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Realizing the unexpected: How cospecialization supports the serendipity journey in SMEs' digital transformation

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Abstract
Although innovation is often portrayed as arising deterministically from deliberate strategy and calculated decisions, many significant breakthroughs emerge not from planning but serendipitously. Building on this insight, this paper bridges the literatures on dynamic capabilities and serendipity to examine how SMEs realize serendipitous value during digital transformation (DT). Drawing on 21 semi-structured interviews with 11 top managers from four digitally transformed manufacturing SMEs, it was explored how these companies attempted to navigate the serendipity journey, comprising triggering, association, materialization, and realization. The findings show that cospecialization, a microfoundation of dynamic capabilities, conditions the unfolding of serendipitous events in the context of DT. Cospecialization fosters the coordinated association of complementary assets, resources, and capabilities in the wake of change driven by digital technologies, enabling businesses to sustain momentum from initial triggers through the materialization and realization of serendipitous opportunities. We develop a process model to illustrate how SMEs harness situated agency to move from unexpected triggers to realized value through the unfolding dynamics of the serendipity journey.

KEYWORDS
cospecialization, digital transformation, dynamic capabilities, serendipity, SMEs, value creation

INTRODUCTION

In the late 1990s, the founders of Athena Women's Health—a small maternity clinic in San Diego (CA)—developed a web application to automate insurance checks and patient billing. What began as an effort to reduce paperwork unexpectedly triggered a surprising reaction: Potential investors valued the software more than the clinic itself. Recognizing this as a turning point, the founders shifted their focus toward software development, eventually establishing Athenahealth, a leading provider of health information systems, which was later acquired for over $17 billion.

Episodes of this kind illustrate serendipity, which is defined as the process of making valuable and surprising discoveries through chance encounters that require effort to recognize and exploit (Busch, 2024; Liu & de Rond, 2016; Merton & Barber, 2004; Yaqub, 2018). Serendipity can generate a range of outcomes, from new revenue streams and cost reductions to breakthrough products, processes, and enhanced stakeholder attractiveness (Balzano, 2022; Oo et al., 2025). Realizing such value, however, requires navigating an uncertain journey, from triggering to the eventual realization of serendipitous value (Busch, 2024). As Busch et al. (2024) note, converting promising situations into positive turning points is often difficult and requires firms to overcome intrinsic inertia (Trott, Ellwood, & Baxter, 2024), as latent value may remain unexploited if momentum is lost (Balzano, 2022).

Various heterogeneous occurrences can introduce sufficient disruption to trigger serendipity. Digital transformation (DT) can provide fertile ground for serendipity, but it becomes effective only when complemented by

appropriate organizational capabilities and cospecialization mechanisms. We define DT as the deliberate company-wide inclusion of digital technologies, such as big data analytics, cloud platforms, and artificial intelligence, to redefine business models, processes, and customer interactions (Björkdahl, 2020). By amplifying the flow, volume, and variety of data inside the firm, DT expands the trigger landscape, increases the visibility of weak signals, and fosters richer conditions for emergent, surprising cues. It also has the potential to support the associative phase by helping employees connect unexpected observations to existing knowledge frames, while also accelerating materialization through low-cost experimentation and rapid iteration (Mele et al., 2024).

However, many companies fail to turn the promise of DT into tangible results (Li et al., 2018; Warner & Wäger, 2019). This is particularly true for SMEs (Eurostat, 2023), as resource scarcity, the lack of technical skills, and the presence of technology-averse managers often hamper the full potential of DT (Marrucci, Rialti, & Balzano, 2025). With many SMEs undertaking DT, supported by government incentives and pressures to innovate, it is therefore essential to explain why only a subset of SMEs can maintain momentum from initial triggers to eventual materialization, turning DT-related opportunities into realized value. Uncovering the mechanisms that distinguish these success stories from many less fruitful efforts is therefore central to both managerial practice and theory development.

To better understand how DT can lead to realized serendipitous value, this paper integrates research on serendipity with studies on the dynamic capabilities and their microfoundations (Teece, Pisano, & Shuen, 1997). Prior studies show that SMEs that leverage dynamic capabilities during DT, particularly those related to digital technologies, are more likely to realize the intended outcomes of DT (Mele et al., 2024; Warner & Wäger, 2019). The literature identifies cospecialization—the close, mutually reinforcing alignment of new resources with a firm's existing assets through capabilities (Teece, 2007)—as a microfoundation of higher order dynamic capabilities that explains competitive advantage under change (Teece, 2018). We extend this line of argument by theorizing that cospecialization has the potential to trigger and influence the serendipity journey by (a) defining emerging capabilities and (b) enacting them in combination with existing ones to leverage assets and resources for value creation across the serendipity journey.

To explore this line of inquiry, we conducted an in-depth qualitative analysis of four Italian manufacturing SMEs that had completed significant DT projects between 2018 and 2023. The analysis draws on multiple data sources. Primary data consist of 21 semi-structured interviews with 11 managers. Secondary data were used for triangulation and included web searches, recorded speeches, and prior research on the topic (Rialti & Filieri, 2024). Following a preliminary comparison of the firms, we analyzed the data inductively. Key themes were identified through a manual coding process (Corley & Gioia, 2011).

Our research design follows Eisenhardt's two-step procedure for multiple-case theory building (Eisenhardt, 2021; Eisenhardt & Graebner, 2007). First, a within-case analysis was undertaken, focusing on deconstructing the process by which digitally transformed SMEs cultivate the preconditions for serendipity, manage the unexpected, and subsequently attempt to realize serendipitous value. In instances where firms succeeded in realizing serendipitous value, a further analysis examined how positive turning points were achieved and how the resulting value was institutionalized, embedding serendipity as an ongoing source of strategic renewal. Second, a between-case analysis was performed, comparing findings across multiple cases.

The findings show that serendipitous value emerges when resources are tightly woven into firms' assets and are exploited thanks to the interplay of emerging and existing capabilities. In other words, when sensor data, machine-learning models, artificial intelligence, and cloud platforms are integrated with established process knowledge, supplier relationships, and interpretative schemas, managers and employees seem better positioned to recognize surprising triggers, engage in associative framing to uncover latent value, and mobilize resources to sustain momentum toward materialization. When digital and legacy assets remain loosely connected, potentially valuable signals may be overlooked, or the organization may lack the means to act on them in time. These insights support the development of a process model that captures how firms sustain momentum across the subsequent stages of the serendipity journey, from triggering and association to materialization and realization.

The study makes three theoretical contributions to the field of SMEs innovation management. First, it extends the value-creation perspective in DT research by showing that serendipitous outcomes emerge not from digital tools alone but from their cospecialization with assets and capabilities. Second, it advances the emerging literature on serendipity in SMEs by explaining how companies can convert weak signals into realized value and by identifying the contingencies that enable or inhibit this process. Third, it enriches the debate on cospecialization by illustrating how the joint deployment of legacy and emerging dynamic capabilities, along with physical or digital assets, supports the serendipity journey, enabling firms to sustain momentum and move from triggering events to strategic renewal. Together, these insights offer managers a blueprint for DT initiatives that do more than automate existing processes. They establish organizational pipelines capable of surfacing, associating, materializing, and realizing unexpected opportunities as ongoing sources of renewal.

The remainder of the paper is organized as follows. The Theoretical Background section presents the

theoretical background on serendipity and cospecialization. The Method and Findings sections present the methodological approach and the main findings, respectively. The Discussion section discusses the main theoretical contribution and managerial implications. In the Conclusions section, we elaborate on the limitations and open questions for future research.

THEORETICAL BACKGROUND

Serendipity as a journey: Concepts, drivers, and outcomes

This study embraces a view of serendipity as an uncertain and dynamic journey, requiring situated agency to sustain momentum through successive stages of value emergence and realization. Specifically, we adopt Busch's (2024) conceptualization of serendipity as something that unfolds through four interlinked phases—triggering, association, materialization, and realization—each requiring situated agency and effort to sustain momentum toward positive turning points (Busch, 2024; Cunha et al., 2015).

