Understanding SMEs Digitalization: A Literature Review of Maturity Models

Niccolò Ulderico Re, Antonio Ghezzi, Raffaello Balocco, Andrea Rangone
Politecnico di Milano – Department of Management, Economics and Industrial Engineering – Via Lambruschini 4B, 20156 Milan, Italy

niccoloulderico.re@polimi.it
antonio1.ghezzi@polimi.it
raffaello.balocco@polimi.it
andrea.rangone@polimi.it

Abstract: In recent years, digital technologies have transformed the way large firms conduct their business, from strategies and processes to products and services. However, small and medium-sized enterprises (SMEs) have faced difficulties in fully embracing these technologies due to resource constraints and a lack of expertise. The COVID-19 pandemic has highlighted the potential and versatility of digital technologies, potentially increasing SME entrepreneurs' awareness of digital topics. SMEs represent the beating heart of the European economy; therefore, it is essential to find tools to support their digital transformation. To guide SMEs in their digital roadmap, readiness or maturity models could be useful. However, existing research often lacks the proper perspective on SMEs. To address this issue, authors aim to illustrate the state-of-the-art digital maturity models for SMEs, through a review of existing academic knowledge. A systematic search, followed by a bibliometric review and conceptual review has been carried out to highlight and compare previous contribution to the topic. Since maturity models are multi-dimensional, major themes addressed in defining a maturity model or readiness model from both quantitative and qualitative models have been identified. The relevant dimensions were, then, reclassified and summarized into eight clusters. Digital strategy roadmap, employee skill and culture, organizational flexibility and adaptability, information technology, integration, customers, external environment, and, performance and benefits, are the major dimension identified in the review. A prominent attention of scholars and practitioners toward manufacturing and industry 4.0, is reflected in the existing model. It also emerges a focus internal dimension, that neglects external elements. Digital maturity models often take a vertical approach focused on manufacturing, hindering the development of comprehensive models to study digital maturity. Consequently, a future research agenda is also presented, highlighting the importance for future studies to build digital maturity model, analysing the specific context in which both manufacturing and service SMEs operate, and considering their peculiarities.

Keywords: Digital Maturity, Digital Transformation, Maturity Models, Literature Review, SMEs

1. Introduction

In recent years, significant shifts have been observed among large corporations, as they've embarked on a journey to reshape their business strategies, processes, capabilities, products, services, and interfirm associations by seamlessly integrating digital technologies into their operations (Bharadwaj, El Sawy, Pavlou & Venkatraman, 2013). Some of these enterprises have nearly reached the culmination of their strategic endeavors, leading to a noteworthy ability to deliver specialized, high-quality products and services at a reduced cost, consequently driving down prices (Trstenjak, Cajner & Opetuk, 2019). Conversely, small and medium-sized enterprises (SMEs), hindered by limited resources and expertise, encounter greater obstacles in harnessing the full potential of emerging technologies (Amaral & Peças, 2021). Despite this, the vulnerability of SMEs to various risks becomes apparent, spanning economic, social, human, and organizational domains. These vulnerabilities have been glaringly exposed through their arduous responses to the challenges precipitated by the pandemic (Mandviwalla & Flanagan, 2021).

The pandemic has, in fact, unveiled the vast capabilities and adaptability of digital technologies, potentially fostering heightened awareness among SME entrepreneurs concerning digital domains. However, the journey of transformational change brings about substantial hurdles, primarily stemming from the necessity to cultivate novel competencies within the organization (Soluk & Kammerlander, 2021). One conceivable approach to guide SMEs through their digital transformation involves leveraging tools such as readiness or maturity models. Regrettably, the existing body of research frequently lacks the requisite SME-centric perspective (Mittal, Khan, Romero & Wuest, 2018), often neglecting crucial considerations such as firm boundaries, industry dynamics, market competitiveness, and the broader operational network of SMEs.

This study seeks to address the pivotal research question: What is the contemporary landscape of digital maturity models tailored for SMEs? The overarching aim of this investigation is to provide an insightful response to this inquiry, achieved through a systematic review encompassing the existing academic knowledge.

