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Impact of Digital Transformation on Business Model Innovation in Manufacturing Companies in Ghana: Mediating Role of Risk Management

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Abstract

The dynamic landscape of modern business necessitates organizations to embrace digital transformation and innovate their business models for sustainable growth and competitiveness. In light of this context, this conceptual paper aims to establish the impact of digital transformation on business model innovation through the mediating influence of risk management. The study integrates the perspectives of the socio-technical systems theory and the upper echelon theory to establish the mediating role of risk management in the relationship between digital transformation and business model innovation. At the heart of this conceptual paper's originality lies the integration of the socio-technical systems theory and the upper echelon theory to provide a nuanced understanding of how digital transformation, risk management, and business model innovation converge within the manufacturing sector in Ghana. By adopting these theoretical lenses, this study not only explores the distinct roles of technological and human elements but also delves into the cognitive dimensions of leadership that influence strategic decisions surrounding digital transformation and risk management. This synthesis contributes to the existing body of knowledge by offering a comprehensive framework that elucidates how these multifaceted elements interact to shape the trajectory of business model innovation, specifically within the context of a developing economy. Moreover, the paper's focus on the manufacturing sector in Ghana adds a distinctive perspective, as empirical investigations in this region are relatively limited. By centering on this unique context, the research aims to uncover insights that are applicable not only to the manufacturing sector but also to other industries facing similar challenges in the ever-evolving digital landscape. Consequently, this paper's originality lies in its holistic framework, theoretical synthesis, and the contextual lens it employs, all of which collectively contribute to a deeper understanding of how manufacturing organizations in Ghana can strategically navigate digital transformation, optimize risk management practices, and foster innovative business model evolution.

Keywords: Digital transformation, risk management, business model innovation, digitalization, digital technologies.

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1.Introduction

Digital transformation is radically impacting the world economy and society from the early 1990s to the present (Del Vecchio et al., 2017). Digital transformation helps an organization keep up with emerging customer demands and survive in the face of the future challenges (Autio et al., 2018;Vial, 2019). Firms that embrace digital transformation can access new markets opportunities, gain new knowledge regarding their customers, and improve new product development process more effectively (Imran et al., 2021; Parida et al.,2019; Vial, 2019). Digital transformation employs a combination of advanced digital technologies and organizational practices to enable major business improvements – better products and services, a competitive advantage, enhanced customer experiences, business model innovation, and new business process (Autio et al.,2018; Lucija et al., 2019; Geissbauer et al., 2018; Singh & Hess, 2017; Vial, 2019). Digital transformation concept has been adopted broadly, especially in the developed countries (Vaska et al., 2021), and our knowledge of digital practices has grown considerably over the past decade (Sony & Naik, 2020; Vial, 2019; Warner & Wäger, 2019). However, prior literature fails to provide a comprehensive understanding of how digital transformation leads to improvement in business model innovation, especially in the manufacturing sector in developing and emerging economies (Vaska, et al., 2021). Emerging economies in general are ignored when it comes to research on digital transformation and business model innovation, despite the presence of several digital firms and multinational companies (Vaska et al., 2021). Ghezzi (2018) argue that generalization and the relevance of findings depend on

the peculiarity of the context under examination. For this reason, a replication of research in emerging economies should be carried out. This will help to overcome the problem of generalizability with a single geographic region. Meanwhile, most recent studies on digital transformation and business model innovation have focused on technological aspect (Vaska et al., 2021) to the neglect of other important digital transformation dimensions, such as risk management (Imran et al., 2021). For instance, literature on digital transformation is dispersed between disruptive technologies, shared platforms and ecosystems, and new enabling technologies such as Big Data, the Internet of Things (IoT), Industry 4.0, Cloud computing, and digital fabrication (Vaska et al., 2021). Matt et al. (2015) have called for empirical research to test including technology, changes in value creation, structural changes, and financial aspects of digital transformation of business innovation model. This will help to discover commonalities or differences in organization's digital transformation strategies. Vaska et al. (2021) posits that new enabling technologies create new ways of doing business for firms and lead to the implementation of new ways of creating, delivery, and capturing value. Latifi et al. (2021) posits that business model innovation carries with bigger risks and greater ambiguity. Emerging and evolving risk types that arise from new business model presents a challenge to businesses. This requires businesses to pay close attention to risk management (Nambisan et al., 2019). The prevailing gaps in the literature on digital transformation and business model innovation has necessitated this study on digital transformation and business model innovation in emerging economies with focus on Ghana. The study specifically investigates the impact of digital transformation on business model innovation, with risk management as the mediating variable in Ghana's manufacturing companies. Digital transformation in this study is assessed by six dimensions (management capabilities, employee empowerment, organizational culture, organizational structure, employee skills and competencies, and technological capabilities), while business model Innovation is assessed by four dimensions (value creation, value delivery, value capture and value preposition).

2. Ghana's Manufacturing Sector and Digital Transformation

Ghana's manufacturing sector has undergone substantial growth in recent years, contributing significantly to the nation's economic progress (Ghana Statistical Service, 2020). Representing about 6% of Ghana's GDP and engaging around 10% of the labor force, the sector played a pivotal role in 2020 by contributing approximately 16.3% to GDP and providing employment for around 280,000 individuals (Ministry of Finance, 2020; Ghana Investment Promotion Centre, 2022). The manufacturing landscape in Ghana encompasses a diverse array of activities spanning from food processing and design to textiles, pharmaceuticals, and machinery (Association of Ghana Industries, 2023). Factors such as favorable government policies, growing domestic demand, and foreign investments have propelled the sector's expansion. However, this growth has been historically led by small and medium-sized enterprises (SMEs) (Ghana Investment Promotion Centre, 2019).

Key players in Ghana's manufacturing sector encompass a range of industries, including aluminum smelting, oil refining, chemicals, cement production, metal processing, pharmaceutical manufacturing, wood processing, textiles, and garment manufacturing. The manufacturing sector holds the potential to drive significant economic development in Ghana by diversifying production, expanding exports, creating employment opportunities, raising income levels, and boosting export revenues (Ministry of Finance, 2020; Ghana Investment Promotion Centre, 2022). Notable industries that are expected to contribute to Ghana's manufacturing growth include cocoa processing, agro-processing, textiles, garments, and pharmaceuticals (Ghana Statistical Service, 2020; Ghana Investment Promotion Centre, 2022).

Several noteworthy initiatives are underway or in progress, with the potential to profoundly impact Ghana's manufacturing sector. These include the development of value chains for local raw materials, the imminent implementation of the Ghana Conformity Assessment Programme (GCAP) to ensure imported goods meet specified standards, and the removal of minimum capital requirements for foreign investors entering the manufacturing sector. These initiatives aim to enhance the sector's competitiveness and attractiveness for both domestic and foreign investors, further bolstering Ghana's industrial capabilities (Ghana Investment Promotion Centre, 2022).

Despite its progress, certain industries in Ghana, including design, architecture, advertising, textiles, and fashion, grapple with challenges as they strive to embrace the digital age. A primary concern is the lack of adequate technological infrastructure and skills necessary for the shift to digital platforms (Karanasios & Senyo, 2022). Many firms in these industries still rely on traditional production and distribution methods, leaving them at a competitive disadvantage compared to digitally transformed counterparts from other nations (Dutta & Lanvin, 2022). Additionally, limited access to funding and capital hampers the ability of these SMEs to invest in digital

transformation, thereby hindering their growth and market expansion (Ministry of Finance, 2020;(United Nations Industrial Development Organization, 2020).

Furthermore, the absence of collaboration and networking among sector firms has exacerbated these challenges (Ghana Statistical Service, 2020). The lack of a coordinated approach to digital transformation and business model innovation isolates many firms, compelling them to navigate the complexities of the digital era alone (Karanasios & Senyo, 2022). This isolation also curtails the sharing of valuable knowledge and best practices that could otherwise facilitate innovation and enhance competitiveness (Ministry of Finance, 2020). Consequently, these challenges have led to reduced productivity, limited innovation, and a diminished competitive edge on the global stage. To combat these issues, the Ghanaian government has implemented policies and initiatives aimed at bolstering the nation's digital infrastructure, fostering digital literacy, and promoting innovation to invigorate the manufacturing sector's growth (Ghana Investment Promotion Centre, 2022). As reflected by its ranking of 103 out of 131 countries in the Network Readiness Index in 2022, Ghana's strides in enhancing its digital capabilities continue to evolve (Dutta & Lanvin, 2022). For instance, while the 2022 digital technology readiness ranking of Ghana show that digital technology is not adequate for Ghanaian businesses, it tends to rank higher in terms of access to the available technologies, and the content of the technology (Dutta & Lanvin, 2022). Although this may not fully reflect the conditions amongst all Ghana's design, architecture, advertising, textile, and fashion industries, it suggests the available digital technologies and infrastructure in Ghana is supportive of business growth (Karanasios & Senyo, 2022). This is a result of the several digital technology initiatives being undertaken by the government boost the growth of businesses in Ghana(Ghana Investment Promotion Centre, 2019).The government for instance is making efforts to increase broadband penetration across the country. According to the National Communications Authority, as of March 2021, Ghana had over 17 million internet users, representing a penetration rate of 57.2% (Ghana Statistical Service, 2020). The government is increasing adoption of mobile technology and internet connectivity across the country. According to the Ghana Investment Fund for Electronic Communications (GIFEC), mobile penetration in Ghana is very high, with over 42 million mobile phone subscribers in the country as of 2020 (United Nations Industrial Development Organization, 2020). This has made mobile technology a key driver of digital infrastructure development in Ghana, with mobile money services being one of the most popular applications.