Triggering marks the moment when an unexpected observation, event, or encounter creates a surprising disruption that activates a latent space of potential value within the organization. Such triggers are often uncovered in contexts characterized by non-linear dynamics, such as innovation projects involving multiple actors, artifacts, and practices (Busch, 2020; Garud et al., 2011).

Following triggering, the association phase unfolds. This is where actors seek to make sense of the unexpected by linking it to existing or emerging interpretative frames (Busch, 2024; de Rond, 2014). This process relies on the availability of shared knowledge structures, ongoing dialog, and contextual familiarity that allow actors to recognize latent value rather than dismiss anomalies (Lane et al., 2021). Strategic communication, social interconnectedness, and the diversity of perspectives expand the cognitive resources needed for such associative work (Graebner, 2004; Knudsen & Lemmergaard, 2014). Businesses that cultivate cross-functional interactions—particularly those that bring together distinct forms of expertise—are better positioned to uncover previously unseen connections and synergies (Garud et al., 2016).

Once associative sensemaking reveals potential value, the journey proceeds to materialization (Busch, 2024). This involves enacting the possibilities identified during association through adaptive experimentation, reconfiguration of routines, and resource reallocation (Regnér & Zander, 2011). Materialization is supported by an organizational climate that promotes cooperative learning and tolerates non-conformity, thereby increasing the likelihood that novel combinations are tested and refined (Halachmi & Woron, 2013; Kato, Ito, & Itaya, 2019).

The final stage of this process—realization—refers to the institutionalization and scaling of serendipitous outcomes into tangible value. This requires not only successful implementation but also the embedding of the new solutions into the firm's evolving strategic direction, stimulating renewal over time (Busch & Barkema, 2022; McCay-Peet & Toms, 2015; Ross, 2023). Firms capable of transforming transient surprises into sustained outcomes tend to develop routines and structures that make serendipity an ongoing strategic capability (Busch, 2024).

Successful completion of the "serendipity journey" generates a range of valuable outcomes (Balzano, 2022; Yaqub, 2018). Firms that navigate the full process can ultimately gain novel products, services, and processes that diverge from planned innovation trajectories, often resulting in market breakthroughs (Garud et al., 2018, 2016). Research into entrepreneurial settings, such as crowdsourcing, further highlights how serendipitous innovations can enhance perceptions of product innovativeness and improve market success (Oo et al., 2025). In this vein, although serendipity matters for any type of company, in SMEs, it is frequently a fundamental discriminant between success and demise (Thomas & Douglas, 2024). SMEs often face constraints that limit their innovation potential; hence, the unexpected opportunity to further exploit existing assets or resources to generate additional value can represent a pivotal support for the launch of additional initiatives and serve as a strategic buffer amid negative economic jolts (Balzano, Marzi, & Turzo, 2025).

Although much attention has been given to the preconditions that increase the likelihood of triggering serendipity, realizing its value requires specific organizational enablers. Competence-building activities, such as collaborative innovation, help expand interpretative horizons and support associative processes (Bonney et al., 2007; Knudsen & Lemmergaard, 2014). Flexible organizational systems and structures increase the manageability of serendipitous signals by enabling data recombination and contextual re-framing (Barbier et al., 2024). Socially connected environments, promoted through strategic communication and coordinated interactions across company boundaries, broaden the interpretative capabilities necessary for association and materialization (Graebner, 2004).

DT introduces new affordances that can fundamentally reshape the serendipity journey (Appio, Martini, & Fantoni, 2017). Digital tools enhance the organization's capacity to surface weak signals through advanced analytics, machine learning, and real-time data processing. Platforms and collaborative tools extend the reach and speed of association by connecting distributed actors and facilitating knowledge recombination (Rialti et al., 2019). Furthermore, digital infrastructures enable rapid experimentation and iterative testing, accelerating materialization. These technological capabilities, combined with digitally enabled coordination and communication mechanisms, create conditions that make serendipity more actionable and scalable (Schiavone et al., 2021). DT, therefore, not only increases the visibility of

potential triggers but also strengthens the capabilities required to associate, materialize, and realize their value.

Cospecialization and the serendipity journey

Cospecialization refers to the alignment and joint enactment of both existing and emerging capabilities, to leverage their synergistic potential through the better use of complementary assets, resources, and competencies (Pitelis & Teece, 2009). Building on Teece's (2007, 2018) seminal papers, cospecialization is a microfoundation of dynamic capabilities, representing an integral, embedded trait of routines, actions, and micro-processes that contribute to the determination of any specific lower order capability. This, in turn, helps define the three higher order dynamic capabilities underpinning firms' competitive advantage (Teece & Pisano, 1994).

Initially, cospecialization emphasizes the strategic identification and calibration of opportunities during the sensing phase (Hu, Olivieri, & Rialti, 2023; Matarazzo et al., 2021), enabling businesses to anticipate which assets can be combined, even at the acquisition stage. It influences a company's ability to detect latent triggers and recognize weak signals, positioning it to build associations that unlock the latent potential embedded in seemingly unrelated observations.

Regarding seizing, cospecialization fosters strategies to harness cospecialization economies (Denrell, Fang, & Winter, 2003; Teece, 2007). Jacobides, Knudsen, and Augier (2006) observe its relation to managerial awareness about the processes, systems, and sub-systems determining firms' architecture. When such an understanding is diffused, the firm is better equipped to sustain momentum from association to materialization by rapidly configuring the right combinations of resources and capabilities, transforming promising triggers into actionable strategic responses (Langlois, 1992; Teece, 2007). Managerial awareness accordingly sustains successive agency with regard to the pursuit of the firm's new configuration, supporting profits gained from emergent opportunities (Jacobides, Knudsen, & Augier, 2006).

With respect to reconfiguring, cospecialization explains how firms generate new radical innovations, define new emerging capabilities, and activate these in conjunction with existing ones to recombine resources and assets (Teece, 2007; Teece, Pisano, & Shuen, 1997). This helps explain why some firms are able to steadily realign when facing environmental turbulence and continuously accomplish strategic fit. Cospecialization thus enables the purposeful recombination and realignment of assets, helping organizations transform fragile moments of potential into positive turning points, where serendipitous value can be materialized and realized (Teece, 2018).

Newey, Verreynne, and Griffiths (2012) put forward several activities through which the effects of cospecialization can be accelerated: *network knowledge generation*, *schema development*, and *value proposition development*. *Network knowledge generation* pertains to creating, extending, or modifying operational capabilities. It generates internal knowledge about the value network that the firm operates in. *Schema development* refers to the development of a shared understanding or schema within the company with regard to the value of the dynamic capabilities and the innovations they can produce. It is thus critical to align the efforts and motivations of different parts of the organization toward new goals. *Value proposition development* consists of the process of developing a value proposition that articulates the benefits and value of the innovation to customers and other stakeholders. This is crucial to the successful commercialization of innovations and ultimately to the creation of a sustained competitive advantage (Lessard, Teece, & Leih, 2016).

By anchoring assets to configurations that heighten overall receptivity to surprising cues, DT cospecialization represents a foundational lever for creating the enabling preconditions that make the triggering of serendipity more likely. Likewise, in the context of DT, cospecialization may make a company better at sensing weak signals and detecting emerging trends with more precision (Schoemaker, Heaton, & Teece, 2018).

A diffused architectural understanding, supported by actions related to network knowledge generation and shared schema development (Pan et al., 2007), allows businesses to engage the majority of managers and individuals in associative sensemaking that supports the connection of surprising triggers to actionable opportunities. This increases the likelihood that latent value surfaces rather than remains overlooked. DT demands a rethinking of the business's structure, which is not possible without the mapping of the value chain and the comprehensive involvement of all individuals (Kopalle, Kumar, & Subramaniam, 2020; Weber, Büttgen, & Bartsch, 2022). In this way, DT may foster an environment in which managers and employees interact and exchange ideas for further improvements (Cetindamar, Abedin, & Shirahada, 2021). This collaborative effort increases the visibility of latent value and supports the transition toward materialization (Konlechner, Müller, & Güttel, 2018).

