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The digital transformation canvas: A conceptual framework for leading the digital transformation process

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Abstract Digital transformation has garnered significant interest within the research and business communities, and has become an umbrella concept to address the multiple technological, strategic, operational, and leadership dimensions involved in digitally enabled organizational renewal. Such transformation spans beyond mere automation of existing practices to a radical change of business scope. Despite this increased attention, a shared understanding of exactly what digital transformation encompasses and how a digital transformation initiative can be defined and led is still underdeveloped. This article aims to contribute to this research gap by identifying the multifaceted conceptual and applied dimensions of digital transformation and integrating them into a single, unifying framework. Based on a synthesis of extensive yet fragmented literature and feedback from domain experts, we present a conceptual map (i.e., a canvas) for successful digital transformation initiatives. In addition, we identify the key elements through which one can lead implementation (i.e., roles, competencies, behaviors, and enablers). The article contributes both to academia—by advancing the meaning and constituent factors of digital transformation—and practitioners, with the formulation of a conceptual tool for managers engaged in a systemic design of digital transformation initiatives.

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1. Digital transformation: Essence or appearance?

Digital transformation marks a radical rethinking of how organizations combine technology, people, and processes to achieve better business performance (Bonnet & Westerman, 2020). Such benefits include the enhancement of customer satisfaction (Westerman et al., 2014), increased process efficiency (Andriole, 2017) and transparency (McCarthy et al., 2022), improved product/service flexibility (Nambisan et al., 2017), an increased range of products and services (Lanzolla et al., 2020), and the empowerment of decision-making (Pigni et al., 2016)—not to mention environmental sustainability (Feroz et al., 2021) and social inclusiveness and equity (del Hoyo et al., 2021).

However, digital transformation may also bring some risks at the organizational and individual level. For organizations, the pervasive adoption of digital technologies may compromise the security of corporate data and intellectual property, which may lead to digital fraud or inappropriate access to data. This can be caused by the lack of specific digital skills that are often absent in the company and unavailable in the market (see Lanzolla et al., 2020).

For individuals, the adoption of digital technologies may generate psychological pressure on employees who are pushed to continuously upgrade their digital competencies (Harish et al., 2023), causing a sort of digital divide between those who master digital competencies versus those who do not. Digital technologies may also be alienating due to the presence of rigid control and procedures, loss of autonomy, and depletion of social relations (Rodriguez-Lluesma et al., 2021).

To reap the benefits and reduce the risks of digital transformation, organizations face a set of challenges: the coherence of the digital transformation with the organization's business strategy, the development of digital skills, the change of internal processes and roles, alignment with international standards and regulations, fulfillment of customer or user expectations, and the availability of funds for investment. Organizations that refuse to recognize, analyze, and address these challenges risk a sort of *Digital Darwinism* (Goodwin, 2018), which refers to the decline of organizations that are incapable of embracing digital transformation by changing their processes, resources, communication interfaces, products, and services (Karimi & Walter, 2015).

A further, often hidden challenge concerns leadership (Fitzgerald et al., 2013)—more specifically, digital leadership. *Digital leadership* is defined as "doing the right things for the strategic success of digitalization for the enterprise and its business ecosystem" (El Sawy et al., 2016, p. 142). Digital leadership is crucial for the success of every digital transformation initiative. It goes beyond an individual characteristic and becomes a distributed capability including peers, supervisors, the organizational environment, and culture.

An exemplary case of digital leadership can be recognized amid the COVID-19 pandemic, which pushed a large portion of the workforce to work remotely by adopting readily collaborative platforms, communication tools, and new interfaces. Organizations need to ensure not only resiliency and business continuity (e.g., training and education, drug delivery, public administration) but also new services delivery (e.g., remote monitoring and surveillance of patient conditions, forecasting disease activity; Elia et al., 2022; Margherita et al., 2021; Margherita & Heikkilä, 2021). During that period, individuals and organizations leveraged distributed intellectual curiosity, continuous learning, creativity, and innovation to discover which technologies to prioritize and how to exploit them to reach equilibrium, stability, and business and social success following the disruptive event (de Araujo et al., 2021; Hillmann & Guenther, 2021).