In addition, the Ghanaian government has been working on improving its e-government services, with the aim of making public services more accessible to citizens through digital platforms(United Nations Industrial Development Organization, 2020). For instance, in 2018, the Ghanaian government launched the National Data Centre, which is aimed at providing secure and reliable storage of government data. The data centre also provides hosting services for private businesses, with the aim of boosting the country's digital economy (Ghana Investment Promotion Centre, 2022). Furthermore, Ghana has invested in developing a fibre optic network across the country, which is aimed at improving internet connectivity and supporting the growth of the country's digital economy (Dutta & Lanvin, 2022). The fibre optic network covers major cities such as Accra, Kumasi, and Takoradi. This has created opportunities for businesses to provide services such as cloud computing, data analytics, and digital marketing (Karanasios & Senyo, 2022).

Moreover, the government has implemented a number of policies aimed at encouraging the growth of the digital economy to boost the growth of the manufacturing sector(Ministry of Finance, 2020). These include the establishment of the Ghana Tech Lab, which provides support and incubation services to startups, the implementation of the e-Transform project, which aims to digitize government services and reduce bureaucratic inefficiencies, the establishment of e-justice system, which allows citizens and businesses to file court cases online, and the e-procurement system, which allows businesses to bid for government contracts online(Ministry of Finance, 2020). Overall, Ghana is rapidly advancing in digital transformation, with several sectors of the manufacturing sector, including the design, advertising, architecture, textile, and fashion industries, implementing digital technologies in their operations and activities(Karanasios & Senyo, 2022). However, how these digital transformation initiatives currently impacting the business model innovation of the manufacturing companies, especially those in the design, advertising, architecture, textile, and fashion sector, to best knowledge of the researcher, is not known. As to whether the application of the digital infrastructure and technology as well as the digital skills and capabilities has helped to improve the business model innovation of the manufacturing companies has not been researched. It is against this background that this research is being conducted to investigate the impact of digital transformation on business model innovation in manufacturing companies in Ghana.

The digital infrastructure of the country has the potential to revolutionize the manufacturing sector (Dutta & Lanvin, 2022). It presents significant digital transformation and business model innovation opportunities for the Ghanaian manufacturing sector to enhance productivity, efficiency, and competitiveness. Although the Ghanaian manufacturing sector is not without its challenges, with the right digital transformation and business model innovation strategies, these challenges can be addressed, and the sector can become more competitive and efficient. By adopting the right digital tools, skills and capabilities, as well as the right business model innovation, manufacturing companies in Ghana can reduce costs, improve efficiency, create new revenue streams, and remain competitive. Hence, it is very essential to examine and understand how the digital transformation initiatives, vis-à-vis the adoption of the digital technologies, impact the business model innovation of the manufacturing companies.

3. Review of Literature

3.1 Digital Transformation

In today's dynamic business landscape, digital transformation is not just an option; it's a necessity for organizational survival and growth. Its impact spans customer engagement, operational efficiency, strategic decision-making, and organizational culture (Zaki, 2019). Organizations that embrace digital transformation stand to reap the rewards of improved customer relationships, streamlined operations, innovative practices, and a culture that thrives in a digitally connected world (Schwertner, 2017). While challenges exist, the potential benefits make the journey toward digital transformation a strategic imperative for organizations across industries (Brunetti et al., 2020;Kraus et al., 2021). The scholarly discourse surrounding digital transformation underscores its multifaceted nature, encompassing various dimensions of organizational change driven by the adoption of digital technologies (Priyono & Darmawan, 2021). Verhoef et al. (2021) define it as the automation of goods and services or the introduction of digital business models that ingeniously capture value. Vaska et al. (2021) defined digital transformation as a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies. This interpretation underscores the technological advancement aspect of digital transformation, emphasizing the integration of digital technologies to revolutionize value creation (Sabai & Theresa, 2018). In contrast, present digital transformation as a metamorphosis in an organization's architecture, processes, and business paradigms catalyzed by the embrace of digital technologies (Zhang et al., 2021). This perspective underscores the broader systemic impact that digital technologies can have on the fundamental underpinnings of an organization.

However, the most encompassing definition is offered by Hinings et al. (2018), wherein digital transformation represents a constellation of digital innovations that collectively trigger novel changes across actors, structures, practices, values, and beliefs. This comprehensive viewpoint recognizes that digital transformation involves not only technological evolution but also the reconfiguration of cultural, structural, and strategic elements. It acknowledges that digital transformation goes beyond surface-level changes, impacting the very essence of how organizations operate within their ecosystems. Hinings et al. (2018) definition of digital transformation acknowledges digital transformation as a multifaceted phenomenon, involving dimensions like management capabilities, employee empowerment, organizational culture, structural dynamics, employee skill sets, competencies, and technological proficiencies. According to Trushkina et al. (2020), these dimensions reflect the myriad aspects and accentuate how digital transformation permeates various facets of an organization, culminating in a comprehensive understanding of the intricate relationship between digital transformation and its impact on organizational performance.

The definition proposed by Hinings et al. (2018) stands out as the most comprehensive and insightful interpretation of digital transformation due to its holistic perspective that encompasses multiple dimensions of organizational change. This definition recognizes that digital transformation is not a singular, technology-centric phenomenon but a complex interplay of various components that collectively reshape the organizational landscape. Hinings et al. (2018) proposition of digital transformation offers a richer understanding of digital transformation. First, the definition underscores the multifaceted nature of digital transformation(Metzler & Muntermann, 2021). It emphasizes that digital innovation is not confined to technology adoption alone, but it triggers a series of interconnected changes across various organizational aspects (Trischler & Li-Ying, 2022). This holistic understanding is crucial because it acknowledges that the impact of digital transformation extends far beyond technology implementation(Brunetti et al., 2020). It includes shifts in how actors within the organization function, how structures are reconfigured, how practices are altered, and even how values and beliefs evolve in response to the digital evolution. By considering these interconnected dimensions, this

definition paints a more accurate and nuanced picture of the transformative potential of digital technologies(Wu et al., 2021).

One of the critical strengths of Hinings et al. (2018) definition of digital transformation is its acknowledgment of the cultural and strategic shifts that digital transformation engenders. This goes beyond mere technological upgrades and addresses how digital innovations can lead to changes in the core cultural fabric of an organization (Horváth & Szabó, 2019). Digital transformation often demands shifts in mindsets, beliefs, and practices (Trushkina et al., 2020). Additionally, it prompts organizations to reevaluate their strategic positioning and adapt to new market dynamics (Warner & Wäger, 2019). By acknowledging the broader cultural and strategic implications, this definition captures the depth of transformation that goes beyond structural and technological changes (Frick et al., 2021). Hinings et al. (2018) definition of digital transformation is also notable of its recognition of the ecosystem-wide impact of digital transformation. Organizations do not operate in isolation; they exist within complex ecosystems that include industries, fields, and broader societal contexts (Leyer et al., 2019). By noting that digital transformation can alter existing rules of the game within these ecosystems (Vaska, Massaro, Bagarotto, & Massaro, 2021), the definition acknowledges the potential for disruption and reconfiguration that goes beyond the boundaries of a single organization(Straub et al., 2021). This realization is crucial for understanding how digital transformation can ripple through industries and reshape the competitive landscape (Hund et al., 2021).

By highlighting that digital transformation affects the very essence of how organizations operate, Hinings et al. (2018) definition of digital transformation brings attention to the depth of organizational impact. It is not just about adopting new technologies; it is about redefining how business is conducted, how decisions are made, and how value is created and delivered (Trushkina et al., 2020). This definition recognizes that digital transformation requires organizations to evolve in fundamental ways, prompting them to rethink their strategies, structures, and cultural norms (Nadkarni & Prügl, 2021). Such a depth of impact is often overlooked in narrower definitions that focus solely on technology. In effect, Hinings et al. (2018) definition of digital transformation is a constellation of digital innovations triggering changes across actors, structures, practices, values, and beliefs offers a profound perspective that captures the complexity and depth of this phenomenon. By acknowledging the interconnectedness of various dimensions and the transformation's impact on culture, strategy, and ecosystems, this definition provides a comprehensive framework for understanding how digital transformation reshapes organizations in the digital age.

Building upon the definition proposed by Hinings et al. (2018), this paper proposes a focus on investigating the holistic impact of the various organizational aspects, including management capabilities, employee empowerment, organizational culture, organizational structure, employee skills and competencies, and technological capabilities of digital transformation on an outcome of a firm. Thus the author argues that there is an interplay between digital innovation and the fundamental elements that constitute an organization's functioning. In other words, it is argued based on the definition of Hinings et al. (2018), that an organization that embraces and integrates digital transformation across multiple dimensions will have a positive impact on its overall outcomes, such as business model, competitiveness, and long-term performance. It is being proposed that organizations that effectively implement digital transformation initiatives to enhance their management practices, empower their employees, cultivate an adaptable organizational culture, optimize their structure, develop employee skills, and leverage technological capabilities will position themselves more favorably in today's digitally disrupted business landscape. Hence, it is hypothesized that:

H1: The degree of digital transformation within an organization, as indicated by the presence of enhanced management capabilities, employee empowerment, organizational culture, organizational structure, employee skills and competencies, and technological capabilities, positively influences firms' outcomes.

3.2 Business Model Innovation

The concept of business model innovation is multifaceted and varies among scholars and studies. Different definitions and perspectives exist, contributing to a diverse understanding of the term. Wirtz et al. (2016) initially characterized business model innovation as a paradigm shift necessitating fundamental rethinking of the company, whereas Teece (2017) viewed it as a framework for generating and delivering customer value while securing a portion of that value. In recent times, business model innovation has gained significance as a competitive advantage (Hossain, 2021). Other scholars, including Foss and Saebi (2017), Saqib and Satar (2021), and Bashir et al. (2020), define it as purposeful changes in existing models or the introduction of new elements.