During DT, value realization may occur when cospecialization enables the firm to institutionalize emergent value by recombining assets and capabilities in ways that embed newly surfaced potential into strategic and operational routines (Jacobides, Knudsen, & Augier, 2006). Thus, firms characterized by the ability to quickly accumulate and combine different knowledge sources to identify innovative complementarities can be better equipped for value realization (Appio, Martini, & Fantoni, 2017). This is the case with many SMEs, which are naturally inclined to rely on whatever is at hand to attempt to overcome concurrent problems without incurring greater-than-expected expenditure (Thomas & Douglas, 2024).

METHOD

Research context

According to Eurostat, in 2023, approximately 69% of European SMEs[1] had undertaken at least some steps toward DT, and roughly 40% of these firms succeeded in this endeavor. This trend was consistent across different industries. As a firm-level initiative involving the digitization of information, the digital transformation of processes, and the adoption of technologies to trace supply chains, improve production, and enhance customer orientation (Gong & Ribiere, 2021), DT is increasingly seen by SMEs as an imperative for maintaining competitiveness and sustaining firm viability in turbulent environments.

We consider digitally transformed SMEs to be ideal settings in which to examine how businesses navigate the uncertain stages of the serendipity journey (triggering, association, materialization, and realization) and how cospecialization enables them to harness momentum toward positive turning points. Indeed, beyond technology, DT depends on people's situated agency, their interpretative frames, and the broader configuration of firm capabilities that shape whether surprising triggers are recognized and whether momentum toward realization is sustained (Rialti et al., 2019; Schiavone et al., 2021).

Prior research has already noted a link between SMEs' DT and dynamic capabilities in generating greater value (e.g., Matarazzo et al., 2021). In SMEs, digital technologies tend to diffuse quickly across the organization due to their smaller scale. When employees do not resist transformation, these tools can serve as catalysts for ongoing change, supported by strengthened dynamic capabilities (Schneider et al., 2023). The wide array of advanced digital technologies available to modern SMEs can create a fertile ground for serendipity, deriving from improvements in operational efficiency and product innovation (Zheng et al., 2024).

SMEs widely rely on entrepreneurial action, with decision-making being typically faster and more decentralized, involving fewer individuals with greater autonomy (Hu, Olivieri, & Rialti, 2023). This structure enables closer alignment between strategic intent and action, supporting the conversion of positive and unexpected patterns into tangible value. The flexibility characterizing these firms is pivotal to the realization phase, when new configurations to reap the unexpected require shared willingness and the capacity to rapidly deploy resources and capabilities toward the pursuit of new approaches.

[1]European Commission Recommendation 2003/361 defines SMEs as firms with less than 250 employees, turnaround below €50 million, and assets below €43 million. The number of employees is a binding threshold that a firm cannot overcome to be classified as an SME. In light of this condition, it is necessary to respect just one of the other two thresholds to remain in this category of firms. The research adopts this definition as an inclusion criterion for the considered SMEs.

Methodological approach

We adopted a multiple-case study approach, rooted in Eisenhardt's (2021) two-step procedure. This approach is particularly well suited to exploring complex and context-dependent phenomena—such as the serendipity journey—which unfolds over time and is shaped by organizational routines, capabilities, and situated managerial actions. First, a within-case analysis was performed to observe firms' functional activities when pursuing DT-related value. Specifically, we inspected how capabilities support progression, from triggering surprising cues to associating them with latent value, materializing emergent opportunities, and realizing serendipitous value through capability recombination and resource alignment. Second, a between-case analysis allowed for the identification of leitmotifs explicating how cospecialization fosters the surfacing of serendipity, as well as the realization of serendipitous value. Attention was also paid to the eventual institutionalization of unexpected discoveries into competitive advantages.

Data were collected through semi-structured interviews with top echelon managers from four Italian manufacturing SMEs operating in the fashion sector. The sample was purposively narrowed to firms operating in a single industry. Selecting firms from the same industry ensures exposure to similar technological pathways and constraints, due to path dependencies in the evolution of production technologies. This decision allowed us to observe the potential for serendipitous outcomes on a level playing field (Hu, Olivieri, & Rialti, 2023). Firms in the same industry are exposed to similar environmental contingencies (i.e., macro-economic shocks or fluctuations in consumer behavior).

Attention was paid to the inclusion of firms with similar evolutionary paths and comparable age (thus preventing a situation in which the comparison would have occurred between firms established by more technologically savvy founders). Only firms not directly controlled by a single family or a standalone institutional investor were included in the sample. Family dynamics may have hindered recognition of the importance of cospecialization because family members sought to take credit for the breakthrough. Institutional investors' ownership, instead, could have generated unfair benefits in some firms, due to a greater availability of financial resources (Kopalle, Kumar, & Subramaniam, 2020). Finally, only firms that had already undergone DT were included. Those not yet fully leveraging digital technologies were excluded in order to maintain analytical focus (Gillier & Lenfle, 2019). Indeed, it was necessary to include only firms that completed DT projects to observe when and how they identified serendipity triggers and subsequently realized them. The selected firms also started from a comparable level of digital maturity. Each firm had adequately managed several digital technologies while also having clear plans for future developments. In Table 1,

TABLE 1 Sample characteristics.

Acronym	Sector	Foundation year	Headquarters	Approximate number of employees	Sales revenue	Inception of digital transformation—Achievement of digital transformation objectives
α	Metal hardware and jewelry for fashion	1986 (39 years)	Florence (FI)	80	€10 million	Jan 2018 to Dec 2021
β	Leather-goods production	1974 (51 years)	Florence (FI)	120	€30 million	Apr 2018 to Dec 2023
γ	Surface treatment of fashion goods	1974 (51 years)	Arezzo (AR)	140	€50 million	Sep 2018 to Jan 2021
δ	Textile and fast fashion goods production	1967 (58 years)	Prato (PO)	90	€25 million	Jan 2019 to Dec 2021

we report on the sample characteristics. To address privacy issues, the names of the firms were replaced by four letters of the Greek alphabet.

The interview protocol consisted of two stages. The introductory stage contained questions about the firm, its history, and the paths underpinning its DT. The exploratory stage, instead, focused on unexpected opportunities emerging during digitalization, processes, and capabilities that led the firms to seize opportunities, and eventual follow-ups to realize value and convert serendipitous events into tangible benefits (Table 2).

A total of 11 top-echelon managers were interviewed, many of whom participated in multiple sessions and follow-up conversations to provide additional insights. The focus was placed on those most capable of offering detailed information, namely, individuals directly involved in the firm's DT or those with a clear understanding of events linked to serendipitous opportunities (Legrand et al., 2023). Discussions about expectations and challenges connected to digitalization were encouraged, as this helped us to collect information beyond the interview protocol. Almost all of the interviews were conducted in person, and, in certain cases, two researchers were present. In total, 21 interviews were conducted. The average duration of each interview was 1 h and 30 min, and the total length of all interviews was just under 30 h. Further information about all the firms was gathered through formal firm visits and informal interactions with managers and employees (Hu, Olivieri, & Rialti, 2023). Insights emerging from these additional sources integrated information from managers, exhibiting repetitive patterns, enabling the achievement of theoretical saturation. During these company visits, we informally discussed serendipitous occurrences with employees involved in them, assessing how they collaborated with managers to prepare for positive outcomes and what the effects of serendipity were. Data collection lasted from January 2023 to December 2023. Interviews were recorded and transcribed and then integrated with additional insights. A total corpus consisting of 45 pages of text was developed, representing our primary dataset. Details of the interviews can be found in Table 3.

