diversification strategy research field is still in its infancy, with limited empirical studies examining how firms execute such strategies (Pizzo et al., 2022), we chose an explorative qualitative research design. This renders an in-depth understanding of the process of realizing strategies, “to determine the cause of events” and to observe the critical events that hinder or facilitate successful results (Merriam and Tisdell, 2016, p. 5).

3.2. Case selection and research setting

This study is part of a long-term research program on the digital transformation of established manufacturing firms. Two project partner firms, North and South, provided contemporary and historical data collection opportunities. The third and fourth authors were industrial PhD students at these firms who supported long-term process-related data collection. Both firms are headquartered in Sweden, and although founded there, they operate on a global scale. North operates exclusively in the business-to-business (B2B) market, while South primarily engages in B2B activities but also has a small presence in the consumer market. While Firm North recently started to engage in digital diversification strategies and considered itself in the initial stages of its digital transformation, South has engaged in digital diversification strategies since approximately 2012. During this period, the firms launched several digital products and services.

We applied a purposeful sampling technique to study firms’ digital diversification strategies (Patton, 2015) with four criteria. First, we selected strategic programs intended to apply digital technologies to enhance current products or services or to develop entirely new digital products or services for existing or new markets. This allowed us to include different digital projects and programs (Wheelwright and Clark, 1992; Yang et al., 2021) to observe firms’ intentions to diversify, how they pursue digital opportunities in existing and new markets, and the program execution process. All studied programs should intend to broaden the firms’ portfolio or market scope using digital technologies. Second, we examined programs with at least one active project manager or team member who remained involved in the program from the beginning to the end. Third, the program’s lifecycle had to be longer than three years, enabling us to investigate programs that had time to mature. Fourth, the selected programs should have reached some critical conclusion, allowing us to identify their outcomes as either realized or unrealized.

After the initial case selection, the relatedness, execution process, and outcomes of each case were discussed during the three workshops. After each workshop, the selections were discussed with industry experts, such as digital management officers (who are not co-authors of this paper), to identify similar and complementary aspects of the program to the existing business resources and capabilities and to identify the redeployment of existing resources and capabilities into these programs (Luithge, 2020). Thus, this study uses both researchers’ theoretical knowledge and managerial perceptions to assess the relatedness of digital diversification (Tanriverdi, 2005). In the first workshop, we examined how the programs related to existing core products and markets by discussing the firm’s customer segments, technology and
product development processes, resources and capabilities, and business models. After reviewing the interviews and drafting case descriptions, in the second workshop, we chose six programs that fulfilled all the criteria for the purposeful case sampling technique, referred to as Alpha and Beta from North and Gamma, Delta, Epsilon A, and Epsilon B from South to protect anonymity. The third and fourth authors discussed the level of each program’s relatedness with managers at their respective firms. The third workshop focused on verifying the results and creating a coherent understanding among the authors of the program execution process.

3.3. Data collection and analysis

To explore digital diversification types and implementation, we conducted semi-structured interviews, supplemented by final program reports to assess outcomes (Bell et al., 2019). This method offered insights into the full lifecycle of the program, encompassing current and historical events during its initiation, execution, and closing phases. Our interview guide, included in the Appendix, focused on aspects like organizational structuring, new business functions, product development, and digital attitudes within firms. Data collection spanned from late 2017 to the summer of 2023. We interviewed digitalization program managers and team members, adapting to face-to-face or digital formats due to Covid-19 restrictions. In total, thirty interviews were conducted. Specifically, from September 2021 to October 2022, we interviewed nine managers, product owners, and AI engineers involved in the selected programs. The first author led all interviews, with the second and third authors often participating. Interviews varied in length from 40 to 70 min and were recorded and transcribed for analysis.

Our data analysis involved several iterative and overlapping steps. Initially, all authors meticulously reviewed the interview transcripts, forming initial interpretations. We then engaged in “within-case and cross-case analysis” to identify process patterns and case similarities. The first step, within-case analysis, focused on factors relevant to the study’s themes like relatedness and execution towards program realization or failure. These factors encompassed program initiation motivations, firm capabilities, development stages, target customers, challenges, and current status (Bell et al., 2019). In the second step, through cross-case analysis, we compared cases to discern patterns that distinguished successful from unsuccessful diversification programs. This comparison included an assessment of realized and unrealized programs across related, semi-related, and unrelated categories. We developed general themes to encapsulate key factors like the reasons for program initiation, market gap identification, and the use of new digital technologies in product development.

Additionally, we analyzed the final reports of the programs independently from the interviewee statements to confirm whether the digital diversification strategies were realized. We ensured that all identified themes were represented in each program for a comprehensive comparison. In the final stage of data analysis, we reviewed our findings with two managers (who are not co-authors) for additional insights and refinements, as acknowledged in our paper.

4. Case descriptions

4.1. Alpha case

At Firm North, Alpha began as an experimentation program intended to combine the positive features of two product architectures to simplify the product portfolio and reduce the number of variants. The CTO and program owner wanted to develop the most advanced product in their market segment to satisfy several existing and new potential customers. The new product was designed to be future-proof with added digital technologies that enable connectivity, data collection-pipelining-storage, raw data analysis/assessment, Digital User Interface on a mobile device, two-way communication with firmware over the air (FOTA) functionality, as well as traditional machine learning models with pattern recognition during the product usage. The digital value proposition for the customer was being able to connect the product, see operations data, and take decisions for service or maintenance proactively without any downtime. The Alpha program was set up like earlier programs, focusing on existing capabilities and personnel and limited real-world testing together with future customers. The team wanted to include all known customer needs in the product but soon realized it would be impossible. Instead, they included all the functionalities that they believed the customers wanted. The program and its approach were well-anchored in the organization and received full support from senior management.

During its implementation, the program faced three main technology-related challenges. First, it was more difficult to integrate the two product architectures than expected because the architectures were designed to fulfill different tasks, and the product became a compromise between the two. Second, the development team struggled to include all customer requirements, and instead added all the functionalities that they believed would make the product stand out. However, their perceptions of what customers wanted did not correspond with the actual customer needs. Third, because the program team had no experience developing and integrating digital technologies, it acquired skills from a consultancy firm to support development. However, the program’s team struggled to disseminate the consultants’ knowledge internally. Despite setbacks during product development, the program received full support from senior management, with a general feeling within the firm that this new product would be successful.