This may involve altering market position, introducing novel combinations of existing products or services, or transitioning from product-centric to outcome-based services (Haaker et al., 2021;Hussain et al., 2021;Foss & Saebi, 2017). Despite debates about whether it's planned or spontaneous, most scholars concur that business model innovation is intentional and strategic (Trischler & Li-Ying, 2022;Teece, 2017;Bouwman et al., 2019).

Business model innovation emerges as a strategic process shaped by deliberate decisions, distinct from regular improvement (Hacklin et al., 2018). The potential of business model innovation lies in enhancing a company's resilience, particularly in the face of digital transformations (Parida et al., 2019). Geissdoerfer et al. (2018) propose that it can facilitate transitions between business models, enhancing adaptability and long-term competitiveness. Different configurations of business model innovation can be observed, such as startups, model changes, diversification, and acquisitions (Geissdoerfer et al., 2018). It is acknowledged that the digital era requires continuous improvement and adaptation, making business model innovation an ongoing process that is pivotal for survival and success (Lang, 2020; Heredia et al., 2022). Overall, business model innovation is a dynamic and strategic phenomenon, essential for staying competitive and relevant amidst evolving market landscapes and technological advancements (Ritter & Lettl, 2018).

According to research conducted by (Khaddam et al., 2021), business models serve six distinct functions: delineating the value proposition, outlining market segments, characterizing the structure of the value chain, projecting costs and profits related to offered products, specifying the firm's position within the value network, and formulating the competitive strategy of the firm. Scholars such as Clauss (2017) and Matzler et al. (2013) have proposed a triad of dimensions for gauging Business Model Innovation (BMI): value creation, value proposition, and value capture innovation. Matzler et al. (2013) define a prosperous business model as one that adeptly integrates both high-value production and high-value capture. On the other hand, Chen et al. (2021) classify business models into two distinct categories: product-oriented and customer-oriented.

The literature consistently identifies three key aspects as the cornerstones that shape an organization's business model: value creation, value proposition, and value capture (Kraus et al., 2020; Yang et al., 2021; Nambisan et al., 2019; Parida et al., 2019; Chen et al., 2021; Clauss, 2017; Hermes et al., 2019; Vaska et al., 2021). Clauss (2017) introduces a tripartite framework for quantifying BMI, encompassing value creation innovation, value proposition innovation, and value capture innovation. Additionally, Khaddam et al. (2021) emphasize that the creation of business model value emerges through interactions and transactions among pertinent entities like resource providers and purchasers, along with the reduction in transactional costs.

Ibarra et al. (2020) advocate that in order to meet the standards of BMI, organizations must institute novel adaptations within the components of their business models, particularly in value creation, value proposition, and value capture. Changes to value creation encompass efficient production, alignment of internal and external company processes with those of suppliers, employee training, data-driven transparent decision-making, real-time insights into manufacturing, sales, and inventories, as well as the incorporation of fresh physical and human resources (Vaska, et al., 2021). Alterations in value proposition entail new offerings, intelligent products, customer segmentation, and direct interactions (Trischler & Li-Ying, 2022). Lastly, value capture adjustments involve cost optimization, savings, and the identification of new revenue streams (Rezazadeh & Carvalho, 2018).

Beyond the core tenet of value proposition, a business model also endeavors to depict the phases of value creation, value distribution, and value realization (Geissdoerfer et al., 2018; Ranta et al., 2021). These four components constitute the foundational structure of a business model (Khaddam et al., 2021; Clauss et al., 2019; Yang et al., 2021; Parida et al., 2019), although in a rudimentary and holistic manner, resonating with the majority of the aforementioned perspectives. Thus, it is argued that four elements – value proposition, value creation, value delivery, and value capture – are the focal points underpinning business model innovation of an organization.

It is argued that organizations that proactively innovate and adapt within the fundamental dimensions of value proposition, value creation, value delivery, and value capture in their business models are poised to experience positive outcomes of increased competitiveness and sustained growth (Kohtamäki et al., 2019). This argument rests on the premise that strategic alignment with evolving customer preferences, emerging technological trends, and dynamic market conditions can confer distinct market positioning, improved customer engagement, optimized resource allocation, and novel revenue streams (J. Zhang et al., 2021). By strategically crafting offerings that address shifting customer needs and framing value propositions that resonate within the current landscape, these organizations can cultivate a competitive edge while aligning value capture methods with

innovative ways of monetizing their products or services (Tonder et al., 2020). This proactive approach is anticipated to lead to enhanced organizational resilience and success, fostering a responsive and forward-looking operational framework that remains adaptable in the face of changing business environments (Alshawaaf & Lee, 2020). Based on this argument, it is hypothesized that:

H2: In the context of business model innovation (BMI), organizations that strategically modify their value creation, value proposition, and value capture dimensions are more likely to achieve enhanced market competitiveness and sustainable growth.

3.3 Risk Management

Risk management involves coordinated actions aimed at guiding and controlling an organization's exposure to risks across various levels, sectors, roles, projects, and activities(Fernandes & Brandão, 2016). Its primary objective is to anticipate and assess potential aspects and events that could pose threats to an organization's performance and ensure effective decision-making and operations (Musiello-Neto et al., 2022). The process encompasses identifying, analyzing, and prioritizing risks while striving to optimize projected returns relative to risk tolerance (Wirahadi & Pasaribu, 2021). It aims to create a secure work environment, enhance operational efficiency, mitigate legal liabilities, provide protection from hazards, and contribute to organizational establishment (Etges et al., 2017;Brillinger et al., 2020). The process does not eliminate all risks but seeks to minimize adverse consequences (Magni et al., 2022).

Risk management is a proactive strategy that identifies, monitors, and manages individual risk occurrences and overall risks to reduce an organization's financial vulnerability (Bielialov, 2022). It involves a series of steps such as identifying, assessing, prioritizing, treating, and monitoring risks (Ma & Zhang, 2022).The process encompasses risk assessment, evaluation, treatment, and the utilization of multiple evaluation tools for problem-solving and decision- making (Brillinger et al., 2020). Its purpose is to ensure the successful execution of business decisions and operations while minimizing potential threats (Aarøen & Selart, 2020).

In the context of digital transformation and business model innovation, risk management plays a critical role in navigating the changing landscape (Andreini et al., 2021). Digital transformation, characterized by the adoption of digital technologies and strategies, has brought about new opportunities and challenges (Musiello-Neto et al., 2022). Organizations need to manage risks associated with technological disruptions, cybersecurity threats, and shifts in customer behavior (Songling et al., 2018). Risk management becomes a pivotal component in ensuring a smooth transition to digital operations while safeguarding data privacy, intellectual property, and overall operational resilience (Linde et al., 2020).

Business model innovation often arises as a response to digital transformation, necessitating a reevaluation of value propositions, customer engagement methods, and revenue streams (Brillinger et al., 2020). Risk management becomes integral in this process as organizations need to assess the potential risks and uncertainties associated with altering core components of their business models (Clauss et al., 2021). Strategic decisions such as shifting from product-centric to service-oriented models or embracing platform-based approaches require careful consideration of associated risks and mitigation strategies (Hossain, 2021). Thus, risk management serves as a guiding framework to identify, evaluate, and manage risks while optimizing the benefits of digital transformation and business model innovation for sustained growth and competitive advantage (Rachinger et al., 2019).

It is argued that organizations which deliberately integrate comprehensive risk management practices into their processes of digital transformation and business model innovation stand to reap favorable outcomes marked by heightened resilience, successful transitions, and enhanced competitive positioning (Mihalache & Volberda, 2021;Sun et al., 2020). This proposition is underpinned by the recognition that the intricate and ever-evolving landscape of digital transformation and business model innovation exposes organizations to a range of uncertainties and potential risks (Fernandez, 2021). In response, a strategic approach to risk management becomes essential, allowing organizations to foresee, evaluate, and proactively address these risks (Kibisu & Awino, 2017). This strategic integration equips organizations with the tools to maneuver through the intricacies of transformational endeavors, protecting critical assets, and leveraging emerging prospects (Settembre-Blundo et al., 2021).

The rationale behind this assertion stems from the understanding that risk management serves as a protective shield, enabling organizations to navigate uncharted territories with a clearer understanding of potential pitfalls and effective risk mitigation strategies (García-Sánchez et al., 2018). By fostering a culture of risk-awareness and preparedness, organizations can not only anticipate potential disruptions but also capitalize on innovative opportunities (Taran et al., 2019). This proactive stance empowers organizations to not only weather uncertainties but also leverage them to carve out unique competitive advantages (Wirahadi & Pasaribu, 2021). Ultimately, this assertion suggests that by weaving risk management into the fabric of digital transformation and business model innovation, organizations can enhance their capacity to adapt, thrive amidst evolving business landscapes, and achieve sustained growth (Al-Nimer et al., 2021). Based on this assertion it is hypothesized that:

H3: Effective integration of risk management practices within the processes of digital transformation and business model innovation enhances organizational resilience, facilitates successful transitions, and contributes to sustained growth and competitive advantage.

3.4 Digital Transformation and Business Model Innovation

The integration of digital technology into all areas and activities of an organization results in infrastructure changes in how the business operates and provides value to its customers(Kraus et al., 2022; Vial, 2019). Digital transformation, as defined by Hinings et al. (2018), is the result of multiple digital innovations that give rise to new actors (and actor constellations), structures, practices, values, and beliefs that alter, threaten, replace, or supplement preexisting norms within organizations, ecosystems, or industries. Ulrich and Fibitz (2020) emphasized that digitization has an impact on enterprises of all sizes, industries, and structures. Therefore, businesses need to reevaluate their value design in order to remain competitive and prevent oblivion in the marketplace. This makes it essential for practitioners and researchers alike to comprehend the connection between digital transformation and business models.