We jointly analyzed the primary dataset to investigate how the possibilities underpinning potential breakthroughs—through triggering, association, materialization, and eventual realization—unfold in digitalized SMEs. We performed open, axial, and selective coding to pass from emerging concepts to themes and finally aggregated dimensions. In doing so, we inductively associated the main themes with dimensions explaining the importance of cospecialization in influencing the outcome of the serendipity journey in digitally transformed SMEs (Corley, 2015).

Emerging insights were triangulated with secondary data stemming from additional sources, such as accounting and internal documents, reports from consultants, previous academic studies considering the same sector, websites, and social media. Triangulation supported the credibility of the picture emerging from interviews (Yin, 2018). Finally, external and internal validity was assessed through comparisons with extant literature on serendipity, dynamic capabilities, value creation and capture, and DT. Insights regarding the results of the qualitative interpretation procedure are provided in Figure 1.

FINDINGS

Within-case analysis

Alpha: Digital transformation, missed serendipity, and doing business as usual

Alpha is a supplier of metal hardware and jewelry for fashion brands, with production organized in a large plant near Florence. Alpha entered the DT process in 2018. The aim of the DT was the implementation of robotics and additive manufacturing technologies, such as 3D printing, in order to improve the firm's productivity and better meet customers' expectations. Specialists supporting the implementation of the technologies were provided by the seller of the selected tools.

The main challenges experienced by alpha pertained to the training of staff members, as some resistance from

TABLE 2 Interview protocol.

Type of question	Aim of the data collection	Area of investigation	Questions	Source(s)
Premise	Introduction to the interview (part of the introductory phase)	General information and information about the advanced digital technologies used by the firm	a. Introduction to the concept of digitalization and information about advanced digital technologies currently used in the firm	Matarazzo et al. (2021); Schneider et al. (2023)
Participant screening	Descriptive information about the key informant (part of the introductory phase)		b. Key informant profile • Age • Gender • Education • Role in the firm • Expertise and seniority • Involvement in digitalization projects • If so, which role or responsibility (management, supporting staff, auxiliary) were you involved in for the initiative?	Hu, Olivieri, and Rialti (2023)
Firm screening	Firm information (part of the introductory phase)		c. Firm profile • Year of foundation • Brief description of firm evolution • Firm core business model • Industry • Position in the industry (e.g., market leader, large player, and core supplier) • Intensity of advanced digital technologies and their impact on operations	Kopalle, Kumar, and Subramaniam (2020)
Open questions	Semi-structured interview (exploratory phase)	Understanding the motivations behind digitalization initiatives	d. Inception of digitalization initiative • What factors triggered the firm's interest in advanced digital technologies? • How was the initiative embedded in the firm's agenda?	Matarazzo et al. (2021); Schneider et al. (2023)
		Pursued objectives and expected value	e. Pursued objectives • Can you describe which orientation was initially proposed to support the consideration of the adoption of advanced digital technologies? • Which functional areas of the firm were deemed more suitable, or which were particularly targeted? f. Expected value • Which kind of value do you expect advanced digital technologies to generate?	Matarazzo et al. (2021); Schneider et al. (2023); Ghobakhloo (2020)
		Technological layers	g. Technological layers • Which advanced digital technologies were considered?	Tortorella et al. (2023)
		Existing capabilities enabling the recognition of surprising opportunities	h. Dynamic capabilities and new opportunities • Which existing capabilities were fundamental to recognizing and associating surprising triggers with hidden opportunities related to digitalization? • How did capabilities provide a fertile ground to use resources and assets in a different way? • Were existing capabilities and assets sufficient to deconstruct advanced digital complexity? Or were new ones required?	Teece (2018)
		Exploring capability complementarities	i. Existing and emerging complementarities • Did the firm experience any complementarity within existing capabilities?	Argote and Ren (2012)

(Continues)

TABLE 2 (Continued)

Type of question	Aim of the data collection	Area of investigation	Questions	Source(s)
			• Was complementarity among capabilities fundamental to better exploiting existing assets and resources?	
		Surfacing, associating, and estimating the latent value of serendipitous opportunities	j. Surfacing of serendipitous opportunities • Who noticed the emergence of unexpected new opportunities related to digitalization? • How did such opportunities emerge, and how were such opportunities noticed? • How was the latent value of these surprising opportunities framed, discussed, and estimated?	Balzano (2022); Busch (2024); Cunha et al. (2015)
		Materialization, realization, and institutionalization of digitalization outcomes	k. Digitalization accomplishments • Do you deem the initiative to be complete? Do you expect any future steps to unfold? • Were the results of the exploration process institutionalized? • If so, how did the process unfold? Were any of the aforementioned capabilities fundamental, and which assets were required?	Bonney et al. (2007); Fultz and Hmieleski (2021)

older employees surfaced. This notwithstanding, the predicted outcome of DT was achieved, and the endeavor generated value by enhancing efficiency through the increased productivity of machinery. Expected value thus appeared in the form of increased revenue due to higher production rates.

An interesting insight emerged in the interviews regarding the data architecture of alpha. Although the use of the aforementioned digital technologies required the connection of machines to an internal internet network, managers explained that data were usually stored for only 30 days and were only accessible to employees in the production department. The gathered insights corroborate that other business areas, such as administration, were not significantly affected by advanced digital technologies.

The rationale underpinning alpha's DT was accordingly conservative and narrowly focused on productivity enhancement, which prevented the company from sustaining momentum beyond expected outcomes and recognizing the latent potential of its digital triggers. This limited the development of capabilities related to digital technology usage to only certain departments within the firm's boundaries. Further, capabilities in digital technologies did not cross-fertilize with capabilities in other areas, thus remaining applicable only to improved production techniques.

Therefore, new and enhanced data analytics capabilities led to a series of expected benefits, circumscribed to decreases in unitary costs and improved production processes. Different departments of the firm operated in isolation, preventing the associative sensemaking required to connect triggers across organizational boundaries and limiting the emergence of cross-functional momentum toward materialization. For this reason, potentially complementary assets or resources were not identifiable by everyone within the firm, as capabilities to exploit technologies were not diffused. The CEO's unilateral selection of non-integrated technological tools also revealed a short-sighted decision-making that prevented cospecialization from generating unexpected value.

One manager consistently observed that the firm experienced significant underutilization of its digital assets. The scope for unexpected value was minimized, and emerging insights from data or ideas were mostly kept in distinct employees' minds. It was also revealed that digitalization fostered the rise of unexpected potential in alpha's key competitors, showing that the firm missed some of the opportunities arising from DT.

Beta: Turning tacit knowledge into higher quality standards and new services

Beta has been producing leather goods since 1974. The firm owns five small plants, each specialized in different products. It is located in Tuscany and has about 120 employees. Beta started a DT project in 2018. The aim of the initiative was to adopt a digital platform to connect all the plants. The selected platform was embedded with cloud computing, big data analytics (BDA), and artificial intelligence (AI). The reliance on the Internet of Things (IoT) allowed sensors placed in any machine to monitor all the production processes and feed data into a common database. A digital consulting firm and a system integrator acted as key partners supporting beta in recent years.

In 2023, the firm accomplished its DT, as originally planned. The implementation of the aforementioned platform and related advanced digital technologies met the

TABLE 3 Data collection: primary and secondary data sources.