2. Literature Screening

The examination of scholarly literature pertaining to the assessment of digitalization in SMEs was conducted through a systematic approach using the Scopus database. Initially, a search query was devised based on the research scope, meticulously selecting keywords with the aid of relevant papers to ensure comprehensive coverage of the existing literature on the subject.

Phenomenon	
Purpose	*(TITLE-ABS-KEY ("digital maturity" OR "digital readiness" OR "digital transformation" OR " digitali?ation" OR "digiti?ation")*
Subject of interest	*AND TITLE-ABS-KEY ("measur*" OR "assess*" OR "defin*" OR "framework*" OR "model*" OR "evaluat*" OR "index*" OR "level*" OR "stage*" OR "phase*" OR "survey*" OR "case stud*" OR "journey*")*
	AND TITLE-ABS-KEY ("sme" OR "smb*" OR "small enterprise*" OR "medium enterprise*" OR "small business*" OR "medium business*" OR "small firm*" OR "medium firm*" OR "small and medium-sized enterprise*" OR "small and medium-sized business*" OR "small and medium-sized firm*" OR "small-medium enterprise*" OR "small-medium business*" OR "small-medium firm*" OR "small and medium enterprise*" OR "small and medium business*" OR "small and medium firm*"))*

Figure 1: Research strategy

The query was designed to retrieve articles and conference papers in English, structured according to the principal themes encompassing the research area. Notably, the keyword search encompassed titles, abstracts, and keywords, categorized into three primary clusters:

- Phenomenon under Study: Digitalization process.
- Objective/Purpose of the Study: Establishing a structured approach to measure the phenomenon.
- Subject of Interest: Small and medium-sized enterprises (SMEs).

The phenomenon outlined in Table 1 was elucidated using five distinct yet complementary keywords, identified through an initial review. Concerning the first two keywords, digital maturity and digital readiness, the terms "readiness" and "maturity" are frequently interchanged to denote the same set of concepts (Pirola, Cimini & Pinto, 2019). However, readiness is defined as "the state of being both psychologically and behaviorally prepared to take action (i.e., willing and able)" (Weiner, 2009), while maturity pertains to "the state of being complete, perfect, or ready" (Soanes & Stevenson, 2006). Consequently, these two definitions are synonymous. Alternatively, Mettler (2011) introduces the concept of evolution, asserting that maturity necessitates progressive evolution in demonstrating a specific ability or accomplishing a target, transitioning from an initial to a desired state. Singh, Kaur, Kaur, and College (2015) introduce another perspective, contending that maturity pertains to "the degree of formality and optimization of processes, from ad-hoc practices to formally defined steps, to managed result metrics, to active optimization of the processes."

Convergence among authors is evident when discussing readiness assessment and maturity assessment. Benedict et al. (2017) define readiness assessments as "evaluation tools to analyze and determine the level of preparedness of conditions, attitudes, and resources at all system levels necessary for goal achievement." Using Holt, Armenakis, Field, and Harris (2007), readiness assessment aims to identify potential risks, opportunities, and challenges arising during the implementation of change processes within an organizational context. Moreover, readiness assessment allows addressing gaps in the existing organization either beforehand or during the planned changes (Holt et al., 2007). Mettler (2011) asserts that maturity models for maturity assessment are "models that facilitate individuals or entities in achieving a higher maturity level (i.e., ability) in people/culture, processes/structures, and/or objects/technologies through a step-by-step continuous improvement process."

Hence, maturity models, akin to readiness assessment models, aid in objectively and impartially evaluating a company's position, addressing queries about measurement requirements and assigning specific maturity stages or degrees (Becker, Knackstedt & PѵppelbuѵÜ, 2009). Consequently, this study considered both digital readiness and digital maturity models. Regarding the second set of terms-digitization, digitalization, and digital transformation-literature portrays them as describing distinct facets/phases of the same phenomenon. Despite their frequent interchangeability, these terms encapsulate interrelated yet distinct phenomena.