The product generated skepticism among customers soon after it was launched. First, most customers were not interested in having both architectures in one product because it did not solve critical customer problems. Secondly, customers found it too expensive and complicated, and the data generated from the sensors and connectivity were not used. Third, customers constantly had to request services and repairs as the product malfunctioned. The program team attempted to improve the product, but the existing knowledge and external expertise were insufficient to solve technical and digitalization issues. The program report showed that the program dramatically exceeded expected costs and required extra investment to meet customers’ needs. Therefore, senior management cancelled the program in 2020.

4.2. Beta case

North’s Beta program began when the firm saw an opportunity to use its core technology to create an integrated product. The product includes all the functionalities required for a specific task to satisfy a defined customer need. The integration of digital technologies included sensors and actuators to capture product usage data, connectivity functionality to capture data into the backend using LTE (3G/4G), showcase the captured data on web and mobile application and provide dashboards on the usage of the product. This would allow North to add new features like firmware update and advanced analytics online, ability to do e-commerce in spare parts and services, reminders on maintenance and support based on the actual usage of the product rather than a scheduled plan. The digital technology integration into the product required internal development combined with external expertise. The firm’s typical product-development process focuses internally on limited customer collaboration. For the Beta program, however, the intention was to be more customer-centered than before to understand their needs. The program received considerable support from senior management, who perceived it to fit well with the firm’s overall strategy.

The program team developed prototypes that were sent to key customers. The customers reported how the product performed, and the team changed the specifications accordingly. Several technology-related issues arose from this development process. First, some customers required a higher capacity than others, making the product complicated and expensive. As most customers did not require a high capacity, the team decided to reduce it to an acceptable level. Second, technology
integration required more external competencies than initially thought, and the program team needed a specific type of electronics and mechatronics competency that was difficult to attract. Finally, the program struggled to identify an effective use of integrated digital technologies. The program team conducted experiments to provide suggestions for preventive maintenance and remote support using sensors and connectivity. However, as customers were unable to identify the added value of such functionality, the team temporarily removed the digital technologies from the product.

Over the last five years, the program team has iteratively developed the product, with key customers assessing prototypes. This iterative development process allowed the program team to identify and solve critical customer needs. Having acquired external expertise and worked closely with customers, the team created a product that received positive responses from customers and generated preorders. The program team were able to build new knowledge that was not only useful for completing Beta, but also for other future programs. Despite low customer interest in digital technologies, there are some discussions on integrating them into future versions of the product to provide distance troubleshooting and preventive maintenance recommendations. The product is now launched and attracts both interest and orders from several customers, each buying more than one product.

4.3. Gamma case

The Gamma Program stems from a collaboration with several firms in different industries and was initiated in 2017. The initial idea with the program was to test and evaluate a new sales channel and enable customers to rent, rather than buy, a selection of Firm South’s products. The targeted customers were mostly homeowners and professional users with an occasional need for South’s products. The technology in Gamma is based on different components, and key parts are a connected container with different compartments that can hold different products, an app that customers can download to their smart phones (using Bluetooth and cellular services) to access these compartments, a subscription service that facilitates the payments for the rental period and most importantly, the firm’s own cloud based connectivity platform (running on AWS and Azure) that interconnects all the key parts and makes the different parts function as one combined solution. The cloud-based web services platform keeps track of all events that takes place during the rental occasion, i.e. publish which products are available for rent, including rental cost, enables customer access to the product by unlocking the correct compartment that initiates the rental period as well as its return, and finally makes sure that the correct cost is paid by the customer.

The firm’s typical approach would be to have the digital innovation lab develop the concept and the digital platform internally. However, their limited experience meant they engaged in collaboration with several partners. Furthermore, the Gamma program team decided that customers would pay per day, and a combination of the current dealer network and their own personnel would manage operations and where to place the boxes. The initial small-scale launch generated positive responses from customers. After the digital innovation lab developed and assessed the Gamma program, it handed over its scaling to one of South’s established business units. This unit identified Gamma as a potential means of generating revenue and placed more boxes around Sweden, but still on a small scale.

Despite receiving positive customer feedback, the management team raised concerns about Gamma potentially cannibalizing the existing business. They expressed concerns that customers would rent rather than buy products, challenging existing dealer networks’ business. Thus, Gamma received limited financial support. Therefore, the program team has shrunk, further preventing potential scale-up. Despite this hesitance, senior management does not intend to cancel the program, as it still acknowledges its potential. It has already provided useful input for understanding customer behavior and can potentially provide valuable data on how to attract the younger generation, who prefer to rent rather than buy.

4.4. Delta case

Program Delta was one of South’s first initiatives to use digital technologies in new offerings. Delta’s technology was initially based on an external device including sensors that could be added to both South products as well as products from competitors which customers may have in their fleet. Being product agnostic was important as many customers run fleets with products from different manufactures and a solution that only works for one brand would limit the value generated from the solution. Over time, similar sensor technology that was first attached to the product was later also embedded into the products. Not only was this an effective way to limit the aftermarket effort to retrofit the sensor but was also a more cost-effective approach as well as allowing richer data sets to be provided. The sensor technology used can understand the runtime of the machine, help understand where a machine was last seen and provide reminders for upcoming service and maintenance needs. The solution was initially dependent on smartphone interaction for connection between product and cloud-service but has later evolved to also include direct cloud access for certain product types. The service creates seamless digital twins of the products. South identified an opportunity to sell Delta as a service to existing customers in several different markets; therefore, the aim was to quickly launch the service and generate revenue from it.

While the add-on device provided the service a head-start before the products had embedded connectivity, Delta had some limitations. First, the design of the add-on device enabled it to work better in combination with certain product categories. Another challenge was the reliability of the connectivity and data transfer to the digital platform; Delta did not always satisfactorily meet the need for continuous uptime. Furthermore, while some existing customer types appreciated the limited functionality available initially, others questioned Delta’s value proposition. However, there was a large new market segment for which the functionality offered is an interesting fit. These new customers were customers of a different business unit of South from the one that first developed the Delta. Therefore, the program gained recognition from two business units, leading one unit to lead the development, splitting of costs, and sharing outcomes with the other unit.

Despite being launched in 2014, the program team is still working to meet the expectations of all potential customers. Although the service works well for some customers, the team struggles to achieve the same valuable experiences for others. Furthermore, some product categories still only have a few products with embedded connectivity, affecting opportunities to develop a more advanced service for which customers are willing to pay a premium. The program has not yet been able to unlock the full potential of the platform for all product categories and customer types, which is why the continuation of Delta is questioned by parts of the business units.