Data sources				
Primary data				
Semi-structured interviews	Role of key informants (seniority) Key informants indicated with * have been contacted multiple times for specific follow-ups.	Firm	Date(s) of the interview and interviewers (*n*)	Duration (approximate)
	CEO* (35 years)	α	Jan 2023 (2) Sep 2023 (1)	1 h 30 min 2 h
	Head of production department* (20 years)	α	Jan 2023 (1) July 2023 (1) Sep 2023 (1)	1 h 1 h 30 min 1 h
	CEO* (39 years)	β	Jan 2023 (2) Apr 2023 (2) Sep 2023 (2)	1 h 30 min 1 h 1 h 45 min
	Head of digital transformation* (10 years)	β	Jan 2023 (1) Dec 2023 (1)	1 h 30 min 2 h
	Operations manager* (3 years)	β	Sep 2023 (1) Dec 2023 (1)	1 h 15 min 1 h
	CEO* (25 years)	γ	Apr 2023 (1) Sep 2023 (1)	1 h 30 min 2 h
	Managing director* (8 years)	γ	May 2023 (1) Dec 2023 (1)	1 h 45 min 1 h
	CIO (10 years)	γ	Dec 2023 (2)	1 h 15 min
	CEO* (25 years)	δ	Jan 2023 (1) Oct 2023 (1)	1 h 30 min 30 min
	Senior supply chain manager (15 years)	δ	Dec 2023 (1)	2 h
	CMO (24 years)	δ	Dec 2023 (1)	1 h 30 min
Total	11	4	Jan 2023 Dec 2023 (1 Year) 21 Interviews	About 30 Hours
In situ observations	After the interviews, all the firms were visited to obtain further information and to observe digitalized activities. Some employees were also involved to ask their opinion about digitalization and its outcomes within the firm.			
Secondary data	Used for triangulation and validation of evidence from the cases.			
	Typology	Source		Use
	Website	α, β, γ, δ	Internet	Reports about firms' digitalization activities
	Accounting documents	α, β, γ, δ	Accounting documents were collected for the selected firms through the Chamber of Commerce	Triangulation of the accuracy gained insights
	Keynote speeches	γ	Virtual participation	Discussions and questions during the event were used to outline the outcomes of the initiatives
	Previous research	γ, δ	Research repositories	Evaluation of the consistency of our findings with previous evidence

expectations of managers. Coordination among the different plants was achieved, as well as reduced lead time, improved traceability, and a reduction in waste. Most challenges were related to employee and managerial involvement, which were lower than expected in some cases.

We observed how, before DT, information flows were managed more informally in beta. This created room for tacit knowledge, both at an individual level and at plant levels. After platform implementation, the data architecture of the firm started to become centralized. Information flows became more structured, and new and meaningful insights emerged. Once the platform had gained organizational acceptance, tacit knowledge surfaced and was associated with digital data flows, enabling

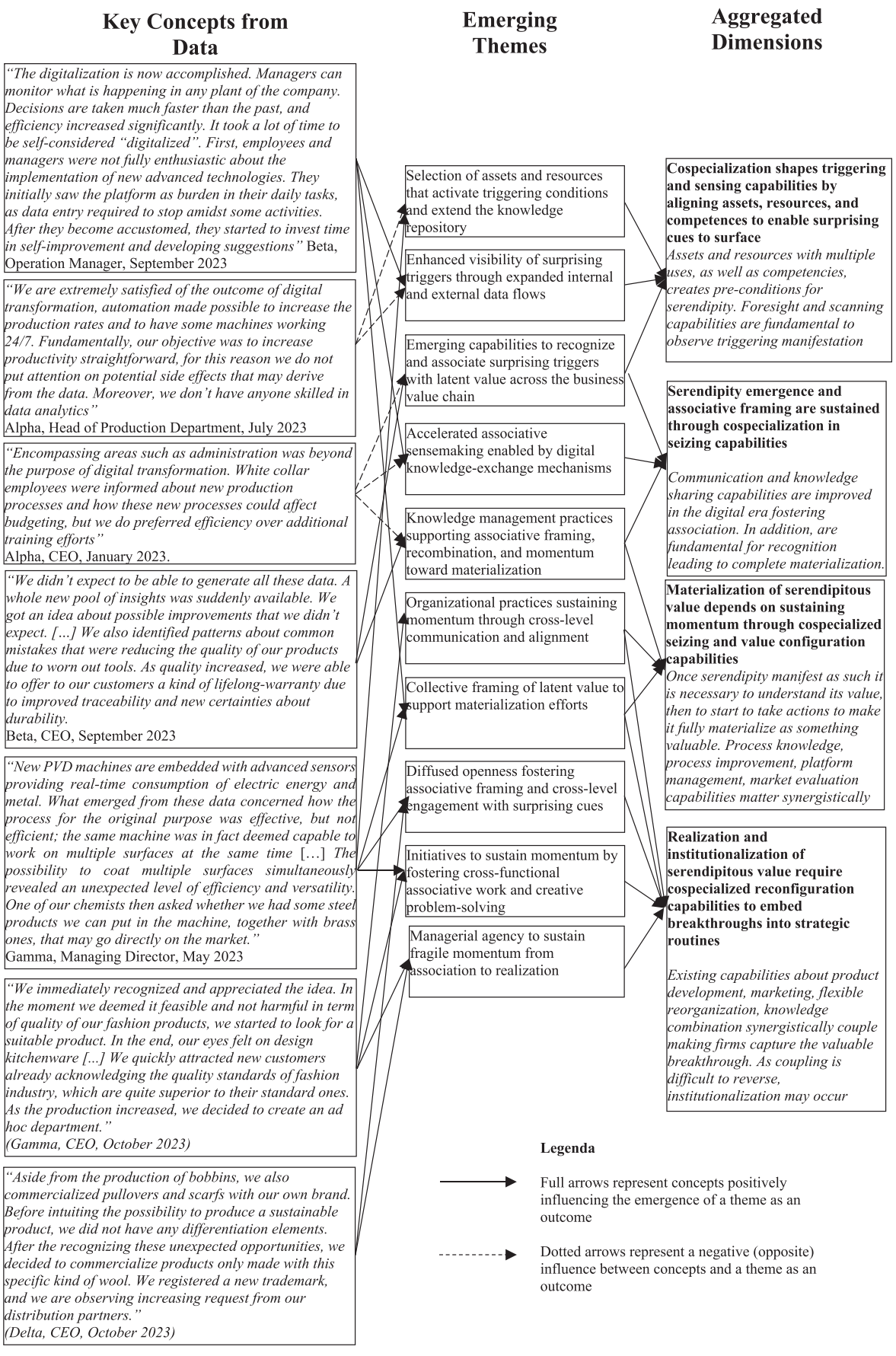

FIGURE 1 Analytical procedure

the organization to recognize previously latent value and frame it as a strategic asset.

This process may be interpreted through cospecialization. Existing knowledge acquisition and conversion capabilities, coupled with digital technology-related ones, unleashed the power of melded tacit and explicit knowledge. Serendipity was thus triggered as a consequence of the ability to associate data and knowledge for greater purposes than ever. Knowledge-sharing and application capabilities facilitated more effective knowledge flows throughout the firm, enabling it to be digitally leveraged by employees. Association manifested through the possibility of offering higher quality products at comparable cost. Existing consumer service capabilities, coupled with those regarding supply-chain management, as well as new capabilities in digital traceability and digital quality management, enabled the firm to use big data effectively and to develop a new digital asset, such as blockchain, to provide customers with a complete view of the supply chain. Customers had the opportunity to receive products that satisfied their own final consumers; thus, they increased the quantity of their orders. The materialized value was identified as a source of competitive value, and, through the modification of existing practices, value was captured in the form of new products with a lifelong warranty.

Gamma: Digital transformation, efficient usage of assets, and entry into related markets

Gamma offers surface treatments for fashion products. Gamma has four plants, and each plant is dedicated to a specific production process, addressing diverse markets. One plant is dedicated to acrylic painting and the dyeing of leather, whereas another exclusively deals with the enameling of wood and plastic garments. However, gamma's core business is represented by the galvanic and cataphoretic coating of metal hardware.

Digital technologies were adopted in all of the plants, but the core DT project concerned the plant dedicated to metal hardware. The DT process began in 2018 in the production area and quickly expanded to the entire plant. It started with the implementation of automation to support productive processes and quality control. Robotics with advanced vision systems were integrated, supported by a cloud computing infrastructure and AI to optimize processes. Gamma also purchased some new PVD (physical vapor deposition) coating machines to support its older ones.