Digital leadership includes roles, competencies, behaviors, and enablers to guide the digital transformation process, ensure effective coordination of activities and people to achieve organizational objectives at the strategic and operational levels (Raguseo et al., 2021), and avoid partial achievement or failure of the expected results (Tabrizi et al., 2019).

Considering its multidisciplinary nature and awareness that a shared understanding and conceptualization of digital transformation are still missing (Warner & Wäger, 2019), business leaders often struggle to identify a path forward, relying on heuristics and personal experiences. In this study, we aim to support organizations in leading their digital transformation processes via a conceptual tool (i.e., Digital Transformation Canvas) that provides a systemic view of digital transformation by integrating both strategic and operational perspectives. As such, the article bolsters research on the founding elements required to manage digital transformation—which are fragmented (Neumeyer & Liu, 2021)—and provides an operational perspective on the concept of leadership amid digital transformation,

which is still limited (Cortellazzo et al., 2019). The canvas has been developed by analyzing scholarly contributions and validating the preliminary findings with a group of experts.

The article is organized as follows. Section 2 presents the conceptual background of the study, followed by the key findings (i.e., a canvas of key elements of digital transformation and leadership) in Section 3. In Section 4, we discuss the findings and resulting implications at both the academic and practitioner levels, and we conclude with limitations and avenues for future research in Section 5.

2. The elusive nature of digital transformation

Digital transformation is a multidisciplinary process that orchestrates value-creation functions, structural changes, technology usage, and financial issues. It can be characterized by three key elements: (1) the wide scope of its applications and its pervasiveness across industries; (2) the exceptional scale of benefits potentially deriving from its implementation; and (3) the rapidity of the change process it provides the organization (Hanelt et al., 2021).

Organizations that decide to undertake a digital transformation expect to achieve the following categories of benefits (Akter & Wamba, 2016): informational (e.g., wider access to and use of data and information to facilitate problem-solving); transactional (e.g., increased efficiency and transparency in search, communication, coordination, and commercialization); strategic (e.g., access to new partners, networks, and markets); transformational (e.g., competency enhancement, improved resiliency, and business continuity); and societal/environmental (e.g., broader citizen participation, wider access to public services, improved homeland security, and decreased pollution).

At its origin, digital transformation was mainly discussed in the information systems literature (Nadkarni & Prügl, 2020; Vial, 2019) with a prevalent focus on technological issues. From 2010 onward, the concept attracted multidisciplinary interest from scholars working in other fields such as strategic management, organizational studies, and innovation management (AlNuaimi et al., 2022; Hanelt et al., 2021; Verhoef et al., 2021). Appendix 1 groups the main definitions proposed by scholars from which a set of distinguishing themes can be delineated:

- The need for change that outlines the business or societal objective of a digital transformation

initiative (Dąbrowska et al., 2022; Margiono, 2020; Vial, 2019).

- The performance orientation of the change process (Westerman et al., 2014).

- The transformation of internal and external processes, which impacts the organizational model and relationships (AlNuaimi et al., 2022; Verhoef et al., 2021; Warner & Wäger, 2019).

- The societal and environmental impact that guarantees industry pervasiveness and sustainability (Gomez-Trujillo & Gonzalez-Perez, 2021; Huong & Thanh, 2022; Magnusson et al., 2022).

- The leadership required to initially secure stakeholder buy-in (Leonardi, 2020), and then to successfully implement the transformation process.