4.5. Epsilon A & B cases

While Delta and Gamma are associated with South’s product assortment, Epsilon focus on technology that does not involve physical products. Epsilon primarily utilizes satellite data, to which artificial intelligence (AI) algorithms are applied. These AI algorithms assess the data sets, enabling them to identify and evaluate the condition of vegetation. The insights generated from this analysis are used for decision-making in various applications, such as determining the health status of the analyzed vegetation.

The Epsilon program began as a collaboration between South’s AI lab and an external consultancy firm. The aim was to explore the business and technical possibilities of using satellite data to assess vegetation. The consultancy firm had limited technical development skills but identified an interesting business case from the technology’s potential.
Epsilon is built on South’s history of rural and urban vegetation management and provides a service for assessing vegetation and plant conditions through a digital platform. After several iterations, the program team within the AI lab identified two interesting paths for the program: focusing on forest management and assessing urban green spaces. The team decided to pursue both paths and split the Epsilon program into two parts.

4.5.1. Implementation and outcome of Epsilon A

The idea was to apply AI algorithms to satellite data images to create an overall “greenness” score for selected cities. The digital technology of Epsilon A, specifically, incorporated deep learning based on vision data. The training data set was obtained against a fee, but open-source satellite data was used to analyze and assess the output during this project. The digital solution also included traditional logarithmic and geometric mapping models to score individual cities worldwide based on certain criteria and present this on a website where visitors can compare cities. The consultancy firm continued to collaborate with the Epsilon B program, while Epsilon A brought in a startup firm to provide the data and perform parts of the analysis. Epsilon A began as a technology experimentation program rather than executing a clear business case from the start, which meant that questions on how to commercialize Epsilon A were initially out of scope. The execution of the Epsilon A program provided the team with increased knowledge of the feasibility of the technical solution, giving them the confidence to start the Epsilon B project, which had a more defined business case from the start.

Epsilon A was launched in 2019 and created a new public urban greenspace assessment market. It has grown slowly but steadily, and the team has added new functionalities to each annual launch event based on user feedback and their interests. However, the targeted customers who could provide revenue for Epsilon A remain fuzzy, and several municipalities have entered a competition to discover which city is the greenest. The service has also attracted the attention of others who found the statistics interesting. It has received internal recognition and has been featured in annual reports since its launch. The senior man found the statistics interesting. It has received internal recognition and greenest. The service has also attracted the attention of others who municipalities have entered a competition to discover which city is the team has added new functionalities to each annual launch event based on certain criteria and present this on a website where visitors can compare cities. The consultancy firm continued to collaborate with the Epsilon B program, while Epsilon A brought in a startup firm to provide the data and perform parts of the analysis. Epsilon A began as a technology experimentation program rather than executing a clear business case from the start, which meant that questions on how to commercialize Epsilon A were initially out of scope. The execution of the Epsilon A program provided the team with increased knowledge of the feasibility of the technical solution, giving them the confidence to start the Epsilon B project, which had a more defined business case from the start.

Epsilon A was launched in 2019 and created a new public urban greenspace assessment market. It has grown slowly but steadily, and the team has added new functionalities to each annual launch event based on user feedback and their interests. However, the targeted customers who could provide revenue for Epsilon A remain fuzzy, and several municipalities have entered a competition to discover which city is the greenest. The service has also attracted the attention of others who found the statistics interesting. It has received internal recognition and has been featured in annual reports since its launch. The senior management at the corporate unit and other managers were surprised by how well Epsilon A was received externally, and one of the established business units decided to provide program funding. The program offers the unit two main opportunities. The first is to brand themselves towards sustainable and green technologies, and the second is to use capabilities from the program to develop future products and services.

4.5.2. Implementation and outcome of Epsilon B

Epsilon B applied AI algorithms to satellite images to assess forest status. Although Epsilon A and B cater to different use cases, they both employ the same AI methodology but utilize distinct data sets. The program used forest industry consultants to understand what value the service could provide and which customers to target. Current alternative forest assessment methods suffer from excessive costs, are time-consuming, and provide less accurate measurements. Recognizing that using satellite data could provide large forest owners and grid operators with almost real-time updates of forest status at a fraction of the cost, the team decided to provide the service through a subscription model. Customers paid based on updated images and assessments’ coverage, resolution, and frequency. It took only a few months for the service to attract its first paying customer.

The initial success of Epsilon B stagnated shortly after launch. It became clear that the service was launched before completion, and the program team did not have the resources or capabilities to address the issues. Because the collaboration with the consultancy firm focused on business aspects, it could not provide such technical capabilities for service development. Although appealing to customers, the service did not work as intended, negatively affecting customers’ willingness to pay. Despite internal interest in using program outcomes in other applications, senior management put the program on hold at the end of 2022.

5. Analysis and discussion

We aimed to expand the scholarly understanding of the execution process of digital diversification strategies with varying levels of relatedness in established firms and to study the factors that contribute to their results. This study focuses on two research questions to achieve this aim: (a) How do established firms adjust and modify digital technology & product, and market activities to realize their digital diversification strategies? and (b) What factors contribute to the results of established firms’ digital diversification strategies? The next section discusses the answers to the first two research questions.

5.1. The implementation process and outcomes of digital diversification strategies

This study expands the digital diversification literature by showing the dynamics of the implementation processes of digital diversification strategies, how digital program relatedness changes during the implementation process, and the diverse results for digital diversification strategy implementation (see Table 1), although the programs are sometimes executed within the same departments. For example, the level of relatedness of the Alpha and Beta digital diversification programs decreased during the implementation process. As the case analysis showed, the non-realization of Alpha was mostly due to its excessive focus on technology and insufficient emphasis on customer needs, confirming the gap between strategy formulation and realized outcomes during the implementation (Mintzberg and Waters, 1985; Mirabeau and Maguire, 2014). These findings indicate that meeting targeted customers’ needs is critical for related digital diversification (Correani et al., 2020; Menz et al., 2021) and failing to do so can suspend digitalization activities in the unit. The findings indicated that similarity to existing products and the ability to redeploy existing technologies and capabilities cannot guarantee the success of related digital diversification strategies.

The analysis shows South’s Gamma and Delta programs were initiated as semi-related digital diversification (see Table 1). The internal expectation was that Delta would become a cornerstone of South’s digital transformation and yield substantial revenue; therefore, it received considerably more resources, attention, and excitement than Gamma (Engwall, 2003). While Delta internally developed its digital platform, Gamma utilized an external partner for development. Moreover, during the planning stage, the team used the firm’s proven project management tools to plan and estimate the required knowledge, human resources, and investment for Delta. This indicates how existing routines, decision-making tools, and practices are implemented during the execution of digital diversification programs (Almatrodi and Skoumpopoulou, 2023) which might cause a delay in the program or its unrealization.