Digitizatio. According to Legner, Eymann, Hess, Matt, Böhmann, Drews, Mädche, Urbach & Ahlemann (2017), digitization refers to "the transformation of information into a digital representation." It is also described as "the

technical process of converting analogue data into digital ones, creating data for information system and processing" (Autio, Nambisan, Thomas & Wright, 2018; Tilson, Lyytinen, & Sørensen, 2010; Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian & Haenlein, 2021). Park, Pavlou, and Saraf (2020) offer a slightly different yet coherent definition, portraying digitization as the "firm's effort and process to digitize its business processes by implementing, assimilating, and using information systems."

Digitalization. Described as a paradigm that heightens the pivotal role of information technology (IT) in competitiveness and customer satisfaction (Mithas, Ali & Will, 2013), digitalization is characterized by Fischer, Imgrund, Janiesch, and Winkelmann (2020), Autio et al. (2018), and Tilson et al. (2010) as a "socio-technical process." This process involves the incorporation of information and communication technology (ICT) alongside knowledge-based assets, such as organizational and human capital, to foster enhanced outcomes (OECD, 2017).

Digital transformation. As articulated by Legner et al. (2017), digital transformation ensues as digital technologies facilitate connections between people, things, and locations, generating and analyzing vast quantities of data. This fusion of digitization and digitalization results in digital transformation, which, as asserted by Hansen & Sia (2015) and Holotiuk & Beimborn (2017), "alters communication and interactions between all stakeholders and reshapes the current economic, social, and political landscape." Acknowledged by Verhoef et al. (2021) as the most intricate and far-reaching phase, digital transformation encompasses changes in strategy, organization, information technology, supply chains, and marketing. Rogers (2016) underscores that it is fundamentally strategic rather than merely technological. In synthesis, digital transformation can be defined as "the process of reshaping the business model of a company through the adoption and use of digital technologies, enabling new possibilities and value creation" (Jeansson & Bredmar, 2019).

After the extraction, the compiled list underwent a meticulous screening process (Figure 1), with the primary aim of accumulating articles strictly relevant to the designated topic. This selection procedure unfolded across three distinct steps. Firstly, a title screening was executed to eliminate outcomes that clearly deviated from the research objective, resulting in the exclusion of 359 records. Illustrative instances of papers excluded encompassed titles such as "The Quality of Infectious Disease Hospital Websites in Poland in Light of the COVID-19 Pandemic" (Król & Zdonek, 2021), with a pronounced connection to health management, and "The Implications of Social Media on Local Media Business: Case Studies in Palembang, Manado, and Bandung" (Maryani, Rahmawan & Karlinah, 2020), prominently linked to marketing and communications.

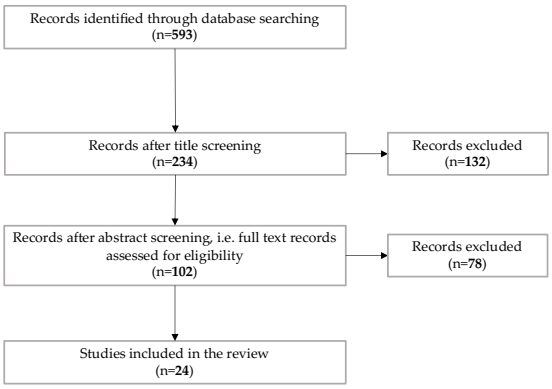

Figure 2: PRISMA Flow Chart

The ensuing step involved filtering the records through abstract reading, whereby 132 records were eliminated due to their misalignment with the research objective. The remaining documents underwent a comprehensive scrutiny during the final phase, involving a thorough examination of full-text content to assess their eligibility.

3. Bibliometric review

To better describe the composition of our data sample and to identify the trends and the most trending issues in scientific research, we have conducted also a bibliometric analysis. Bibliometric was first used by Paul Otlet in 1934 and it is defined as “the measurement of all aspects related to the publication and reading of books and documents” (Chonsawat & Sopadang, 2020). The interest in bibliometric research is growing thanks to ICTs, since it allows analyses based on large amount of data with distance-based approaches (Durana et al., 2020).