In light of the recent conversation about digital transformation and business model innovation, it is clear that the former has an effect on the latter. For instance, Vaska et al. (2021) conducted a literature study on how digital technology is impacting business model innovation. Their studies demonstrated that digital transformation has an impact on the development, delivery, and capture of value in almost every firm. Rachinger et al. (2018) evaluated the influence of digitalization on BMI. The authors especially looked at how digitalization affects a company's value generation, offer, and capture, as well as how organizations deal with the issues that growing digitalization presents. A qualitative study approach was employed to collect empirical data from 12 important informants from two diverse sectors, media, and automobile. The findings show that digitization has a significant impact on the value-generation component of business model innovation in both the automobile and media industries. The research also discovered the impact of changing personnel qualifying standards. Furthermore, the study's findings demonstrated a beneficial impact of digitalization on the value proposition and value capture elements, resulting in increased and extra revenues.

Tavoletti et al. (2021) conducted an exploratory study of business model changes used by management consulting companies to stay competitive throughout the digital transformation. Using a longitudinal multiple case study of the European practices of major global management consulting firms, the study found that management consulting firms' business model innovations, such as value creation innovation, value proposition innovation, and value capturing innovation, are influenced by the firm's digital transformation. Rummel et al. (2021) investigated how manufacturing organizations' innovation processes might be adapted to produce unique business models to handle the difficulties of digitalization. The research used a multiple-case study technique to gather data on BMI processes in six manufacturing organizations. The findings indicate that digital transformation has an impact on the design of business model innovation processes. The authors emphasized that to remain competitive, manufacturing organizations must innovate beyond new goods and services and build their digital business model innovation processes.

Using existing research, Verhoef et al. (2021) explored digital transformation and its impact on business model innovation. The authors discovered that digital transformation influences firm business model innovation. The authors stated that digital transformation necessitates certain organizational structures and has implications for the metrics used to assess success. They also believe that digital transformation and the resulting business model innovation have fundamentally changed customers' expectations and habits, exerting enormous pressure on established enterprises and disrupting many marketplaces. Ulrich and Fibitz (2020) investigated the impact of digital transformation on company models. The study's findings showed that innovating business models is aided by a greater focus on digital technologies and the use of specific digital approaches.

Legowo et al. (2021) investigated the impact of digitization on BMI in SMEs. The purpose of the research was to identify the elements that impact digitalization implementation in developing, modifying, and upgrading the values of business model innovation in Indonesian SMEs. Data was gathered from 100 Indonesian SMEs. The study found that digitalization, as influenced by external business variables and dynamic capacity elements, has a key role in developing, modifying, and increasing values in business model innovation for Indonesian SMEs. Menchini et al. (2022) investigated the strategic competencies for digitalizing company models. The study's goal was to determine the relationship between the ability to apply enterprise architecture tools and the efficacy of business model digitalization in organizations. The authors employed two research methodologies - a survey and a focus group - to examine the link between enterprise architecture (EA) maturity and digital maturity from the standpoint of socio-materiality. The authors discovered that top management's dedication and clarity, as shown by its sponsorship of strategy communication, contribute to the integration, involvement, and flexibility of individuals engaged and are responsible for increased maturity in business model digitization.

Although current research on digital transformation confirms that digital transformation disrupts the existing business models of transitioning organizations, research investigating the underlying processes and the particular effect is still limited (Metzler & Muntermann, 2021). Rachinger et al. (2018) emphasized that, although research on digitalization in the context of business model innovation is now receiving more attention, there is still a research vacuum in this subject due to the low number of empirical findings. An empirical evaluation of studies on the link between digital transformation and business model innovation indicated that the majority of research has focused on digitalization and business model innovation. Meanwhile, no hypothesis is identified in any of the examined research works that examines the link between digital transformation and business model innovation through value creation, value proposition, value delivery, and value capture. As a result, this research hypothesized that:

H4: Digital transformation has a positive impact on value creation, value proposition, value delivery, and the value capture of business model innovation.

3.5 Mediating role of Risk Management between Digital Transformation and Business Model Innovation

Risk management is critical in uncertain times because it prevents organizations from responding hastily and poorly, enabling them to become more flexible and resilient (Settembre-Blundo et al., 2021; Sun et al., 2020). Although digital transformation has resulted in a quickly changing business environment with exponentially expanding prospects for new skills and projects, one of the most crucial success criteria in this digital era is an organization's capacity to manage risk (Settembre-Blundo et al., 2021; Clauss et al., 2021). According to Wirahadi and Pasaribu (2021), businesses are attempting to minimize risk while also experimenting with digital initiatives that generate new possibilities. According to Bocken and Geradts (2020), the outcome is a constant struggle between the drive to innovate and the requirement to reduce risk.

Better risk management in cybersecurity, data privacy, and system dependability is a key driver of digital transformation, with 40% of firms identifying this as a desirable transformative result (Garcia-Perez et al., 2022; De et al., 2020). Risk management perceptions differ by area (Cullen et al., 2018; Fernandez, 2021). Asia-Pacific company executives tend to be more risk-averse, which may reflect the initial phases of factoring risk into their strategy (Zhang et al., 2021). Regulatory regulations, on the other hand, have compelled European businesses to address privacy and data security from the start (De et al., 2020). Proactive risk mitigation becomes a larger priority as firms continue down the road of digital transformation (Kersten et al., 2017). This means that when company leaders prioritize security, agility, and operational efficiency, they will be better positioned to include risk mitigation in their overall DT and BMIs (Zhang et al., 2021; De et al., 2020; Sun et al., 2020).

According to Fernandes and Brandão (2016), it is critical for enterprises to manage the risks brought into the environment and their influence on the current ecosystem to maximize the value of their digital activities. Meanwhile, according to Geissdoerfer et al. (2018), altering the business model by incorporating technology and sustainable components puts organizations at risk. According to Tohanean et al. (2020), to gain competitive advantages and maintain high market shares, businesses must constantly manage risk associated with business model innovations, not only by implementing the latest technology available but also by creating their risk-resistant business model innovations, to make the business both more profitable and more sustainable. Garcia-Perez et al. (2022) asserts that companies that do not grasp fundamental detection, mitigation, and response methods, as well as how risk impacts their operations, are unlikely to be adequately aware of the risks and uncertainties they confront. According to Kersten et al. (2017), businesses that are unaware of domain-specific

risks and uncertainties are unlikely to gain the requisite knowledge and capacities for a successful business model and digital transformation. As a result, risk management is critical in both digital transformation and business model innovation. Thus, risk management may be seen as a bridge between digital transformation and business model innovation.

Scholars on digital transformation and business model innovation generally agree that agile organizational structures enable businesses to remove traditional hierarchical barriers and create connected harmony to create value, operate in lean, improve customer interaction, and accelerate technology adoption, all of which define the success of any business's digital transformational applications (Jayawardena et al., 2020; Sun et al., 2020; Fernandes & Brandão, 2016; Musiello-Neto et al., 2022; Garcia-Perez et al., 2022; Kersten et al., 2017; Gunasekara et al., 2020; Kibisu & Awino, 2017; Al-Nimer et al., 2021; Wirahadi & Pasaribu, 2021). Al-Nimer et al. (2021) investigated the impact of Enterprise Risk Management (ERM) on business performance, with Business Model Innovation acting as a moderator (BMI). The findings revealed that ERM procedures have a considerable impact on BMI and financial business performance. Wirahadi and Pasaribu (2021) developed and articulated the link between enterprise risk management, strategic agility, business model innovation, and financial performance in a changing business environment. The research was carried out through a review of the literature. According to the findings of the literature review, in an uncertain and risky business environment, enterprise risk management has a positive impact on strategic agility and business model innovation, strategic agility has a positive impact on business model innovation, and business model innovation has a positive impact on the company's financial performance. Garcia-Perez et al. (2022) examined core constructs that contribute to the required transformative, adaptive, and absorptive capacities for health system's digital resilience using data collected at the peak of the COVID-19 pandemic from owners and C-level executives from critical infrastructure sectors in the United Kingdom. According to the findings, a balanced foundation of cyber security knowledge development, uncertainty management, and consideration for the sector's high levels of systemic and organizational interdependence is critical for digital resilience and the sustainability of digital transformation efforts.

Although scholars agree that the success of digital transformation and business model innovation is heavily dependent on how effectively the associated risks are managed, no research has been conducted to investigate the role of risk management in mediating the relationship between digital transformation and business model innovation. According to Latifi et al. (2021), current research efforts have tended to concentrate on the mediating function of how business model innovation affects a firm's overall performance by mediating the effect of efficiency growth, revenue growth, and organizational skills. Latifi et al. (2021) agree with Kraus et al. (2020) on the need for a greater study on digital transformation and business model innovation, investigating their mediating and moderating relationships. As a result, this research hypothesizes:

H5: Risk management mediates the relationship between digital transformation and business model innovation.

3.6 Conceptual Framework

Based on the theoretical framework of the study, the following conceptual framework, as shown in Figure 1, is proposed for the study. The proposed conceptual framework encompasses an array of dimensions within the scope of digital transformation, encompassing factors such as management capabilities, employee empowerment, organizational culture, organizational structure, employee skills and competencies, and technological capabilities, which serves as the independent variables. These independent variables collectively exert a direct influence on the process of risk management, which takes on the crucial role of a mediator, bridging the relationship between the independent variables and the dependent variables. As outlined in the framework, the dependent variables are characterized by the multifaceted dimensions of business model innovation, specifically encompassing value delivery, value creation, value capture, and value proposition.

The framework serves to visually depict the intricate web of relationships within the organizational context. By demonstrating the direct influence of digital transformation dimensions on risk management, it emphasizes the pivotal role of risk management in channeling the impacts of digital transformation towards the subsequent dimensions of business model innovation. The conceptual framework also underpins the hypothesis that risk management plays a crucial mediating role in shaping how the effects of digital transformation factors ultimately manifest in terms of business model innovation dimensions. This mediation is essential in uncovering the

intricate mechanisms through which these variables interact and collectively contribute to organizational outcomes.