Furthermore, during its implementation, the Delta team identified synergies between other product categories that saw the potential to connect their products to Delta’s digital platform. These reasons led Delta to be split into several product categories with shared development costs and outcomes, which increased its level of relatedness. In comparison, Gamma maintained its semi-related diversification orientation, as the program team did not consider uses for their program results in other product categories. Consequently, integrating multiple product categories across different business units seems to have exacerbated the complexity of existing and new technologies, market dynamics, and interactions between the various units (Åkesson et al., 2018). Utilizing a single technology platform across all product categories while simultaneously achieving successful digital transformation is difficult (Bhargava et al., 2013). The result was a compromise in which the product categories responsible for developing the platform adapted it to their products, lessening its suitability for other categories’ products. These findings show how the relatedness of digital diversification programs is adjusted during execution and how established firms
Table 1
Summary of the digital diversification programs.

<table>
<thead>
<tr>
<th>Program</th>
<th>Relatedness from start</th>
<th>Relatedness result</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>Related diversification. The new product was based on the firm’s core technology and targeted a familiar industry sector.</td>
<td>Semi-related diversification. The technology challenges of integrating product architectures were too many and therefore the project was not prioritized as customer readiness was low.</td>
<td>Unrealized. New technology but the market was not interested. The project has been closed and will not be restarted.</td>
</tr>
<tr>
<td>Gamma</td>
<td>Semi-related diversification. The technology was new for the firm, but the customers were both existing and new.</td>
<td>The program evaluated new business and sales models. The development of the platform and box was outsourced.</td>
<td>Realized. Generates revenue but no profit and limited exposure. There are no discussions on canceling it.</td>
</tr>
<tr>
<td>Delta</td>
<td>Semi-related diversification. The technology was new, but the customers were the same.</td>
<td>The program evaluated new business and sales models. The development of the platform and box was outsourced.</td>
<td>Partly realized. Despite being commercialized, there are some discussions in the South about its future. However, it is still being developed and improved.</td>
</tr>
<tr>
<td>Epsilon A</td>
<td>Unrelated diversification. A new technology was used which targeted a new industry.</td>
<td>Unrelated diversification. The technology and targeted customers are still not part of the firm’s core offerings.</td>
<td>Realized. Provide other types of value for incumbent South despite lack of direct revenues.</td>
</tr>
<tr>
<td>Epsilon B</td>
<td>Unrelated diversification. A new technology was used which targeted a new industry.</td>
<td>Unrelated diversification. The technology and targeted customers are still not part of the firm’s core offerings.</td>
<td>Unrealized. The project has been closed and is not likely to be restarted.</td>
</tr>
</tbody>
</table>

struggle to plan, execute, organize, balance, and coordinate digital diversification strategies (Björkdahl, 2020; Fernandez-Vidal et al., 2022), negatively affecting the firm’s overall digital transformation.

Epsilons A and B started from the same initiative at the AI lab to use a digital platform for an advanced digital service to a new customer group but divided into two programs later. During the main development, Epsilon A’s team decided to formulate the expected value and outcome of the digital platform for marketing purposes and improve the brand image of the firm rather than generate revenue. The newly adopted purpose and image focus became a new digital diversification intention (Mintzberg and Waters, 1985) which aligned the potential of Epsilon A to the firm needs (Mugge et al., 2020). Epsilon A’s launch generated significant internal and external interest, increasing Firm South’s reputation as a sustainable and eco-friendly firm (Corrocher and Ozman, 2020). This strategic repositioning therefore not only contributed to show South’s intentions of utilizing more digital technologies but also contributed to their sustainability focus and extended their portfolio of green offerings.

Customers’ positive responses to Epsilon A surprised the senior management, who subsequently gave it their full support. This development demonstrates that digital diversification strategies can redefine expected outcomes and values (Burgelman et al., 2018; Hess et al., 2016; Jarzabkowski, 2004; Kane et al., 2015) and gain legitimacy. Epsilon B’s team, however, stuck to traditional performance indicators for revenue generation. Although Epsilon B was promising, it could not grow as expected and did not deliver the expected customer value and revenue (Sanchez-Riofrio et al., 2022), and therefore got less managerial attention. The journey of Epsilons A and B shows that one part of an organization could stick to old practices and learning while the other could creatively change their practices.

Using qualitative analyses and comparisons among the programs, the initial level of the digital diversification program’s relatedness and how it evolved throughout the execution process was displayed in Fig. 1. Strategy implementation follows different paths and encounters different challenges, meaning that the programs had to change their ways of collaborating both internally and externally, question previous intentions, and use digital technologies in alternative ways, which eventually led the programs to reach different outcomes (Lopez et al., 2021). The findings highlight the importance of middle managers’ autonomous strategic behavior in creating strategic responses to
inappropriate or insufficient intended strategies (Burgelman et al., 2018; Mirabeau and Maguire, 2014). This emphasize how those managers redefine the intended outcomes of the programs, and how internal practices and creative adoption, such as using new types of performance indicators, can act as deal-makers, from strategy formulation to execution (Paroutis and Pettigrew, 2007; Pizzo et al., 2022) to provide legitimacy and proven value for the organization; the pausing of Epsilon B shows that managers recursively sought profitability and financial revenue, hindering creative solutions and capability building (Jarzabkowski, 2004; Menz et al., 2021; Schräge et al., 2022).

5.2. Factors for realizing or failing to realize digital diversification strategies

The above analysis of processes suggests four factors that enable or hinder the realization of digital diversification strategies, grouped under (1) market, (2) technology-product, (3) management and organization, and (4) program execution.

5.2.1. Market-related factors

Digital diversification, particularly when leveraging platform technologies, requires established firms to saturate their existing markets or venture into new markets during strategic implementation. The studied programs exemplify how market considerations are incorporated at the outset and continually refined throughout implementation. For instance, a significant difference between successful and unsuccessful digital diversification programs lies in the perceptions of market gaps and customer needs (see Table 1). A well-defined market gap and an understanding of customer needs became instrumental in the success of related and semi-related digital diversification programs. In the cases where the market gap or segment was indistinct, program managers and teams faced challenges in defining them with varying degrees of success. This underscores the complexity of identifying the intended market segment in the early stages of a digital diversification program. However, as the program progresses, refining this understanding can critically influence its positive outcomes (c.f., Chania et al., 2019).