The following bibliographic analysis is based on the visualization of similarities techniques, using VoS Viewer™ to reconstruct scientific networks. Items in these networks are linked by co-authorship, co-occurrence, citation,

bibliographic coupling, or co-citation links (van Eck & Waltman, 2009). Van Eck et al. (2010) claim that the VoS Viewer is especially useful for displaying large bibliometric maps, but a minimum number of 100 fields is required for a meaningful analysis.

Items analyzed with VoS Viewer are characterized by attributes (e.g., number of citations received by a document). When working with keywords, as in our case, the key attribute is occurrences, i.e., the number of documents in which a keyword occurs (van Eck & Waltman, 2009). Occurrences are used as *weight* attributes: items with a higher weight (a wider circle) are more predominant in the network map than items with a lower weight (van Eck & Waltman, 2009). There are also two standard weight attributes, referred to as *links* and *total link strength*, represented with lines in the graphical representation. For a given item, the links and total link strength attributes indicate, respectively, the number of links of an item with other items and the total strength of the links of an item with other items (van Eck & Waltman, 2009). Lastly, colors are used to identify clusters—the same color means that terms within the cluster are more closely, and therefore more similar, more closely related than terms in different clusters (van Eck & Waltman, 2009).

The data sample analyzed is the result of the eligibility phase of the literature review. We decided to focus our analysis only on papers that are in line with the research topic and that can be recognized as influential publications. The map creation is based on bibliographic data, focused on Index keyword co-occurrences. To avoid noise, a minimum threshold of occurrences of a keyword has been set to 10. Of the 1485 keywords, only 25 meet the threshold. A normalization technique was applied on co-occurrence frequencies that observed the number of co-occurrences of node *i* (aspects) and node *j* called association strength. This improved the readability and the interpretation of the map. Moreover, a minimum number of 6 items was set to create a single cluster.

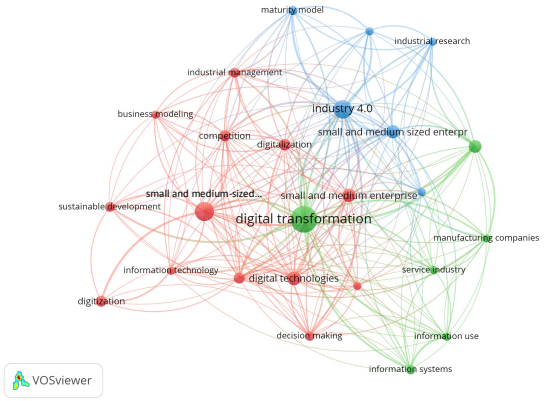

Figure 1: VoS Viewer representation

From Figure 1 it is noticeable that Industry 4.0, digital transformation, and SMEs are the main labels on which clusters are defined. This points to the conclusion that researchers that are focused on SMEs and digital transformation usually address the research topic from an Industry 4.0 perspective. Müller et al. (2018) have collected the definitions of Industry 4.0 in the extant literature and define Industry 4.0 as "a new paradigm which leads to swifter and more accurate decision making and to a completely new approach to production". It is crucial to point out that many of the listed definitions take into consideration the convergence of production and ICT evidencing the strong focus on the manufacturing sector. Digital transformation, instead, has a different level of detail, it has a wider perspective: "Digital transformation is to be understood as the process of reshaping the business model of a company due to, and through, the adoption and use of digital technologies, in order to create a setting where new possibilities are enabled and value created" (Jeansson & Bredmar, 2019). Hence, the Industry 4.0 paradigm involves digital transformation, however a focus on digital transformation does not always imply focusing on Industry 4.0. In light of this analysis, it is necessary to deepen the knowledge of "non-manufacturing" SMEs, in order to understand how they address their digital transformation.