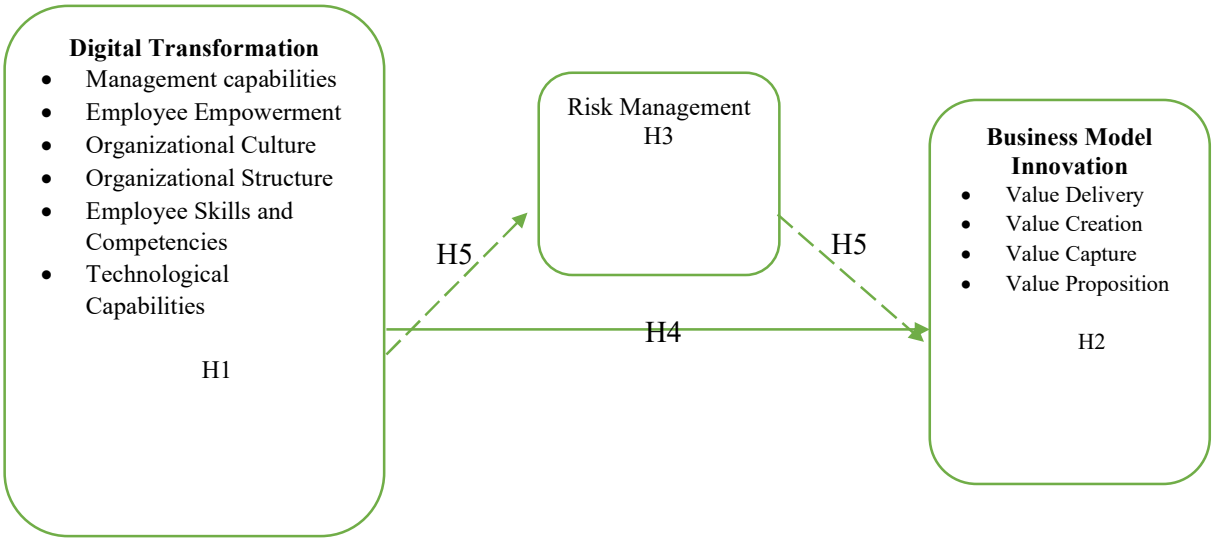

Figure 1: Conceptual Framework of the Study

4. Significance of the Study

The study is of immense significance to practice, policy and contribution to research. In terms of practice, manufacturing companies in Ghana can benefit from the insights provided by this study in their strategic decision-making processes. Understanding how digital transformation, risk management, and business model innovation are interconnected can help these organizations adapt to the evolving business landscape more effectively. On the other hand, the findings of this study can inform talent development strategies within organizations. Manufacturing companies can use the research to identify the skills and competencies needed for employees to thrive in a digitally transformed environment. This can guide training and development programs to upskill the workforce effectively. Moreover, the insights generated by this research have practical relevance not only for the manufacturing sector but also for other industries grappling with similar challenges in the rapidly evolving digital landscape. It provides guidance on how organizations can strategically navigate digital transformation, enhance risk management practices, and drive innovative changes in their business models. In addition, in an era of rapid technological change and market uncertainties, the study contributes to strengthening the resilience of manufacturing organizations. It equips them with the knowledge and strategies needed to adapt to disruptions, whether they are related to technology, supply chain, or market dynamics. The study's insights can also help manufacturing companies in Ghana enhance their competitiveness in the global market. By understanding how to effectively leverage digital technologies, manage associated risks, and innovate their business models, organizations can position themselves as leaders in their respective industries. Meanwhile, the study's focus on business model innovation and market diversification can be particularly beneficial for manufacturing companies looking to expand into international markets. It provides guidance on how to tailor products and services to meet the needs of diverse markets. Also, the study can serve as a source of best practices and benchmarks for manufacturing organizations. Companies can benchmark their digital transformation efforts, risk management strategies, and business model innovations against the findings, helping them identify areas for improvement.

In terms of policy, the study is of several significances. First, policymakers in Ghana and similar economies can draw upon the research's insights to formulate policies that promote digital transformation, innovation, and risk management in the manufacturing sector. These policies can facilitate a more conducive environment for growth and competitiveness. Second, policymakers can develop targeted policies to support and incentivize firms in their digital endeavors, recognizing their potential to drive economic development. Third, the study can also

inform policies aimed at attracting foreign direct investment (FDI) into Ghana's manufacturing sector. Fourth, policymakers can use the research findings to highlight the sector's potential for innovation and growth, making it more attractive to international investors. Fifth, policymakers can develop trade and export policies that align with the study's focus on business model innovation and market diversification. This can facilitate the export of Ghanaian manufactured products to regional and global markets, leveraging the benefits of the African Continental Free Trade Agreement (AfCFTA). Sixth, the study's insights into risk management can guide the development of regulatory frameworks that balance innovation and risk mitigation. Moreover, policymakers can work to create an environment that encourages digital adoption while ensuring safety, security, and compliance with international standards. In addition, policymakers can also use the study's findings to design and implement support programs for local manufacturing companies. These programs can include incentives for technology adoption, access to financing for digital transformation projects, and capacity-building initiatives to enhance risk management practices. On the other hand, the study can inform policies related to the development of digital infrastructure in Ghana. Policymakers can allocate resources to improve digital connectivity, access to technology, and data security, creating an enabling environment for manufacturing companies to embark on digital transformation journeys. Meanwhile, policymakers can also promote collaborative initiatives between manufacturing companies, research institutions, and technology providers through the findings of this study. These partnerships can drive innovation, knowledge sharing, and technology transfer, aligning with the study's emphasis on collaboration as a driver of success. Lastly, the study underscores the importance of regulatory agility in the face of rapid technological change. Policymakers can develop mechanisms for reviewing and updating regulations to keep pace with digital advancements, ensuring that the regulatory environment remains conducive to innovation. Policymakers can also establish monitoring and evaluation mechanisms to assess the impact of digital transformation policies and initiatives in the manufacturing sector. This data-driven approach can help policymakers fine-tune their strategies based on real-world outcomes.

The research contribution of this study is also very noteworthy. The integration of socio-technical systems theory and the upper echelon theory represents a theoretical advancement. This approach enriches the understanding of the complex dynamics involved in digital transformation, risk management, and business model innovation. On the other hand, the study's holistic framework provides a comprehensive view of the interactions between different elements within a manufacturing organization. This framework can serve as a valuable reference for future research in the fields of management, innovation, and digitalization. Moreover, the research's focus on the Ghanaian manufacturing sector contributes valuable contextual insights. It adds to the limited empirical knowledge available in this region, making it a valuable resource for scholars and researchers interested in studying similar contexts. In addition, while the study focuses on the manufacturing sector, its findings and framework have relevance across various industries. Researchers exploring digital transformation, risk management, and innovation in diverse sectors can draw inspiration from this work. Meanwhile, the study's focus on the manufacturing sector in Ghana contributes to the contextual understanding of digital transformation and innovation in developing economies. It offers valuable insights into the challenges and opportunities specific to this region, enriching the body of research on global digitalization trends. Furthermore, future research can build upon this study's findings to assess the impact of policy interventions and initiatives aimed at promoting digital transformation and innovation. This longitudinal perspective can provide valuable insights into the long-term effects of such policies.

5. Conclusion

Digital transformation has gained immense popularity (Lucija et al., 2019;Imran et al., 2021; Hartl & Hess, 2017). However, its impact on business model innovation in the manufacturing sector in developing countries has not been given the needed research attention (Ferreira et al., 2019). Despite the significance of digital transformation, few firms have broken the secret to a successful digital transformation (Ferreira et al., 2019). Paiola and Gebauer (2020) report that only ten percent of global manufacturing companies are digital champions. Many questions still remain unanswered on how digital transformation strategies would affect BMI (Ferreira et al. 2019; Chen & Wang, 2020). Digital transformation and business model innovation practices of firms could significantly improve if answers to these questions are provided through further research. The study contributes to answering some of the questions about Digital transformation and business model innovation by examining the impact of digital transformation on business model innovation in manufacturing firms in Ghana.

References

Aarøen, C., & Selart, M. (2020). Risk Framing and Business Model Adaptation: A Conceptualization Based on Threat-Rigidity Theory. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3594505

Abatecola, G., & Cristofaro, M. (2020). Hambrick and Mason's "Upper Echelons Theory": evolution and open avenues. *Journal of Management History*, *26*(1), 116–136. https://doi.org/10.1108/JMH-02-2018-0016

Al-Nimer, M., Abbadi, S. S., Al-Omush, A., & Ahmad, H. (2021). Risk Management Practices and Firm Performance with a Mediating Role of Business Model Innovation. Observations from Jordan. *Journal of Risk and Financial Management*, *14*(3), 113. https://doi.org/10.3390/jrfm14030113

Ali, R., Rehman, R. U., Suleman, S., & Ntim, C. G. (2022). CEO attributes, investment decisions, and firm performance: New insights from upper echelons theory. *Managerial and Decision Economics*, *43*(2), 398–417. https://doi.org/10.1002/mde.3389

Alshawaaf, N., & Lee, S. H. (2020). Business model innovation through digitisation in social purpose organisations : A comparative analysis of Tate Modern and Pompidou Centre. *Journal of Business Research*. https://doi.org/10.1016/j.jbusres.2020.02.045

Andreini, D., Bettinelli, C., Foss, N. J., & Mismetti, M. (2021). Business model innovation: a review of the process-based literature. *Journal of Management and Governance*, *2*(1), 1–33. https://doi.org/10.1007/s10997-021-09590-w

Association of Ghana Industries. (2023, January 23). *Sectors Covered By AGI Members*. https://www.agighana.org/membership-list/