An unclear market gap revealed a limited customer base and diminished profit opportunities in specific instances. Prahalad and Bettis (1986) emphasized the importance of understanding market potential and competitive positioning at the onset of diversification. This contradicts the unspecified market gaps in the Alpha and Delta programs, which showed initial promise but later revealed a small customer base and ambiguous market demand which did not sustain profitability (Björkdahl, 2020). This early miscalculation of Delta’s impact may have accelerated the initiation of digitalization activities and program implementation, resulting in an oversight of customer value, insights, and segmentation (Loonam et al., 2018).

Findings indicate that in unrelated diversification, success seems inversely related to market gap identification. For example, Epsilon B had a defined market gap but did not succeed, supporting Nenonen et al. (2019) who argue new technologies often create rather than fill market gaps, requiring exploration and experimentation. This suggests that success in unrelated diversification depends less on clearly defined market factors and more on adaptability (Mirabeau and Maguire, 2014; Verhoef et al., 2021). Moreover, these findings imply the need for firms to engage more actively in understanding customer needs during the entire development process of unrelated digital diversification programs. These results highlight the critical importance of market segmentation and gap identification (Ritter and Pedersen, 2020), yet not all market segments are conducive to economies of scale in the digital transformation context as the findings of this study suggested. Accurately identifying target customer groups and understanding their specific needs and expectations of digital products and services are pivotal to the success of digital diversification strategies, emphasizing the need for strategic marketing foresight and planning (Kohtamäki et al., 2022; Oroh, 2021). These findings indicate that digital diversification programs need flexibility in market segmentation adjustment.

5.2.2. Technology and product-related factors

While Aversa and Hueller (2023) emphasize the pivotal role of digital platforms in digital diversification, our findings, particularly those from Alpha and Beta, reveal that firms’ recognition of the importance of such platforms is not always obvious, and understanding its importance can be a gradual process. In these instances, a digital platform facilitating data collection, storage, and analysis was not initially the focal point, as interviewees indicated. Notably, such a digital platform only became a strategic priority for North in early 2022, which followed the suspension of Alpha and the reevaluation of digital technologies in Beta.

Fig. 1. The journeys of the digital diversification programs.

Note: The figure was developed to visualize the journey for the programs. It was built on qualitative, rather than quantitative data.

Source: author’s data collection.
Thus, this study highlights the challenges that established firms face in integrating digital technologies into their product strategies and recognizes the critical role of digital platforms in digital diversification (Gaver and Cusumano, 2014; Verhoef et al., 2021).

The semi-related digital diversification program teams first decided what kind of product or service they wanted to create and then chose a suitable technology. These findings indicate that increased digital diversification relatedness emphasizes exploiting current digital technology (Csepek et al., 2021). However, the Gamma and Delta digital platforms’ technological complexity, number of different connected products, and capacity differed. The Delta program was adjusted to include many product categories without ensuring the digital platform’s success in a limited product categorization. Such stretching increased the intricacy of the Delta since the South has diverse product categories that are part of different market segments, requiring different technological configurations and standardization (Åkesson et al., 2019). In contrast, involving just one business unit’s products reduced Gamma’s complexity, and it steadily showed its product value for the firm and users.

Reflecting on the journeys of Epsilons A and B, we see a snapshot of broader challenges in digital diversification. Epsilon A, which began as a technological exploration, evolved into a unique market niche, demonstrating the strategic value of adaptability and user-driven innovation in the face of uncertainty. This contrasts with Epsilon B, where initial success was undermined by premature market entry and technical shortcomings, underscoring the necessity of aligning technological development with market readiness. In sum, these cases emphasize the multifaceted nature of digital diversification, which is not solely about technology integration but also involves understanding market dynamics, customer needs, the timing of product launches, continuous adaptation (Aversa and Hueller, 2023; Schiuma et al., 2021) and creativity during execution, aligning with the decision-making and technology complexities discussed in the Gamma and Delta programs. The experiences of Epsilons A and B, therefore, reinforce the need for a holistic approach to digital diversification strategies where technological innovation is balanced with market insights, adaptation, flexibility, and operational readiness.

5.2.3. Managerial & organization-related factors

The findings indicated that senior management is highly involved in related diversification programs to set the context and make critical decisions on continuing or suspending programs, eventually leading to their realization or un-realization (Wrede et al., 2020). In North’s Alpha and Beta programs, the senior management teams were the decision-makers at all stages. For example, in the case of Alpha, strong senior management support meant that the program survived. Even though the initial customer interest was low, the program exceeded its budget, and the functionality was poor. This might be because senior management sets digital diversification strategies and selects platforms that can be rapidly realized with existing resources (Björkdahl, 2020; Charias et al., 2019) and in certain cases continue the program that might be good for overall growth but does not provide the expected value and financial outcome.

Altintas et al. (2022) suggested that a higher degree of diversification leads to more senior management involvement, but the findings of this study emphasize the opposite. Senior management attempted to intervene in semi- and unrelated digital diversification programs such as Delta, Gamma, Epsilons A, and B, but middle- and lower-level managers have often sought to limit this involvement. This tendency could be attributed to the agility and flexibility needed for these programs, which often demand a deeper understanding of technical or market complexities, aspects to which middle- and lower-level managers may be more attuned. For instance, when the senior management suggested suspending the Epsilon A program, the AI lab sought internal support from product category managers, split the program to reduce complexities, and creatively developed outcome measurements to promote Epsilon A’s success. This indicates that middle- and lower-level managers adopt adaptive and creative approaches in less related digital diversification strategies, effectively resolving potential tensions within the organization (Mirabeau and Maguire, 2014).

These findings imply that established firms pursuing digital diversification should consider their organizational strategies and structures. The findings advocate more decentralized decision-making processes in which middle- and lower-level managers can make critical decisions in certain diversification programs and reduce complexities. This could lead to more dynamic, proactive, and technically aligned digital diversification strategies crucial to the rapidly evolving digital landscape and platforms.