The implementation of this advanced technology, combined with other advanced digital technologies, generated the potential for serendipity. A surprising fact emerged when a production specialist noticed surplus metal powder clinging to a steel bar at the bottom of the machine. This observation triggered the activation of latent potential, not as pure luck, but as the outcome of a fertile yet fragile process requiring situated agency to recognize and sustain momentum toward materialization. Gamma, in fact, had also invested in a configuration rooted in lean thinking and open innovation. This investment generated an environment populated by employees willing to share emergent potential solutions with increasingly receptive managers. Lean thinking and management capabilities fostered a company-wide understanding of value sources within the firm and its network, making employees and managers better able to recognize emerging breakthroughs. Serendipitous outcomes were finally institutionalized, and the value was realized through the synergistic enactment of product development, process engineering, and change management capabilities, making the surfaced resource exploitable through existing assets. In this case, existing capabilities in production process management and optimization were integrated with emerging capabilities, such as digital product development and engineering. Further, digital technologies enhanced planning capabilities, enabling gamma to schedule the production of two distinct products simultaneously.

As the potential value was deemed "too valuable to miss," gamma reconfigured one of its departments to address a different kind of customer. In this way, it was easier to develop supporting processes to manage new requests without having an employee to deal with two different products for different markets simultaneously. The new process was applied to the production of luxury silverware. The technical capabilities and know-how developed over time in the "metal hardware for fashion" department provided a solid foundation for responding to new demands without requiring additional training. The institutionalization of the new department also allowed gamma to obtain insights about emerging trends in a different market, which, in turn, could be translated into new product ideas for the fashion department.

Delta: Sustainable digital transformation and a new strategic business unit

Delta is a legacy wool mill in Prato, and it operates in the production of premium wool and cashmere yarn bobbins. Delta started a DT project in 2019 to improve the traceability of raw material and to monitor the use of dyes in coloring processes. Blockchain, BDA, IoT, AI, and visual recognition technologies were selected as the most suitable tools to help achieve the objectives. New data started to be collected by delta through these advanced digital technologies. In particular, blockchain logged the origin of all the raw materials forming a bobbin, whereas BDA and AI provided greater insights about the quality of the products. IoT-generated data about the production processes—specifically dye consumption—was also collected.

An unexpected opportunity arose from some interesting data patterns. Some bobbins required less dye than others during the coloring process. This surprising

pattern served as a trigger that prompted associative sensemaking by a senior supply chain manager, who connected the data anomaly to the incidental inclusion of a small quantity of black wool in the bobbins, revealing a latent value that had previously gone unnoticed. One of the breeders had a small number of completely black sheep within his larger herd. The quantity was so small that, without technologies, the distance between the expected consumption of dyes and the actual consumption was simply misattributed to evaluation errors. Data analytic capabilities existing among the sensing ones, associated with partnership nurturing and management capabilities, fostered serendipity and its clear emergence. In detail, this process shows how cospecialization sharpened existing sensing capabilities through digital technologies, making digital sensing possible. The identification of the information source favored serendipitous associations. Digital technologies accordingly made it possible to identify a possible source of value previously hidden in plain sight.

The serendipitous opportunity was initially linked to the aim to lower production costs. Yet, as the demand for more sustainable fashion products was on the rise, it was soon assumed—thanks to market acuity capabilities—that the creation of a different product line could have generated greater value. Cospecialization, in this case, explains first how an emergent resource can be identified and used for a different purpose via an existing asset. Second, it also describes how the firm was able to reconfigure without excessive costs. To enhance market readiness, delta established a new strategic business unit (SBU). However, its staffing drew on the company's existing workforce, which is already trained to handle emerging product demands, particularly special orders for couture collections. The new SBU also ensures greater flexibility, as decisions about new lines of products are now decentralized. The CEO, supported by the CMO, was accountable for seizing the opportunity, building on existing processes. Then, reconfiguring capabilities coupled with network management ones, together with product development and digital communication, made it possible to institutionalize the endeavor to capture the new value and foster the construction of a source of competitive advantage.

Between-case analysis

From a wider angle, the analyzed cases provide insights regarding how serendipity can be converted into realized value by digitally transformed SMEs. The first insight of the research highlights how DT sharpens the conditions for triggering serendipity by amplifying the visibility of small, surprising cues. Yet the progression from these triggers to realized value remains fragile and contingent on the organization's ability to sustain momentum through associative framing and materialization. This created environments more conducive to serendipity. In this case, individuals within the firm felt confident in adopting and using the new technologies.

The role of cospecialization within sensing capabilities is common across cases. It initially pertains to the importance of selecting new digital assets compatible with the existing knowledge repository of the firm. This decision makes it easier for existing employees and managers to understand a new technology, making the triggering of serendipity more likely (Newey, Verreynne, & Griffiths, 2012). The importance of data (and its prompt availability) emerged as a key asset in supporting the association phase across three of the four cases (beta, gamma, and delta). Alpha illustrates how failing to sustain momentum beyond data generation can result in missed turning points, leaving serendipitous potential unmaterialized and unrealized. Even smaller, internal cues that previously passed unnoticed are now detectable. The same applies to signals from external markets. The data extended the firm's ability to sense unexpected opportunities arising from DT, in particular through the development of new digital sensing capabilities.

The importance of cospecialization between knowledge management capabilities and information management ones also emerged in most cases. The coupling of these two groups of capabilities led to the development of digital knowledge-leveraging capabilities in most firms, which were able to sustain momentum by triggering association and materialization, enabling the progression of serendipity toward tangible outcomes in most cases (Mele et al., 2024). Knowledge management capabilities (i.e., acquisition, conversion, and sharing) are inherently coupled with information management capabilities (Rialti et al., 2019). Regardless of cospecialization, information flows improve with DT, making the materialization and clear emergence of a possible opportunity feasible, thereby enabling cospecialization economies (Teece, 2018). Existing integrations among different advanced digital technologies also make it easier to identify complementarity among assets. However, the detection of serendipitous value is associated with the existence of a shared vision about the schema and the architecture of a firm and a global orientation toward value creation. If these conditions are not present, the possible relevance of an emergent breakthrough cannot be reliably estimated, and there is therefore a risk that a valuable opportunity might be missed.

Two cases (gamma and delta) show the relevance of diffused openness toward innovation among managers and employees. This stems from the coupling of capabilities supporting product and process innovation with capabilities on collaboration management (both at internal and external levels). Being open and receptive to ideas coming from partners, collaborators, and employees increases the knowledge repository of the firm. Indeed, the ability to exploit openness allows exploration to go beyond initial purposes, facilitating the identification of suitable assets that could help realize serendipitous value. This element is

related to a further theme that describes managerial actions in serendipitous times and through serendipitous value mechanisms. Managers, through their intuitions, must steer the course toward serendipity in order to have the opportunity to realize serendipitous value. Our analysis reveals that serendipity was realized in three (beta, delta, and gamma) out of four cases (in alpha, there was a "missed opportunity") thanks to the involvement of managers. Attention needs to be directed toward lean management. Nourishing capabilities related to the sphere of lean organization make employees more willing to communicate a source of value to more receptive managers (Rialti & Filieri, 2024). It is then possible to observe how some practices foster cospecialization during DT. The occurrence can be seen as a means of facilitating the combination of employees' perceptions, the information emerging from smart tools, and managerial knowledge related to serendipitous associations.

Finally, the cases show how cospecialization enables firms to transform fragile emergent opportunities into realized value by institutionalizing serendipitous outcomes and embedding them into strategic and operational routines. Capabilities pertaining to process reengineering, new product development, and commercialization are all relevant to this objective. Whether these capabilities couple and are supported by marketing capabilities determines whether existing assets and resources can be arranged to reconfigure a department, a business unit, or the whole business in order to capture value.

DISCUSSION

Toward an interpretative synthesis: A process model

Bridging our analysis with existing literature, Figure 2 proposes a process model describing the fragile progression from cultivating preconditions for serendipity through the interconnected stages of triggering, association, materialization, and realization. The model associates stages of value creation, value configuration, seizing, and value capture with distinct phases of the serendipity journey. Transitions across these stages are interpreted through the lens of cospecialization, which emerged from the empirical cases as a key mechanism for sustaining momentum and overcoming organizational inertia.