4. Systematic review

Maturity models, as highlighted by Wendler (2012), often exhibit multidimensional characteristics. Through a qualitative examination of the literature, specific academic papers with significant influence in this domain were identified. These foundational papers enabled the extraction of key themes addressed by researchers in the formulation of both quantitative and qualitative maturity or readiness models. Consequently, the pertinent dimensions were reclassified and synthesized into eight distinct clusters.

Each theme represents a collection of relationships between two dimensions, endorsed by researchers' studies. Drawing insights from the works of Eller et al. (2020), Jeansson & Bredmar (2019), Pirola et al. (2019), Zangiacomi, Pessot, Fornasiero, Bertetti, and Sacco (2020), Del Giudice, Scuotto, Papa, Tarba, Bresciani & Warkentint (2021), and Park et al. (2020), the intention is to offer a more comprehensive elucidation of established dimensions. This research aims to expand the existing knowledge landscape, fostering a more profound understanding of digitalization in SMEs.

4.1 Strategic Approach and Digital Roadmap

Within the digital strategy/roadmap cluster, we amalgamate connections between digitalization and other dimensions associated with a SME's strategy. A consensus exists among Jeansson and Bredmar (2019), Pirola et al. (2019), Eller et al. (2020), and Zangiacomi et al. (2020) that a positive correlation exists between digital strategy and digitalization. Conversely, the inverse holds true as well: a lack of alignment between digital and business strategies adversely affects digitalization and transformation (Jeansson & Bredmar, 2019), underscoring the pivotal role of a well-defined strategy for a successful digital roadmap. The studies also reveal that the ability to discern which technologies best align with business needs significantly bolsters digitalization (Zangiacomi et al., 2020). Identifying optimal solutions hinges on an understanding of the SME's objectives, thus tethering this subtheme to the former. A robust roadmap necessitates adept management, as underscored by Zangiacomi et al. (2020), who highlight the favorable impact on digitalization of pilot projects. This approach, according to Zangiacomi et al. (2020), proves highly advantageous for company digitalization, offering room for experimentation. A test-by-doing approach is deemed a best practice in charting SME digital trajectories within the dynamic digital landscape.

4.2 Employee Competencies and Organizational Culture

This theme likewise permeates the discourse: four of the six seminal papers (Jeansson & Bredmar, 2019; Pirola et al., 2019; Eller et al., 2020; Zangiacomi et al., 2020) scrutinize the interplay among employee skills, corporate culture, and digitalization. Analogous to the previous theme, authors concur that deficient management and knowledge, coupled with an absence of shared organizational identity and culture, exert detrimental effects on SME digitalization (Eller et al., 2020; Jeansson & Bredmar, 2019), underscoring the pivotal roles of information and know-how for firms. The human element, manifest through employee skills, emerges as a priority for SMEs as organizations; human resources play a pivotal role in fostering implementation and attainment of elevated digitalization levels (Eller et al., 2020). Digital maturity hinges on employee skills and competencies (Pirola et al., 2019), and firms can enhance digitalization by investing in people and culture, facilitating knowledge sharing and best practices within the organization (Zangiacomi et al., 2020). Individuals constitute the foremost users of new technologies, thus becoming the primary source of feedback for SMEs. Hence, nurturing employees' critical approach becomes imperative for effective digital project implementation and consequent improvements in digital maturity (Pirola et al., 2019).