In executing digital programs, Gamma, Delta, and Epsilons A and B have adopted an alternative organizational strategy approach, balancing separation and integration. The Delta program sought to integrate various business units and product categories into its platform, aiming for a more unified approach (Iless et al., 2016). Such organizational integration leads to complex coordination because each unit and product category has their own objectives, processes, and dynamics, which are not necessarily compatible. Moreover, while all of the business units’ managers provided extensive attention to Delta, the other unit were unable to do the same, compromising the programs’ outcomes and effectiveness (Smith and Beretta, 2021). Further, such integration efforts increase operational complexity and slow down decision-making (Yoo et al., 2012). Conversely, Gamma, Epsilon A, and Epsilon B have implemented some level of separation strategies (Svahn et al., 2017). For instance, Gamma was confined to a single business unit and limited to a specific set of product categories. Such an organizational arrangement increased the attention from managers (Smith and Beretta, 2021) and sped up decision-making and adaptability, allowing individuals to swiftly adjust to internal and external changes without negotiating with other categories and units.

Epsilons A and B also followed an elevated level of organizational separation pattern. By embracing such an organizational arrangement, an established firm could foster more dynamic, responsive, and technologically aligned digital diversification strategies (Kane et al., 2015). South’s units and AI lab are given some autonomy to respond quickly to diversification shifts, thereby enabling novel solutions to emerge more frequently and efficiently than in a tightly integrated organizational model. This divergence in strategies—integration in the case of Delta versus separation in Gamma, Epsilons A, and B—reflected the varied approaches to organizational structuring in digital program management (Smith and Beretta, 2021). The findings suggest that a separation strategy at least for Gamma, Delta and Epsilon A supported their positive outcomes.

5.2.4. Program execution-related factors

The study presents an analysis of six digital diversification programs, each demonstrating varying levels of success, and offers insights particularly from a program and project management perspective. While it neither supports nor diminishes Aversa and Hueller’s (2023) finding that the relationship between relatedness and digital diversification performance follows an S-shaped profile, it brings to light three crucial aspects. Firstly, it highlights the role of program management in Epsilons A and B, where technological similarities facilitated unrelated diversifications. The divergent outcomes of these programs—Epsilon A’s success with slight modifications versus Epsilon B’s failure to engage customers—underscore the importance of adaptable project management. Secondly, the study reflects on Alpha and Beta’s related digital diversification intentions. These programs struggled to effectively utilize digital technologies, indicating a gap in integrating these technologies within their existing frameworks, and hence, pointing to the need for more robust project management strategies (Aversa and Hueller, 2023). Third, the experiences of semi-related digital diversifications, namely Gamma and Delta, struggled to achieve their intended outcomes challenges Aversa and Hueller’s (2023) view suggesting that the most
beneficial digital diversification does not necessarily lie between related and unrelated extremes. Gamma’s attempt to set up a new digital sales channel and Delta’s endeavor to monetize data through a digital platform resulted in internal conflicts and collaborative challenges. The findings highlight the complexities in managing digital diversification programs that straddle between relatedness extremes and underscore the critical role of both program and project management in navigating these intricacies.

The study of unrealized digital diversification programs reveals key challenges in adapting development processes when encountering issues. For instance, the unrealized Alpha and partly realized Delta programs initially struggled to define market gaps and target customers. Despite indications that Alpha’s product and Delta’s service were not appealing to intended customers, the teams found it difficult to reorient their programs. Additionally, the Epsilon B program, while introducing a new business model for South, faced technological limitations and integration challenges with the existing product category. This led to the program being paused due to difficulties in aligning its development with the established product line. These factors highlight the need for established firms to engage in continuous learning and capability building when digitally diversifying (Altintas et al., 2022) and creating resources to build new capabilities ( Warner and Wäger, 2019). While established firms derive from stable markets with historically unchanging customer needs, digital technologies disrupt previous development processes and require more experimental and adaptive program execution approaches ( Björkdahl, 2020).

The final assessment of the KPIs of an executed strategy is critical for judging whether digital diversification is successful ( Schrage et al., 2022). This evaluation is key to understanding the varied outcomes and degrees of realization of the strategies employed. The findings show that digital diversification results in different outcomes and degrees of strategic realization. While related digital diversification is more likely to yield swift results because it utilizes existing resources and processes, unrelated digital diversification requires more time, new learning, and collaboration with internal and external actors, which can generate slower and lower revenues (Ceipek et al., 2021; Kim et al., 2016). Consequently, unrelated diversification outcomes might be perceived as less successful because of slower realization than related diversification.

The study’s findings reveal two critical dimensions of realizing digital diversification strategies, focusing on measurement methods and timing. Firstly, there is a shift in performance metrics for established firms and program managers. Moving away from traditional measures like revenue and ROI, there is an increasing emphasis on softer metrics such as customer experience enhancement and corporate image improvement ( Schrage et al., 2022; Warner and Wäger, 2019). For instance, despite Epsilon B’s original revenue generation goal, its potential was seen as promising, suggesting a valuation based on non-traditional metrics. The program’s premature commercialization and insufficient emphasis on value creation contrasts with Epsilon A, which, given its extended development time, managed to deeper understand customer interest, thus redefining its success on softer metrics. Secondly, the findings highlight the crucial aspect of timing in digital diversification. Unrelated diversification, requiring more time and resources as suggested (Ceipek et al., 2021), challenges the efficacy of traditional short-term success assessments ( Björkdahl, 2020). This underscores the need for a long-term view when evaluating digital diversification outcomes.

Factors related to the success or non-success of related, semi-related, and unrelated digital diversifications are summarized below in Table 2.

### 6.1. Theoretical contributions

This study enhances the literature on successful and less successful digital diversification strategy initiation and implementation ( Lopez et al., 2021), integrating insights from the strategy process view ( Burgelman et al., 2018), and diversification strategies based on digital technologies and platforms ( Aversa and Hueller, 2023; Chanias et al., 2019; Xu et al., 2023). It specifically contributes by illustrating how digital technology and market gaps were initially identified in strategy programs and the necessity to refine and expand these aspects during execution. The study finds that timely adjustments, reevaluation of digital technology applications, and their realignment in new markets are crucial for digital diversification success, emphasizing the need for flexibility in strategic planning. In cases of related digital diversification, it was observed that some firms rely on traditional departments for developing digital products and services, highlighting a lack of recognition of the importance of digital platforms and separate organizational structures.