The serendipity journey in digitally transformed SMEs begins with the appearance of a surprising trigger, often sparked by unforeseen combinations of data, technologies, or practices. Although these moments may seem accidental, their emergence is typically contingent on prior investments that create fertile conditions for recognizing latent value and mobilizing organizational attention (Newey, Verreynne, & Griffiths, 2012). Moving beyond these initial triggers requires sustained momentum and deliberate agency from managers (and, in some cases, employees) to interpret and advance emergent possibilities. Cospecialization plays a pivotal role in detecting and activating relevant assets and capabilities. When firms engage in coordinated deployment of complementary sensing-related assets, such as data analytics, domain-specific knowledge, and interpretative schemas, they are better positioned to perceive subtle signals that others might overlook. Here, cospecialization functions as an enabler, allowing the firm to identify latent value embedded within digital environments (McCay-Peet & Toms, 2015).

Cospecialization also supports the transition to the materialization of serendipity. At this stage, the firm begins to explore the feasibility, relevance, and potential value of the unexpected insight. The perception of the emergent value stimulates actors across the organization to reconsider existing asset configurations and workflows. Here, the alignment of sensing with seizing capabilities becomes essential (Garud et al., 2011). Capabilities that enable firms to exploit cospecialization economies, such as internal schema development and cross-functional coordination, help assess whether the opportunity fits within the firm's existing strategic and architectural logic (Rialti & Filieri, 2024). Cospecialization within these capabilities facilitates collective sensemaking and creates a shared evaluative framework through which the opportunity is deemed either worth pursuing or not.

Value realization is also enabled by cospecialization, particularly through the coupling of capabilities that allow for asset reconfiguration. The firm must not only seize the opportunity conceptually but also enact changes to translate this insight into action (Benassi & Rialti, 2024). Cospecialization within reconfiguring capabilities, such as process innovation, product development, and resource orchestration, allows the firm to repurpose or re-align existing elements in ways that support the exploitation of the serendipitous potential. For example, during this phase, capabilities developed by the company in the past, such as product development capabilities, may couple with capabilities in big data analytics, making product development supported by new information from customers. These configurations are often unique to the firm and tailored to its evolving strategic priorities. They can result in the establishment of new units, the redefinition of customer interfaces, or the redesign of workflows. Through this process, emergent value becomes embedded in the firm's operations and offerings.

Importantly, this model also acknowledges that the progression from serendipity emergence to value realization is not deterministic. There are circumstances under which cospecialization does not occur, or when the configuration of assets and capabilities fails to support mutual reinforcement. In these cases, the opportunity remains latent or underexploited, and serendipitous value is not realized. These missed opportunities highlight the limits of path dependency and the frictions that can hinder dynamic reconfiguration, particularly in the absence of shared vision, interpretative alignment, or cross-functional coherence.

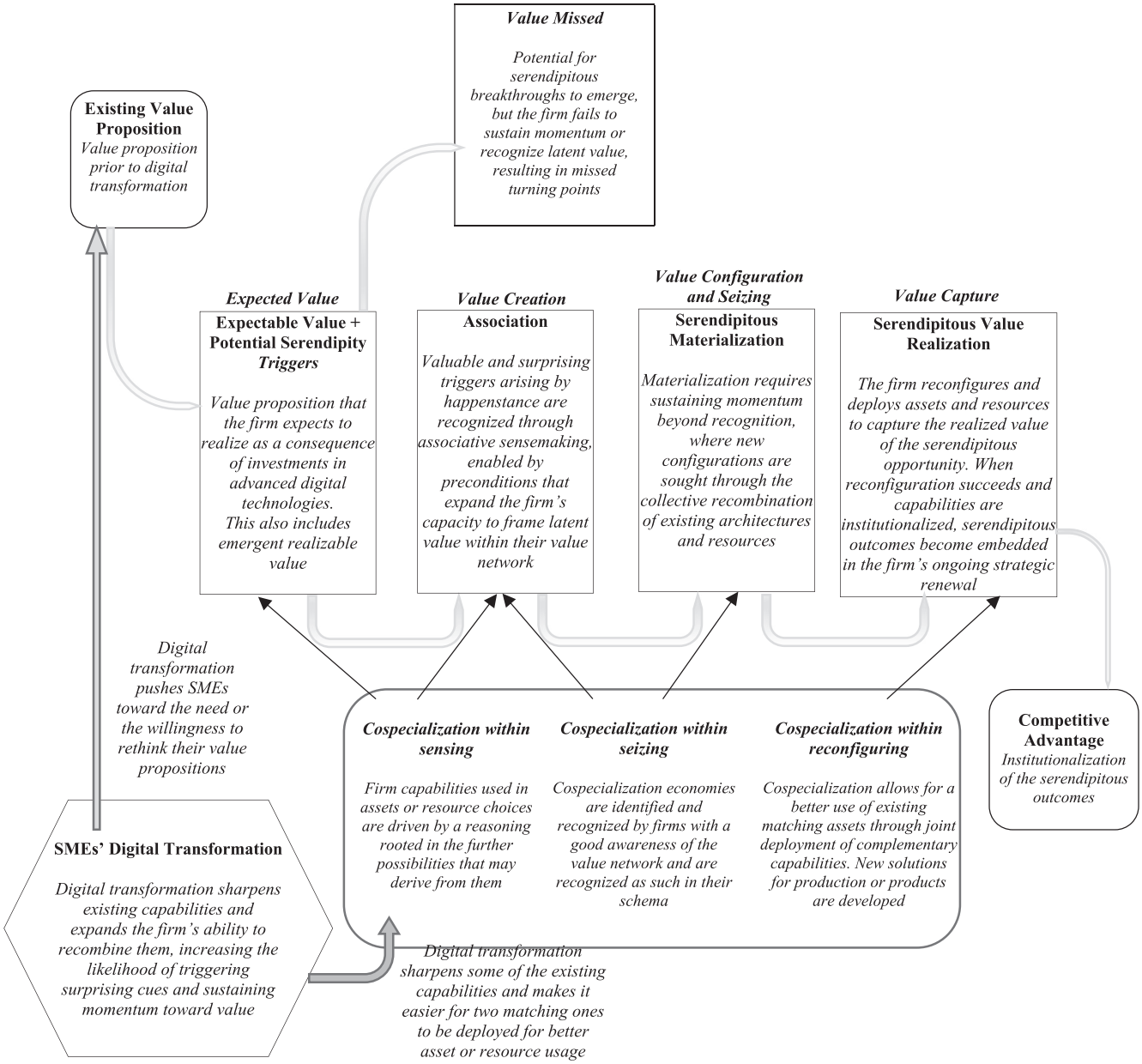

FIGURE 2 Cospecialization and the serendipity journey: A process model

Overall, the model highlights how cospecialization shapes the fragile progression across each stage of the serendipity journey. Rather than treating capabilities as isolated drivers, the model underscores their interdependence: Cospecialization within sensing supports the recognition of surprising triggers; cospecialization within seizing leads to associative sensemaking and materialization; and cospecialization within reconfiguring enables the institutionalization of realized value (Trott, Ellwood, & Baxter, 2024). In this view, the model examines serendipity as the emergent outcome of the elements' interaction through cospecialized deployments. In turn, firms that excel at such deployments are more likely to transform unexpected cues into sources of strategic renewal and competitive advantage.

Implications

This study holds multiple implications for management theory and practice. Through the exploration of the conditions under which serendipity emerges and the investigation of how firms sustain momentum across fragile stages to realize competitive advantages, the paper offers theoretical and practical insights in the realm of SMEs innovation management.