4.3 Agility and Adaptability of Organizations

The third thematic area in the literature pertains to an organization's capacity for adaptation. Multinational entreprises have traditionally held an advantage over SMEs due to their greater resource allocation for introducing enabling digital technologies (Del Giudice et al., 2021). Nevertheless, the growing prevalence of software-as-a-service allows firms to seamlessly transition between technologies while remaining within reasonable resource and time limits (OECD, 2017). This novel avenue empowers SMEs to catalyze digitalization by constructing scalable, high-quality IT infrastructures (Eller et al., 2020). However, effective organizational adaptability is indispensable for harnessing cost-effective digital implementation (Del Giudice et al., 2021). It significantly influences the learning curve of the company (Del Giudice et al., 2021), prompting the need for an ever-evolving set of dynamic capabilities to ensure alignment between business and IT, while rapidly sensing and reacting to shifting contexts (Eller et al., 2020; Park et al., 2020). In tandem with the prior section, this process should unfold through progressive proactive engagement of human resources, aimed at gathering diverse perspectives and fostering an integrated approach (Zangiacomi et al., 2020). In essence, SMEs (and companies at large) must cultivate ambidexterity, characterized as "the ability to simultaneously pursue efficiency and flexibility while balancing exploitation and exploration" (Park et al., 2020). Indeed, Del Giudice et al. (2021) consider it a "measure of organizational agility and adaptability."

The relatively modest size and flexible structure of SMEs can facilitate the establishment of shared codes of positive values and norms conducive to digitalization (Eller et al., 2020). In contrast, large enterprises grapple with structural complexity, inertia of existing processes, and bureaucratic formalities (Del Giudice et al., 2021).

This bidirectional relationship can generate virtuous cycles, as emphasized by Park et al. (2020), where IT systems facilitate seamless knowledge flow by fostering active participation and collaboration among employees, thereby enhancing enterprise flexibility and adaptability in volatile, ever-changing environments (Del Giudice et al., 2021). As businesses continuously adapt to dynamic market demands, the evaluation models must also evolve accordingly. In fact, modularity, interpreted as the capacity to tailor to the company's needs and context, emerges as a pivotal aspect in assessing SMEs' digitalization, according to Pirola et al. (2019).

4.4 Role of Information Technology

Although only a few authors (Eller et al., 2020; Jeansson & Bredmar, 2019; Pirola et al., 2019) delve into the implications of IT within SMEs, it remains fundamental to underscore that digitalization is set in motion by specific technologies. As posited by Pirola et al. (2019), IT holds substantial significance in digital transformation, and a discerning analysis of an SME's current IT infrastructure should form the bedrock of a digitalization roadmap. "IT encapsulates technological devices endowed with computing capabilities that support decision-making and organizational information processing" (Eller et al., 2020). This underscores that Information Technology serves as the core of digitalization—an essential resource and enabler that small and medium-sized enterprises should harness to enhance communication, collaboration, and the development of digital infrastructure (Eller et al., 2020). Hence, both authors concur in affirming that IT wields a positive influence on digitalization.

4.5 Process Integration

This cluster endows digitalization with a pronounced processes-oriented perspective. Within the Integration theme, Pirola et al. (2019) and Jeansson & Bredmar (2019) delineate the nexus between digital maturity and process integration. These researchers extend the discourse beyond a simple positive correlation between these two dimensions, asserting that process integration is an imperative of digital maturity (Pirola et al., 2019). As such, implementing new technologies or software within a company cannot be reduced to a solitary objective for improving digital readiness. SMEs must consider the horizontal implications across all processes affected by new technology, striving to harness the benefits that integration affords (Jeansson & Bredmar, 2019; Pirola et al., 2019). Digitalization, synonymous with technology integration, favorably impacts information exchange and communication across various organizational realms and within the supply chain (Pirola et al., 2019). Hence, sharing information and data amid processes assumes paramount importance for bolstering SMEs' digital readiness and affording companies advantages in future digital undertakings.

4.6 Customers

This thematic cluster encapsulates evidence related to the advantageous impact of digitalization on customers. SMEs recognize the increasing digital orientation of their customer base, as customers embrace digital systems and tools. Consequently, customer orientation becomes a prerequisite for digital maturity (Pirola et al., 2019). Digital tools introduce new avenues for customer communication, prompting SMEs to embark on digital projects to enhance their value proposition communication (Jeansson & Bredmar, 2019). Furthermore, digitalization elevates competition, heightening customer demands. This dynamic landscape compels SMEs to refine their processes and capabilities, positively influencing the implementation of digital projects (Jeansson & Bredmar, 2019). A customer-oriented approach is pivotal for SMEs to achieve digital maturity (Pirola et al., 2019), enhancing communication downstream within the supply chain of companies (Eller et al., 2020).