This study extends research indicating that digital diversification and transformation in established firms often receive insufficient focus, are executed in an ad hoc manner, and tend to stagnate as mere experimental or pilot initiatives. Specifically, it was observed that in two instances, the firm treated digital diversification as traditional diversification, neglecting platform technologies, which partly led to failure. While previous research ( Pizzo et al., 2022) has identified technology scope, and specific customer needs in realizing digital diversification strategies, this study confirms these aspects and further emphasizes the significance of the implementation process, management engagement and attention. This includes shifting focus from financial objectives to softer targets such as brand value. Critically, the study underscores the pivotal role of management in digital diversification. It highlights that while senior management provides resources

### Table 2

<table>
<thead>
<tr>
<th>Factors that contribute to the success of the digital diversification programs (DDPs).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of relatedness</strong></td>
</tr>
<tr>
<td><strong>Related digital diversification</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Semi-related digital diversification</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Unrelated digital diversification</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

### 6. Conclusions

This study responds to empirical and theoretical gaps in understanding how established firms execute related and unrelated digital diversification strategies and what factors contribute to their strategies being realized.
and strategic direction, it is the middle and lower managers who maintain program momentum and apply creative adjustments to execution.

This study offers insights that challenge the existing literature’s view on the organizational separation and integration of digital diversification (Hess et al., 2016). It reveals that both organizational approaches can coexist within a single firm. When firms attempt to integrate digital platform development across various product categories and business units, the program often faces challenges due to its extension over diverse segments (Smith and Beretta, 2021). This extensive organizational integration may be a contributing factor to digital diversification failures, particularly in firms operating across multiple industries with a range of product categories. Additionally, the study presents a nuanced perspective on the organizational separation approach. While it found success in two programs within one established firm, another program in the same firm did not achieve equivalent results, suggesting that the effectiveness of separation approaches can vary significantly even within the same organizational context.

The study’s findings partially corroborate the concept of an S-shaped relationship between performance and relatedness (Aversa and Hueller, 2023) particularly for programs exhibiting high degrees of relatedness and unrelatedness. It is anticipated that related and semi-related digital strategies will generally be more successful, as they leverage a focus on existing products and/or markets within organizations. However, this study reveals that semi-related digital diversification presents notable challenges. This complexity arises from the need to merge new activities with existing ones within the firm, leading to considerable tensions in the programs under examination.

This study significantly advances the strategy-as-process literature (Burgelman et al., 2018) by offering a nuanced examination of the conception, adaptation, and execution of digital diversification programs. It doesn’t just delineate but critically analyzes the conditions under which top management involvement optimizes strategy execution, and it uncovers and articulates the innovative tactics middle managers employ for effective implementation. In doing so, this research doesn’t merely expand but revolutionizes contingency-based research, providing a profound, comprehensive understanding of the strategic dynamics at play in digital diversification. It illuminates the intricate interplay between different levels of decision-making and the adaptive processes within organizations, thereby not just contributing to but also profoundly redefining the conversation initiated by seminal works in the strategy-as-process domain and contingency-based research (Chakravarthy and Doz, 1992; Warner and Wäger, 2019). This study sets a new benchmark for future research and practice, calling for a re-evaluation of established strategic approaches and encouraging a more dynamic, responsive mode of strategy development.

6.2. Practical implications for managers and academicians

This research provides several implications for practitioners and academicians. The findings imply that managers and practitioners should tailor firms’ digital diversification strategies according to whether they are related, unrelated, or semi-related to their existing operations. Related diversification strategies should focus on well-defined market segments, a clear technological focus, and robust senior management support. Unrelated diversification strategies require extensive exploration and experimentation with new technologies and markets, along with a reduced role for senior management and a more significant role for middle and lower-level management. Semi-related strategies need a careful balance between traditional and new execution methods to manage inherent tensions.

It also suggests that key to successful digital diversification lies in a proactive, integrated approach from the outset. Incorporating digital technology and marketing analysis early on helps in pinpointing market opportunities and gaps, allowing for more precise strategy tailoring to the digital landscape. This foundational embedding of technology and insights ensures that established firms can be quick to respond to market shifts, keeping their initiatives in sync with consumer expectations. Moreover, a commitment to continuous evolution is critical. This involves not just launching digitalization programs but also periodically reviewing and adjusting strategies to stay adaptable and aligned with new technologies, market trends, and customer behaviors, maintaining a competitive edge.

The findings suggest a dynamic interplay between middle and top management is pivotal for the efficacy of digital diversification strategies. Middle managers, with their intimate knowledge of operational realities and technical details (Sirmon et al., 2011), provide essential insights into digitalization, making their role in strategy development and decision-making crucial for maintaining responsiveness and relevance. Empowering these managers to actively contribute can lead to more practical and timely innovations and solutions, ensuring strategies are grounded in real-world complexities. Conversely, top management must balance their strategic oversight with granting autonomy to these informed middle layers. They should cultivate an environment that values agile decision-making and diverse insights, adjusting their involvement to avoid stifling lower-level innovation while steering the organization towards its long-term digital diversification. This synergy between the tactical acumen of middle management and the strategic direction from the top can foster a more adaptable, innovative organization, poised to navigate and succeed in the dynamic digital arena.

Moreover, the study’s insights challenge academicians to rethink traditional notions of digital strategy success. The finding that similarities to existing products and capabilities do not necessarily equate to successful diversification prompts a reevaluation of what factors truly drive digital diversification. In this light, academicians are encouraged to not only engage in interdisciplinary research but also to incorporate real-world case studies and practical examples into their work. Scholars can bridge the gap between theoretical models (Vial, 2019) and the complex realities businesses face, by examining actual practices and actions from established organizations that have navigated digital diversification. This approach would enrich the academic discourse with tangible insights and lessons learned from the field, offering a more nuanced and applicable understanding of how digital diversification strategies of established firms unfold in various contexts. Such interdisciplinary research can support developing theory from the ground and action.

This study’s detailed case narratives can be used as an invaluable educational tool, offering immense value to both executive programs for data science, business analytics, and technology management professionals and to traditional engineering and management students. These real-world examples vividly illustrate the complexities of digital diversification strategy, technology integration, and market adaptation, providing a practical perspective that aids students of all levels and specializations in understanding the necessary strategic alignment between digital technologies and market dynamics. Incorporating this material into various academic courses such as strategic management, technology management, digital transformation and program management will enrich experiential learning (Wu and Chen, 2021) by encouraging students across disciplines to critically engage with the content and delve into the nuanced implications of strategic decisions in the digital landscape. Academicians and educators can utilize these findings to design engaging strategic games, simulations, scenarios, puzzles and cases (Priem, 2019) that demonstrate the uneven process of business transformation and diversification. By making academic research relevant and actionable, this approach equips a wide range of future professionals, from budding engineers to aspiring managers, to navigate the challenges and opportunities of digital diversification, ensuring a comprehensive educational experience that seamlessly integrates theoretical insights with practical application.
6.3. Limitations and future research

The focus on only two manufacturing firms operating primarily in business-to-business industries may limit the findings’ generalizability (c.f., Bell et al., 2019). Despite this limitation, this study’s in-depth analysis of various related and unrelated digital diversification programs provides valuable insights and contributes significantly to the digital diversification literature. This research lays the groundwork for expanding studies on digital diversification into diverse sectors such as business-to-consumer and business-to-government. Additionally, there is a need for more exploratory research in underrepresented service industries such as tourism, health, and education.