Autio, E., Nambisan, S., Thomas, L. D. W., & Wright, M. (2018). Digital affordances, spatial affordances, and the genesis of entrepreneurial ecosystems. *Strategic Entrepreneurship Journal*, *12*(1), 72–95. https://doi.org/10.1002/sej.1266

Bashir, M., Naqshbandi, M. M., & Farooq, R. (2020). Business model innovation: a systematic review and future research directions. *International Journal of Innovation Science*, *12*(4), 457–476. https://doi.org/10.1108/IJIS-06-2020-0081

Bassyouny, H., Abdelfattah, T., & Tao, L. (2020). Beyond narrative disclosure tone: The upper echelons theory perspective. *International Review of Financial Analysis*, *70*, 101499. https://doi.org/10.1016/j.irfa.2020.101499

Baxter, G., & Sommerville, I. (2011). Socio-technical systems: From design methods to systems engineering. *Interacting with Computers*, *23*(1), 4–17. https://doi.org/10.1016/j.intcom.2010.07.003

Bielialov, T. (2022). Risk Management of Startups of Innovative Products. *Journal of Risk and Financial Management*, *15*(5), 202. https://doi.org/10.3390/jrfm15050202

Bocken, N. M. P., & Geradts, T. H. J. (2020). Barriers and drivers to sustainable business model innovation: Organization design and dynamic capabilities. *Long Range Planning*, *53*(4), 101950. https://doi.org/10.1016/j.lrp.2019.101950

Bouwman, H., Nikou, S., & Reuver, M. De. (2019). Digitalization , business models , and SMEs : How do business model innovation practices improve performance of digitalizing SMEs ? *Telecommunications Policy*, *43*(9), 101828. https://doi.org/10.1016/j.telpol.2019.101828

Brillinger, A. S., Els, C., Schäfer, B., & Bender, B. (2020). Business model risk and uncertainty factors: Toward building and maintaining profitable and sustainable business models. *Business Horizons*, *63*(1), 121–130. https://doi.org/10.1016/j.bushor.2019.09.009

Brunetti, F., Matt, D. T., Bonfanti, A., De Longhi, A., Pedrini, G., & Orzes, G. (2020). Digital transformation challenges: strategies emerging from a multi-stakeholder approach. *TQM Journal*, *32*(4), 697–724. https://doi.org/10.1108/TQM-12-2019-0309

Chen, J., & Wang, Y. (2020). Business model innovation and growth of manufacturing SMEs : a social exchange perspective. *Journal of Manufacturing Technology Management*. https://doi.org/10.1108/JMTM-03-2020-0089

Chen, W. H., Kang, M. P., & Butler, B. (2019). How does top management team composition matter for continual growth? Reinvestigating Penrose's growth theory through the lens of upper echelons theory. *Management Decision*, *57*(1), 41–70. https://doi.org/10.1108/MD-02-2017-0147

Chen, Y., Visnjic, I., Parida, V., & Zhang, Z. (2021). On the road to digital servitization – The (dis)continuous interplay between business model and digital technology. *International Journal of Operations and Production Management*, *41*(5), 694–722. https://doi.org/10.1108/IJOPM-08-2020-0544

Clauss, T. (2017a). Measuring Business Model Innovation : Conceptualization, Scale Development and Proof of Performance. *R& D Management*, *47*(3), 385–403. https://doi.org/10.1111/radm.12186

Clauss, T. (2017b). Measuring business model innovation: conceptualization, scale development, and proof of performance. *R and D Management*, *47*(3), 385–403. https://doi.org/10.1111/radm.12186

Clauss, T., Abebe, M. A., Tangpong, C., & Hock, M. (2019). Strategic Agility, Business Model Innovation, and Firm Performance: An Empirical Investigation. *IEEE Transactions on Engineering Management*, 1–18. https://doi.org/10.1109/TEM.2019.2910381%0AThis

Clauss, T., Abebe, M., Tangpong, C., & Hock, M. (2021). Strategic Agility, Business Model Innovation, and Firm Performance: An Empirical Investigation. *IEEE Transactions on Engineering Management*, *68*(3), 767–784. https://doi.org/10.1109/TEM.2019.2910381

Cullen, A. C., Anderson, C. L., Biscaye, P., & Reynolds, T. W. (2018). Variability in Cross-Domain Risk Perception among Smallholder Farmers in Mali by Gender and Other Demographic and Attitudinal Characteristics. *Risk Analysis*, *38*(7), 1361–1377. https://doi.org/10.1111/risa.12976

De, R., Pandey, N., & Pal, A. (2020). Impact of digital surge during Covid-19 pandemic: A viewpoint on research and practice. *International Journal of Information and Learning Technology*, *55*, 1–6.

Del Vecchio, P., Di Minin, A., Petruzzelli, A. M., Panniello, U., & Pirri, S. (2017). Big data for open innovation in SMEs and large corporations: Trends, opportunities, and challenges. *Creativity and Innovation Management*, *27*(1), 1–17. https://doi.org/10.1111/caim.12224

Dutta, S., & Lanvin, B. (2022). The Network Readiness Index 2022. In S. Dutta & B. Lanvin (Eds.), *Nasscom* (Vol. 2020). Portulans Institute and Saïd Business School, University of Oxford. Licensing. https://networkreadinessindex.org/wp-content/uploads/reports/nri_2021_dataset.xlsx

Etges, A. P. B. da S., de Souza, J. S., & Neto, F. J. K. (2017). Risk management for companies focused on innovation processes. *Production*, *27*, 1–15. https://doi.org/10.1590/0103-6513.220916

Fernandes, G., & Brandão, L. E. T. (2016). Managing Uncertainty in Product Innovation Using Marketing Strategies. *Journal of Information Systems and Technology Management*, *13*(2), 219–240. https://doi.org/10.4301/s1807-17752016000200004

Fernandez, M. (2021). Risk perceptions and management strategies in a post-disaster landscape of Guatemala: Social conflict as an opportunity to understand disaster. *International Journal of Disaster Risk Reduction*, *57*, 102153. https://doi.org/10.1016/j.ijdrr.2021.102153

Ferreira, J. J. M., Fernandes, C. I., & Ferreira, F. A. F. (2019). To be or not to be digital, that is the question: Firm innovation and performance. *Journal of Business Research*, *101*(November), 583–590. https://doi.org/10.1016/j.jbusres.2018.11.013

Foss, N. J., & Saebi, T. (2017). Fifteen Years of Research on Business Model Innovation: How Far Have We Come, and Where Should We Go? *Journal of Management*, *43*(1), 200–227. https://doi.org/10.1177/0149206316675927

Frick, N. R. J., Mirbabaie, M., Stieglitz, S., & Salomon, J. (2021). Maneuvering through the stormy seas of digital transformation: the impact of empowering leadership on the AI readiness of enterprises. *Journal of Decision Systems*, *30*(2–3), 235–258. https://doi.org/10.1080/12460125.2020.1870065

Garcia-Perez, A., Cegarra-Navarro, J. G., Sallos, M. P., Martinez-Caro, E., & Chinnaswamy, A. (2022). Resilience in healthcare systems: Cyber security and digital transformation. *Technovation*, *August 2021*, 102583. https://doi.org/10.1016/j.technovation.2022.102583

García-Sánchez, E., García-Morales, V. J., & Martín-Rojas, R. (2018). Analysis of the influence of the environment, stakeholder integration capability, absorptive capacity, and technological skills on organizational performance through corporate entrepreneurship. *International Entrepreneurship and Management Journal*, *14*(2), 345–377. https://doi.org/10.1007/s11365-017-0436-9

Geissbauer, R., Lübben, E., Schrauf, S., & Pillsbury, S. (2018). Global Digital Operations Study 2018 - Digital Champions. In *PwC*. PwC. http://www.pwc.com/m1/en/about-us.html

Geissdoerfer, M., Vladimirova, D., & Evans, S. (2018). Sustainable business model innovation: A review. *Journal of Cleaner Production*, *198*, 401–416. https://doi.org/10.1016/j.jclepro.2018.06.240

Ghana Investment Promotion Centre. (2022). *Ghana's Manufacturing Sector Report* (Issue November).

Ghana Statistical Service. (2020). *Rebased 2013-2019 Annual Gross Domestic Product* (Issue June).

Ghezzi, A. (2018). Technological Forecasting & Social Change Digital startups and the adoption and implementation of Lean Startup Approaches : E ff ectuation , Bricolage and Opportunity Creation in practice. *Technological Forecasting & Social Change*, *December 2017*, 0–1. https://doi.org/10.1016/j.techfore.2018.09.017

Gunasekara, N. B. D. V., Shukri, D. S., Khatibi, P. D. A., & Azam, D. S. M. F. (2020). The Impact of Entrepreneurial Orientation on Business Performance in Star Class Hotels of Sri Lanka. *Global Journal of Human-Social Science*, 15–19. https://doi.org/10.34257/gjhssevol20is1pg15

Haaker, T., Thi, P., Ly, M., Nguyen-thanh, N., Thi, H., & Nguyen, H. (2021). Business model innovation through the application of the Internet-of-Things : A comparative analysis. *Journal of Business Research*, *126*(December 2020), 126–136. https://doi.org/10.1016/j.jbusres.2020.12.034

Hacklin, F., Björkdahl, J., & Wallin, M. W. (2018). Strategies for business model innovation: How firms reel in migrating value. *Long Range Planning*, *51*(1), 82–110. https://doi.org/10.1016/j.lrp.2017.06.009

Hartl, E., & Hess, T. (2017). The role of cultural values for digital transformation: Insights from a delphi study. *AMCIS 2017 - America's Conference on Information Systems: A Tradition of Innovation*, *2017-Augus*(January 2019).