Drawing on comparative case evidence from digitally transformed Italian manufacturing SMEs, this study makes several contributions to scholarly literature. First, we extend the value-creation perspective in DT research (Schiavone et al., 2021). Prior work has mostly focused on how firms realize the expected benefits of DT, such as efficiency gains or increased revenue (Hanelt et al., 2021). Whether and how DT can unlock unforeseen positive outcomes has only been analyzed in very specific contexts (Browder, Dwyer, & Koch, 2024). By comparing firms that successfully implement DT, we show that DT can act as a powerful trigger that surfaces weak signals. DT alone, however, might not be sufficient: Serendipity emerges only when new digital assets and legacy capabilities cospecialize, and appropriate capabilities are enacted. These results highlight the importance of how DT is implemented within firms as a key driver of value creation.

Second, our results speak directly to the emerging literature on organizational serendipity. Recent work has called for a deeper understanding of the organizational factors that enable serendipity (Busch, 2024; Lane et al., 2021; Yaqub, 2018). By analyzing the interplay between DT and cospecialization throughout the serendipitous journey, we contribute to explaining why only some firms exposed to similar triggering events successfully complete the trigger–association–materialization–realization sequence. This framing positions serendipity as an outcome of leveraging interdependent assets and capabilities, while also illuminating the interrelated contingencies that inhibit the conversion of serendipitous cues into realized value. Identifying these "missed opportunities" refines our understanding of both the enabling conditions and the barriers to organizational serendipity.

Third, the study contributes to ongoing debates on cospecialization (Benassi & Rialti, 2024; Brueller & Capron, 2021; Santoro & McGill, 2005; Teece, 2018) by illustrating its role in bridging the gap between the surfacing of serendipity and the realization of its inherent value. By emphasizing the significance of the joint deployment of complementary resources and capabilities, the research offers a novel perspective on how firms can better harness cospecialization to sense, seize, and reconfigure resources in response to unexpected opportunities. This contributes to a more nuanced understanding of the dynamic capability framework, emphasizing how the interdependence of sensing, seizing, and reconfiguring (when cospecialized) enables firms to sustain momentum from triggering to realization, transforming unexpected cues into strategic renewal and competitive advantage. In doing so, it moves the discussion from a static view of capabilities to a relational and processual perspective, where organizational learning, reconfiguration, and knowledge alignment are key.

In practical terms, the findings suggest that SMEs should prioritize strategic investments in digital infrastructure and capabilities that promote exploration by exploiting at least some of their existing competencies or processes. These investments foster an environment conducive to serendipity by enhancing the firm's ability to recognize and act on unexpected opportunities. The evidence indicates that, when firms treat digital tools not solely as enablers of efficiency but as integrative components of routines and interpretative systems, they increase the likelihood of triggering serendipitous value creation. Moreover, the study provides insights for firms willing to operationalize cospecialization by actively identifying and integrating complementary assets and capabilities. This involves, for example, cultivating a culture that encourages cross-functional collaboration and leverages technology to enhance connectivity and information flows across organizational boundaries. In this sense, cospecialization becomes not only a matter of resource configuration but a cultural and structural orientation that supports ongoing discovery and adaptation. Firms that embed these orientations into their DT efforts are more likely to sustain learning trajectories that make space for the unexpected and capitalize on it effectively.

Limitations and future research avenues

This study adopts a qualitative, multiple-case approach, focusing on digitally transformed SMEs operating within a specific industrial context. However, the analytical depth afforded by this design comes at the cost of generalizability. The empirical focus on four Italian manufacturing firms limits the transferability of the findings across industries and sectors with varying degrees of digital maturity. Future research might pursue comparative designs to assess how sectoral dynamics, technological intensity, and environmental volatility condition the serendipity journey and the functioning of cospecialization mechanisms.

Relatedly, although the homogeneity of the firms in our sample aligns with our theoretical aim of isolating the factors that help firms translate DT into serendipitous value creation, it also limits our ability to account for the institutional context in which these firms operate. For example, during the period in which our firms carried out their DT projects, the COVID-19 pandemic represented a global shock, and institutional responses (e.g., containment measures, industrial policies, and support schemes for digital investments) varied substantially across countries and regions. Future research could adopt different time frames or compare firms across geographies to investigate how cospecialization interacts with institutional and policy contexts and to examine more directly when and how systemic shocks such as COVID-19 may act as catalysts for digital transformation and serendipitous value creation.

The retrospective nature of the interviews, though mitigated through triangulation with secondary sources, poses additional challenges. Retrospective accounts may suffer from post-hoc rationalizations or incomplete recall, especially when discussing unplanned or emergent

phenomena (Corley & Gioia, 2011). Future studies could adopt longitudinal or ethnographic methods to examine serendipitous dynamics in real time, capturing not only the moment of recognition but also the organizational processes through which unexpected signals are acted upon or overlooked.

In addition, the role of managers in shaping a context conducive to serendipity warrants further investigation. Managerial agency has emerged as a relevant factor across all cases, and a more granular analysis is needed to understand how guidance styles, decision-making logics, and organizational culture affect the mobilization of complementary capabilities in response to emerging opportunities. Studies could examine how leadership enables or constrains the alignment necessary for cospecialization to translate serendipity into realized value.

Research could also extend to SMEs with different managerial arrangements, such as founder-led firms, cooperatives, or businesses embedded in corporate networks. Such designs would allow inquiry into how organizational structures and ownership influence the integration of capabilities, the permeability of informational boundaries, and the formalization of serendipitous discovery. Indeed, although the study offers valuable insights, the selected SMEs shared two common characteristics that positively influenced the identification of triggers and the completion of the serendipity journey. The first pertains to the absence of dominant families; thus, intra-family conflicts, such as those related to generational change or succession, were not of concern. The second, instead, regards the short and somewhat informal chain of command existing in the identified firms. This characteristic, in turn, facilitates rapid flows of knowledge and information, thus increasing the likelihood of identifying triggers. Likewise, it implied greater chances of receiving approval from anyone involved, regardless of their role in the company, and support in pursuing the serendipity journey.

Moreover, the focus on successful or near-successful DT cases also implies a potential bias toward positive deviance. Although one case (alpha) illustrates a missed turning point where momentum toward realization was lost, further exploration of failure cases could illuminate how organizational fragilities, barriers to cospecialization, or structural rigidities disrupt the progression of the serendipity journey. Comparative designs contrasting success and failure across similar contexts may sharpen our understanding of the conditions under which dynamic capabilities enable—or fail to enable—serendipitous value capture.

Finally, future studies could explore how the interplay between DT and dynamic capabilities contributes not only to competitive positioning but to broader sustainability goals. The environmental and social dimensions of serendipitous innovation—especially those arising from unexpected efficiencies, resource reuses, or stakeholder engagement—remain underexplored. Examining how SMEs leverage digital technologies and cospecialized capabilities to create unanticipated sustainable value would extend both theoretical insight and managerial relevance. Future studies could also quantify the economic effects of serendipity using longitudinal, industry-level data. A further exploration rooted in the knowledge-based view (KBV) about the importance of knowledge management processes within the firm and how they can impact the diffusion of information about serendipity within the company is recommended to corroborate and potentially extend the findings (Mele et al., 2024).

CONCLUSIONS

This study examines how the cospecialization of dynamic capabilities shapes the serendipity journey in digitally transformed SMEs. Drawing on multiple in-depth case studies from the Italian manufacturing sector, it explored how firms transition from the potential of unanticipated value to its emergence, materialization, and eventual realization. By conceptualizing serendipity not as a discrete event, but as a fragile, multi-stage journey requiring situated agency to sustain momentum from triggering through association, materialization, and realization, the research advances a processual understanding of how unexpected value can be cultivated, captured, and institutionalized. By illustrating how complementary assets and capabilities—when aligned and mutually reinforcing—can create pathways for serendipitous outcomes, the study extends dynamic capabilities literature into a domain typically characterized by chance. In conclusion, this study contributes to ongoing academic debate by advancing understanding of the dynamic interplay between DT and the cospecialization of dynamic capabilities in fostering serendipity and value realization, paving the way for further theoretical and empirical investigations in the field.

AUTHOR CONTRIBUTIONS

The three authors contributed equally to this work.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the authors upon request, due to privacy restrictions.

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