Since the firms in this study are based in Sweden, their strategic approaches to digital diversification may differ from those in other regions, such as other parts of Europe, or in the USA, China, and India. Future research could explore how established firms in these diverse international contexts innovate and execute their digital diversification strategies and how their technological and market understanding influences the outcomes. These findings provide opportunities for the development of quantitative metrics to analyze digital diversification strategies more broadly in various manufacturing contexts.

Owing to the scarcity of firms offering comprehensive data, this study could not evaluate how firms’ digital readiness levels influence their digital diversification strategies and execution. Nonetheless, firms with varying readiness levels provided complementary empirical findings. Future research might explore how digital readiness affects firms’ digital diversification strategies process and outcome. During our interviews, we inquired if the COVID-19 pandemic or the ongoing Ukraine-Russia war had an impact on the firms’ digitalization programs. Both firms indicated that they did not observe significant changes in their digital diversification efforts as a result of these events. However, this opens an avenue for future research to compare digital diversification strategies and how their strategic approaches to digital diversification may differ from those in other regions, such as other parts of Europe, or in the USA, China, and India.

Moreover, developing analytical tools to categorize diversification programs as related, semi-related, or unrelated makes valuable contributions to digital strategy research. This study’s approach of grouping strategies into related, semi-related, and unrelated categories can serve as a foundation for tool development, helping future research more accurately assess and compare digital diversification strategies across different contexts and industries.

CRediT authorship contribution statement

Martin Andreasson: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. Solmaz Filiz Karabag: Writing – review & editing, Writing – original draft, Visualization, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization, Validation. Johan Simonsson: Writing – original draft, Validation, Investigation, Formal analysis, Data curation, Writing – review & editing. Girish Agarwal: Writing – original draft, Validation, Investigation, Formal analysis, Data curation, Conceptualization, Writing – review & editing.

Declaration of competing interest

The research time of the first and second authors are financed by research grants from Vinnova and Energimyndigheten. The third and fourth authors started this research while they were industrial PhDs. Their industrial employers finance both of their research time.

Data availability

The data that has been used is confidential.

Acknowledgment

The idea of the paper was first discussed during the R&D Management Conference hosted by the University of Trento, Italy, on 11–13 July 2022. The authors are grateful to Patrik Jagenstedt, Anders Johansson, and Mikael Larsson Alexiusson for managerial comments and validation of the findings. We are thankful for the expert advice and comments on the findings provided by Stefan Bernat and Gustaf Lagercrantz. The authors are also thankful for the helpful comments offered by Thomas Magnusson, Viktor Werner, Karin Wigger. This work was supported by Vinnova (Grant number: 2018-02930, Grant Recipient: Solmaz Filiz Karabag), Vinnova (Grant number: 2022-00301, Grant Recipient: Solmaz Filiz Karabag), Energimyndigheten (Grant number: 2020-024533, Grant Recipient: Solmaz Filiz Karabag).

Appendix A. Interview guide used for the study

Project background

1. Could you explain the [program name] project?
2. How did it start, or they started? Where did the idea come from? Where did the project start? What was the intention of the project when initiated?
3. How has the project evolved? What is the current stage of the project?
4. Were there some critical moments where the future of the project was uncertain? How was that solved? What factors contributed to the uncertainty? Other challenges that you have had to overcome?

Organization and business aspects

5. How did you plan the organization (structure, processes, etc.)? Any significant changes made after the plan?
6. What new business functions were developed to assist the [program name] project (sales, marketing, etc.)?
7. What kind of business model(s) do you use and how did you develop them? What business model(s) are you currently developing or exploring?

Ecosystems

8. How have you collaborated internally to develop [program name]? Have you developed new internal ecosystems from this collaboration? What were the challenges in this internal collaboration?
9. How have you collaborated with external actors to develop [program name]? Have you developed new external ecosystems from this collaboration? What were the challenges in this external collaboration?

Digital attitudes

10. Have you seen some differences in attitudes (top management, other divisions, etc.) between developing digital, tangible products and your digital-based solutions? Mostly barriers/challenges or support/opportunities?

Performance

11. How would you evaluate the performance of [program name]? Not only monetary but also customer engagement, data collection, or other non-monetary gains?

Strategy

12. How would you describe [South or North] overall digitalization strategy?


M. Andreasson et al. 2024, 123300

Solmaz Filis Karabog is a senior associate professor at the Department of Management and Engineering, Linköping University, and at the Department of Civil and Industrial Engineering Uppsala University, Sweden. Her main research focuses on business transformation during economic and technological disruption in emerging and established economies. Her latest research explores how mature firms in established economies respond to digital disruptions. She studies these factors in different industries such as telecommunications, automotive, white goods, manufacturing and jet fighters in Turkey, Brazil, and Sweden. She is currently the chief editor of the Journal of Applied Economics and Business Research.

Johan Simonsson does research on digital servitization with a specific interest in business model innovation and key enablers such as digital product-service platforms. Johan has also held several managerial positions in large industrial firms and has been leading product and service management and new solution innovation based on Artificial Intelligence and Machine Learning.

Girish Agarwal completed his MBA in marketing and systems. Girish has experience in solution and enterprise architecture across organizations with an emphasis on IT strategy and business processes. He has held various technology positions during the last few years for digital transformation and new business model adoption within the company concentrating on platforms, data-driven services, and AI. Girish has experience in starting and scaling Technology and Business Innovation Lab units and is currently responsible for Digital and IT within Piab and also researching around how AI Technology is transforming value perception with customers and disrupting existing business models.

Martin Andreasson. After receiving his MSc in Industrial Engineering and Management, Martin started his PhD at the Department of Management and Engineering at Linköping university and has been doing research in digital transformation and strategic management. His focus area has been to investigate the processes and practices of digital transformation and digital diversification strategy realizations in established manufacturing firms from a technology, business model, and organizational perspective. Going forward, he is looking to expand his research into established services firms, to understand how their strategy process differs from the manufacturing firms.