Heredia, J., Rubiños, C., Vega, W., Heredia, W., & Flores, A. (2022). New Strategies to Explain Organizational Resilience on the Firms: A Cross-Countries Configurations Approach. *Sustainability (Switzerland)*, *14*(3), 1–22. https://doi.org/10.3390/su14031612

Hermes, S., Böhm, M., & Krcmar, H. (2019). Business Model Innovation and Stakeholder : Exploring Mechanisms and Outcomes of Value Creation and Destruction. *14th International Conference on Wirtschaftsinformatik*, 1754–1768.

Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Information and Organization Digital innovation and transformation : An institutional perspective. *Information and Organization*, *2*(4). https://doi.org/10.1016/j.infoandorg.2018.02.004

Horváth, D., & Szabó, R. Z. (2019). Driving forces and barriers of Industry 4.0: Do multinational and small and medium-sized companies have equal opportunities? *Technological Forecasting and Social Change*, *146*(May), 119–132. https://doi.org/10.1016/j.techfore.2019.05.021

Hossain, M. (2021). Frugal innovation and sustainable business models. *Technology in Society*, *64*(December 2020), 101508. https://doi.org/10.1016/j.techsoc.2020.101508

Hund, A., Wagner, H. T., Beimborn, D., & Weitzel, T. (2021). Digital innovation: Review and novel perspective. *Journal of Strategic Information Systems*, *30*(4), 101695. https://doi.org/10.1016/j.jsis.2021.101695

Hussain, S., Santoro, G., Khan, J., & Rizzato, F. (2021). Antecedents and consequences of business model innovation in the IT industry. *Journal of Business Research*, *123*(September 2020), 389–400. https://doi.org/10.1016/j.jbusres.2020.10.003

Ibarra, D., Bigdeli, A. Z., Igartua, J. I., & Ganzarian, J. (2020). Business Model Innovation in Established SMEs : A Configurational Approach. *J. Open Innov. Technol. Mark. Complex.*, *6*(76), 1–22.

Imran, F., Shahzad, K., Butt, A., & Kantola, J. (2021). Digital Transformation of Industrial Organizations: Toward an Integrated Framework. *Journal of Change Management*, *21*(4), 451–479. https://doi.org/10.1080/14697017.2021.1929406

Jayawardena, C. D. W., Ahmad, A., & Jaharadak, A. A. (2020). Synthesis of digital transformation beyond technology perspective: Digital strategy, leadership & culture. *Journal of Critical Reviews*, *7*(10), 349–357. https://doi.org/10.31838/jcr.07.10.74

Kanadlı, S. B., Bankewitz, M., & Zhang, P. (2018). Job-related diversity: the comprehensiveness and speed of board decision-making processes—an upper echelons approach. *Journal of Management and Governance*, *22*(2), 427–456. https://doi.org/10.1007/s10997-017-9394-4

Karanasios, S., & Senyo, P. K. (2022). *Digital Transformation of Micro-Enterprises in Ghana*.

Kersten, W., Blecker, T., & M., R. C. (2017). Digitalization in supply chain management and logistics. In *Proceedings of the Hamburg International Conference of Logistics (HICL)*. https://doi.org/10.15480/882.1442

Khaddam, A. A., Irtaimeh, H. J., Rajaa, A., Al-batayneh, S., Raja, S., & Al-batayneh, S. (2021). The effect of business model innovation on organization performance. *Management Science Letters*, *11*(2021), 1481–1488. https://doi.org/10.5267/j.msl.2020.12.026

Kibisu, M. C., & Awino, Z. B. (2017). The Moderating Effect of Innovation on the Relationship between Enterprise Risk Management Strategies and Performance of Christian Hospitality Sectorin Kenya – An Empirical Overview. *International Journal of Business and Management*, *12*(12), 212. https://doi.org/10.5539/ijbm.v12n12p212

Kohtamäki, M., Parida, V., Oghazi, P., Gebauer, H., & Baines, T. (2019). Digital servitization business models in ecosystems: A theory of the firm. *Journal of Business Research*, *104*(June), 380–392. https://doi.org/10.1016/j.jbusres.2019.06.027

Kraus, S., Durst, S., Ferreira, J. J., Veiga, P., Kailer, N., & Weinmann, A. (2022). Digital transformation in business and management research: An overview of the current status quo. *International Journal of Information Management*, *63*(August 2020). https://doi.org/10.1016/j.ijinfomgt.2021.102466

Kraus, S., Filser, M., Puumalainen, K., Kailer, N., & Thurner, S. (2020). Business Model Innovation: A Systematic Literature Review. *International Journal of Innovation and Technology Management*, *17*(6). https://doi.org/10.1142/S0219877020500431

Kraus, S., Jones, P., Kailer, N., Weinmann, A., & Chaparro-banegas, N. (2021). Digital Transformation : An Overview of the Current State of the Art of Research. *SAGE Open*, *July-September*, 1–15. https://doi.org/10.1177/21582440211047576

Lang, M. (2020). Business model innovation approaches: A systematic literature review. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *68*(2), 435–449. https://doi.org/10.11118/actaun202068020435

Latifi, M., Nikou, S., & Bouwman, H. (2021). Business model innovation and firm performance : Exploring causal mechanisms in SMEs. *Technovation*, *April*, 102274. https://doi.org/10.1016/j.technovation.2021.102274

Lee, W. S., Kim, I., & Moon, J. (2016). Determinants of restaurant internationalization: an upper echelons theory perspective. *International Journal of Contemporary Hospitality Management*, *28*(12), 2864–2887. https://doi.org/10.1108/IJCHM-02-2015-0048

Legowo, M. B., Indiarto, B., & Prayitno, B. (2021). Digitalization for Business Model Innovation: Create, Change, and Improve for Values. *2021 4th International Conference of Computer and Informatics Engineering (IC2IE)*, 192–197. https://doi.org/10.1109/IC2IE53219.2021.9649340.

Leyer, M., Richter, A., & Steinhüser, M. (2019). "Power to the workers": Empowering shop floor workers with worker-centric digital designs. *International Journal of Operations and Production Management*, *39*(1), 24–42. https://doi.org/10.1108/IJOPM-05-2017-0294

Linde, L., Sjödin, D., Parida, V., & Gebauer, H. (2020). Evaluation of Digital Business Model Opportunities: A

Framework for Avoiding Digitalization Traps. *Research Technology Management*, *64*(1), 43–53. https://doi.org/10.1080/08956308.2021.1842664

López-Muñoz, J. F., & Escribá-Esteve, A. (2017). An upper echelons perspective on information technology business value. *European Research on Management and Business Economics*, *23*(3), 173–181. https://doi.org/10.1016/j.iedeen.2017.02.003

Lucija, I., Vuksic', V. B., & Spremic', M. (2019). Management Review Mastering the Digital Transformation Process: Business Practices and Lessons Learn. *Technology Innovation Management Review*, *9*(12), 36–50. https://bib.irb.hr/datoteka/987135.Ivancic_et_al_TIMReview_February2019_-_published.pdf

Ma, X., & Zhang, Y. (2022). Digital innovation risk management model of discrete manufacturing enterprise based on big data analysis. *Journal of Global Information Management*, *30*(7), 1–14. https://doi.org/10.4018/JGIM.286761

Magni, D., Palladino, R., Papa, A., & Cailleba, P. (2022). Exploring the journey of Responsible Business Model Innovation in Asian companies: A review and future research agenda. *Asia Pacific Journal of Management*, *0123456789*, 1–30. https://doi.org/10.1007/s10490-022-09813-0

Matt, C., Hess, T., & Benlian, A. (2015). Digital Transformation Strategies. *Business and Information Systems Engineering*, *57*(5), 339–343. https://doi.org/10.1007/s12599-015-0401-5

Matzler, K., Bailom, F., Eichen, S. F. V. Den, & Kohler, T. (2013). Business model innovation : coffee triumphs for Nespresso. *Journal of Business Strategy*, *34*(2), 30–37. https://doi.org/10.1108/02756661311310431

Menchini, F., Russo, P. T., Slavov, T. N. B., & Souza, R. P. (2022). Strategic capabilities for business model digitalization. *Revista de Gestao*, *29*(1), 2–16. https://doi.org/10.1108/REGE-10-2020-0086

Metzler, D. R., & Muntermann, J. (2021). Digital Transformation-Driven Business Model Innovation – Current State and Future Research Directions. *PACIS 2021 Proceedings*, 62.

Mihalache, O. R., & Volberda, H. W. (2021). Business Model Innovation in Transforming Economies : A Co-evolutionary Perspective for a Global and Digital World. *Management and Organization Review*, *17*(2), 202–225. https://doi.org/10.1017/mor.2021.14

Ministry of Finance. (2020). *Macroeconomic performance report 2019* (Issue August). https://doi.org/10.1787/eco_surveys-ita-2002-3-en

Mumford, E. (2006). The story of socio-technical design: Reflections on its successes, failures and potential. *Information Systems Journal*, *16*(4), 317–342. https://doi.org/10.1111/j.1365-2575.2006.00221.x

Musiello-Neto, F., Lima, R. O., Arias-Oliva, M., & Souto-Romero, M. (2022). The role of corporate risk management in the relationship between open innovation and organizational strategy. *International Journal of Innovation*, *10*(1), 6–29. https://doi.org/10.5585/iji.v10i1.20703

Nadkarni, S., & Prügl, R. (2021). Digital transformation: a review, synthesis and opportunities for future research. *Management Review Quarterly*, *71*(2), 233–341. https://doi.org/10.1007/s11301-020-00185-7

Nambisan, S., Wright, M., & Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. *Research Policy*, *48*(8), 1–9. https://doi.org/10.1016/j.respol.2019.03.018

Neely, B. H., Lovelace, J. B., Cowen, A. P., & Hiller, N. J. (2020). Metacritiques of Upper Echelons Theory : Verdicts and Recommendations for Future Research. *Journal of Management*, *20*(10), 1–34. https://doi.org/10.1177/0149206320908640