4.7 External Environment

Firms operating in highly competitive landscapes strive to leverage all available resources. Jeansson & Bredmar (2019) assert that an unstable market and external pressures correlate positively with the development of digital projects. Digitalization, in turn, correlates positively with enhanced market competitiveness, strategic advantages, market positioning, and the innovation of products and services (Jeansson & Bredmar, 2019). Exogenous events, such as the COVID-19 pandemic, serve as catalysts for SMEs' digitalization roadmap (Pirola et al., 2019). This external environment theme encompasses dimensions closely tied to digital maturity. Networking emerges as crucial for SMEs to address internal gaps and knowledge deficits (Del Giudice et al.,

2021). SMEs equipped with robust networks are better poised to adopt new technologies than isolated counterparts, as effective networking can help surmount constraints and propel competitiveness (Mittal et al., 2018; Zangiacomi, 2020).

4.8 Performance and Gains

The final thematic area derived from our review pertains to performance and benefits. This category potentially encapsulates the drivers that SMEs primarily consider when assessing the adoption of new technologies. Authors unanimously underscore the impact on cost efficiency as one of the foremost benefits SMEs can reap from digitalization (Eller et al., 2020; Jeansson & Bredmar, 2019). Yet, digitalization bears numerous other improvements, including the enhancement of a company's measurement system. Eller (2020) observes that digitalization allows real-time data collection, fostering superior process optimization and financial analysis. Data collection emerges as a pivotal driver in the digitalized landscape (Pirola et al., 2019).

5. Conclusions and Future Research Directions

Our review reveals that most of the analysis and studies conducted in past years in connection to digitalization and digital transformation were focused on Industry 4.0 (Klohs & Sandkuhl, 2020). However, Industry 4.0, is a particular shape of digital transformation, which is mainly focused on production technologies such as AR/VR, IoT/IIoT/IoS, smart sensors, data visualization and many others (Mittal et al., 2019). Instead, digital transformation changes are associated with the application of digital technology in all aspects of human society (Kääriäinen et al., 2020). Furthermore, as reported by Frank et al. (2019), servitization is currently the second trend that is shaping businesses, in parallel with Industry 4.0. The authors underline the internal nature of Industry 4.0, due to its focus on improving production-related technologies, while they attribute a more external perspective to servitization, seen as a way of generating value for customers.

Therefore, deepdiving into the service domain can contribute to this research by two means: on the one hand, it allows bridging the literature gap by understanding the dynamics that govern the digitalization process of a service SME, on the other hand, since companies are no longer polarized but they are increasingly product-service oriented, it also provides the opportunity to enlarge the current theoretical basis related to manufacturing SMEs digitalization.

The consequences of the preponderance of Industry 4.0 is reflected in the models extant in the literature. In fact, most of the existing Industry 4.0 and Smart manufacturing models focus on internal dimensions while keeping less attention on external dimensions. Moreover, this excessive attention to the digitization of the production process has led the scientific literature to focus almost exclusively on manufacturing companies, leaving aside the sphere of service SMEs. Therefore, it is interesting to investigate service SMEs' strategic decisions, needs, and the obstacles they encounter while conducting a digitalization project.

Also, the ramifications of the Industry 4.0 era are palpably reflected in existing models. Many Industry 4.0 and Smart manufacturing models predominantly focus on internal dimensions, potentially neglecting external aspects. Additionally, a prevalent vertical orientation in digital maturity models is often observed in the literature, limiting the development of all-encompassing models for studying digital maturity. Building on the findings presented herein, future research endeavors should validate the employment of comprehensive digital maturity models through empirical methods. Furthermore, the creation of tailor-made digital maturity models for SMEs necessitates the analysis of the unique internal and external contexts in which manufacturing and service SMEs operate. Finally, this study acknowledges limitations—it is based solely on extraction from the Scopus database, and only English-language conference and newspaper articles were analyzed.

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