Paiola, M., & Gebauer, H. (2020). Internet of things technologies, digital servitization and business model innovation in BtoB manufacturing firms. *Industrial Marketing Management*, *89*(March), 245–264. https://doi.org/10.1016/j.indmarman.2020.03.009

Parida, V., Sjödin, D., & Reim, W. (2019). Reviewing Literature on Digitalization , Business Model Innovation , and Sustainable Industry : Past Achievements and Future Promises. *Sustainability*, *11*(391), 1–18. https://doi.org/10.3390/su11020391

Plöckinger, M., Aschauer, E., Hiebl, M. R. W., & Rohatschek, R. (2016). The influence of individual executives on corporate financial reporting: A review and outlook from the perspective of upper echelons theory. *Journal of Accounting Literature*, *37*, 55–75. https://doi.org/10.1016/j.acclit.2016.09.002

Priyono, A., & Darmawan, B. (2021). How to harnesses digital technologies for pursuing business model innovation : a longitudinal study in creative industries. *Journal of Systems and Information Technology*, *23*(3), 266–289. https://doi.org/10.1108/JSIT-06-2020-0101

Rachinger, M., Müller, C., Vorraber, W., & Schirgi, E. (2019). Digitalization and its influence on business model innovation. *Journal of Manufacturing Technology Management*, *30*(8), 1143–1160. https://doi.org/10.1108/JMTM-01-2018-0020

Rachinger, M., Rauter, R., Müller, C., Vorraber, W., & Schirgi, E. (2018). Digitalization and its influence on business model innovation. *Journal of Manufacturing Technology Management*. https://doi.org/10.1108/JMTM-01-2018-0020

Ranta, V., Aarikka-stenroos, L., & Väisänen, J. (2021). Resources , Conservation & Recycling Digital technologies catalyzing business model innovation for circular economy — Multiple case study. *Resources, Conservation & Recycling*, *164*(August 2020), 105155. https://doi.org/10.1016/j.resconrec.2020.105155

Rezazadeh, A., & Carvalho, A. (2018). *A value-based approach to business model innovation: Defining the elements of the concept* (No. 12).

Ritter, T., & Lettl, C. (2018). The wider implications of business-model research. *Long Range Planning*, *51*(1), 1–8. https://doi.org/10.1016/j.lrp.2017.07.005

Rummel, F., Hüsig, S., & Steinhauser, S. (2021). Two archetypes of business model innovation processes for manufacturing firms in the context of digital transformation. *R&D Management*, 1–19. https://doi.org/10.1111/radm.12514

Sabai, K., & Theresa, C. F. H. (2018). Digital technology , digital capability and organizational performance. *International Journal of Innovation Science*, 1757–2223. https://doi.org/10.1108/IJIS-08-2018-0083

Saqib, N., & Satar, M. S. (2021). Exploring business model innovation for competitive advantage : a lesson from an emerging market. *International Journal of Innovation Science*, *13*(4), 477–491. https://doi.org/10.1108/IJIS-05-2020-0072

Schwertner, K. (2017). Digital transformation of business. *Trakia Journal of Science*, *15*(Suppl.1), 388–393. https://doi.org/10.15547/tjs.2017.s.01.065

Settembre-Blundo, D., González-Sánchez, R., Medina-Salgado, S., & García-Muiña, F. E. (2021). Flexibility and Resilience in Corporate Decision Making: A New Sustainability-Based Risk Management System in Uncertain Times. *Global Journal of Flexible Systems Management*, *22*(December), 107–132. https://doi.org/10.1007/s40171-021-00277-7

Shahab, Y., Ntim, C. G., Chen, Y., Ullah, F., Li, H. X., & Ye, Z. (2020). Chief executive officer attributes, sustainable performance, environmental performance, and environmental reporting: New insights from upper echelons perspective. *Business Strategy and the Environment*, *29*(1), 1–16. https://doi.org/10.1002/bse.2345

Singh, A., & Hess, T. (2017). How Chief Digital Officers Promote the Digital Transformation of their Companies. *MIS Quarterly Executive*, *16*(1), 1–15.

Songling, Y., Ishtiaq, M., & Anwar, M. (2018). Enterprise Risk Management Practices and Firm Performance, the Mediating Role of Competitive Advantage and the Moderating Role of Financial Literacy. *Journal of Risk and Financial Management*, *11*(3), 35. https://doi.org/10.3390/jrfm11030035

Sony, M., & Naik, S. (2020). Industry 4.0 integration with socio-technical systems theory: A systematic review and proposed theoretical model. *Technology in Society*, *61*(August 2019), 101248. https://doi.org/10.1016/j.techsoc.2020.101248

Straub, F., Weking, J., Kowalkiewicz, M., & Krmcar, H. (2021). Understanding Digital Transformation from a Holistic Perspective. *Twenty-Fifth Pacific Asia Conference on Information Systems*, 1–8.

Sun, Y., Bi, K., & Yin, S. (2020). Measuring and integrating risk management into green innovation practices for green manufacturing under the global value Chain. *Sustainability (Switzerland)*, *12*(2). https://doi.org/10.3390/su12020545

Taran, Y., Goduscheit, R. C., & Boer, H. (2019). Business Model Innovation-A Gamble or a Manageable Process? *Journal of Business Models*, *7*(5), 90–107.

Tavoletti, E., Grieco, C., & Appolloni, A. (2021). Business model innovation and digital transformation in global management consulting firms. *European Journal of Innovation Management*, 1060–1460. https://doi.org/10.1108/EJIM-11-2020-0443

Teece, D. J. (2017). Business models and dynamic capabilities. *Long Range Planning*, 1–10. https://doi.org/10.1016/j.lrp.2017.06.007

Tohanean, D., Buzatu, A., & Baba, C. A. (2020). Business Model Innovation Through the Use of Digital Technologies : Managing Risks and Creating Sustainability. *Amfiteatru Economic*, *22*(55), 758–774. https://doi.org/10.24818/EA/2020/55/758

Tonder, V. C., Schachtebeck, C., Nieuwenhuizen, C., & Bossink, B. (2020). A framework for digital transformation and business model innovation. *Management: Journal of Contemporary Management Issues*, *25*(2), 111–132.

Trischler, M. F. G., & Li-Ying, J. (2022). Digital business model innovation: toward construct clarity and future research directions. *Review of Managerial Science*, *0123456789*. https://doi.org/10.1007/s11846-021-00508-2

Trist, E. L., & Bamforth, K. W. (1951). Some Social and Psychological Consequences of the Longwall Method of Coal-Getting. *Human Relations*, *4*(1), 3–38. https://doi.org/10.1177/001872675100400101

Trushkina, N., Abazov, R., Rynkevych, N., & Bakhautdinova, G. (2020). Digital Transformation of Organizational Culture under Conditions of the Information Economy. *Virtual Economics*, *3*(1), 7–38. https://doi.org/10.34021/ve.2020.03.01(1)

Ulrich, P., & Fibitz, A. (2020). Blessing or Curse: Does Digitalization Foster Business Model Innovation? Evidence From a Quantitative Empirical Study. *Corporate and Business Strategy Review*, *1*(2), 44–65. https://doi.org/10.22495/cbsrv1i2art4

United Nations Industrial Development Organization. (2020). *Ghana country brief- Leveraging industrialization for inclusive growth* (Vol. 49, Issue November).

Vaska, S., Massaro, M., Bagarotto, E. M., & Dal Mas, F. (2021). The Digital Transformation of Business Model Innovation A Structured Literature Review. *Frontiers in Psychology*, *11*, 1–18.

Vaska, S., Massaro, M., Bagarotto, E. M., & Massaro, M. (2021). The Digital Transformation of Business Model Innovation : A Structured Literature Review. *Frontiers in Psychology*, *11*(January). https://doi.org/10.3389/fpsyg.2020.539363

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, *122*(September), 889–901. https://doi.org/10.1016/j.jbusres.2019.09.022

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems*, *28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Warner, K. S. R., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long Range Planning*, *52*(3), 326–349. https://doi.org/10.1016/j.lrp.2018.12.001

Wirahadi, A., & Pasaribu, M. (2021). Business Model Innovation: The Role of Enterprise Risk Management and Strategic Agility. *Advances in Economics, Business and Management Research*, *647*, 283–289. https://doi.org/10.2991/aebmr.k.220304.037

Wirtz, B. W., Göttel, V., & Daiser, P. (2016). Business Model Innovation: Development, Concept and Future Research Directions. *Journal of Business Model*, *4*(1), 1–28.

Wu, M., Kozanoglu, D. C., Min, C., & Zhang, Y. (2021). Unraveling the capabilities that enable digital transformation: A data-driven methodology and the case of artificial intelligence. *Advanced Engineering Informatics*, *50*(August), 101368. https://doi.org/10.1016/j.aei.2021.101368

Yang, W., Liu, J., Li, L., Zhou, Q., & Ji, L. (2021). How Could Policies Facilitate Digital Transformation of Innovation Ecosystem : A Multiagent Model. *Complexity*, *2021*(8835067), 1–19. https://doi.org/10.1155/2021/8835067%0A

Zaki, M. (2019). Digital transformation: harnessing digital technologies for the next generation of services. *Journal of Services Marketing*, *33*(4), 429–435. https://doi.org/10.1108/JSM-01-2019-0034

Zhang, J., Long, J., & Martina, A. S. E. Von. (2021). How Does Digital Transformation Improve Organizational Resilience ?— Findings from PLS-SEM and fsQCA. *Sustainability*, *13*(11487), 1–22.

Zhang, Y., Wang, Y., Ahmad, A. B., Shah, A. A., & Qing, W. (2021). How Do Individual-Level Characteristics Influence Cross-Domain Risk Perceptions Among Chinese Urban Residents? *SAGE Open*, *11*(2). https://doi.org/10.1177/21582440211003570