Digital transformation may happen at different levels. One of the seminal studies that explored such a concept was proposed by N. "Venkat" Venkatraman (1994), who presented five levels of IT-enabled business transformation: (1) local exploitation, (2) internal integration, (3) business process redesign, (4) business network redesign, and (5) business scope redefinition. The logic of his approach linked the benefits of digital transformation with organizational change. Initial levels bring limited benefits and minor changes in the organization. On the other hand, the highest levels may generate relevant benefits but may also require deep changes in organizational processes and roles, skills and competencies, and business strategy. In a later book, Venkatraman (2017) revised his initial perspective by proposing a new framework articulated in three phases: (1) experimentation at the edge, focused on the technical feasibility of prototypes and demonstrators; (2) collision at the core, focused on demonstrating business profitability by challenging traditional organizational models and offerings; and (3) reinvention at the root, focused on reimagining the organization and the industry by leveraging data processing and real-time data analysis. Recently, Garzoni et al. (2020) proposed four levels of engagement toward the adoption of digital technologies: (1) digital awareness, (2) digital enquiring, (3) digital collaboration, and (4) digital transformation. They suggested that digital transformation is contingent upon an organization's commitment to embracing and integrating digital technologies.

Digital transformation is sometimes confused with two other terms such as *digitization* and *digitalization* (Kraus et al., 2022; Vial, 2019). The former aims at creating a digital version of physical artifacts (e.g., documents and photos) to facilitate

their management, storage, optimization, and transfer via digital tools (Gong & Ribiere, 2021). Digitalization integrates digitization and connectivity (Lanzolla et al., 2021; Lanzola et al., 2023) to help firms improve organizational processes (e.g., communication, production, and procurement) by adopting digital technologies (Verhoef et al., 2021) and new ways of workplace communication and collaboration (Kraus et al., 2022).

Digital transformation includes digitization and digitalization and leverages human capital, stakeholder network, and data-grounded decision-making to achieve complementary goals (e.g., task automation (Gong & Ribiere, 2021), redesign of business activities (Matt et al., 2015), renewal of the business model (Verhoef et al., 2021), reduction of environmental impact, and enhancement of social inclusion; OECD, 2020).

Digital transformation is a priority for entrepreneurs and managers who are willing to enhance the level of competitiveness of their organizations and improve business and innovation performance. Due to its nature, digital transformation has an increasingly relevant impact on industries and society—as well as organizations and individuals. As such, this transformation is becoming an agent of socio-technical and economic change. More specifically, at the organizational level, it may enable new configurations of activities, support new forms of collaboration between people and machines, introduce new roles and responsibilities, and open new channels to communicate both internally and externally (Lanzolla et al., 2020). At the individual level, digital transformation calls for managers and employees to acquire new competencies and skills for interacting with technologies productively (Baptista et al., 2020). Moreover, it stimulates people to develop new attitudes toward working in teams, practice new styles of leadership (Karimi & Walter, 2015), and be positively prepared for change (Solberg et al., 2020).

Finally, digital transformation is also linked with institutional and geographical conditions that may affect the use and diffusion of digital technologies within industries and societies. Such conditions include issues related to intellectual property management and appropriation regimes, digital skills development, and digital public services usage (Brem & Nylund, 2021).

3. The digital transformation canvas

Based on a review of the literature on digital transformation, we identified 11 key elements that may guide managers through ideating and designing digital transformation initiatives. These elements—strongly grounded in the literature as described below—have been grouped into four categories that constitute the building blocks of the Digital Transformation Canvas (Figure 1): (1) *Digital Transformation Strategy,* which includes the purpose of the initiative and the strategic direction of the digital transformation; (2) *Digital Transformation Operational Pillars*, which assembles the core issues of the digital transformation and systematizes them into a project; (3) *Digital Transformation Value,* which articulates the expected value that the initiative should create; and (4) *Digital Transformation Pitfalls,* which accounts for issues related to the privacy and protection of data and information in organizations. A brief description of each category with its elements is provided in Sections 3.1.—3.4.

### 3.1. Digital transformation strategy

The strategic purpose represents the goal that justifies and motivates the organization to embrace digital transformation. Purpose should be aligned with—and descend from—organizational and business strategy (Correani et al., 2020) to contribute to an overall digital strategy. Purpose may arise from various sources, such as a problem that needs to be solved, a need requiring fulfillment, an opportunity worth pursuing, or customer requests and insights. It can come either from within the organization, such as the company's strategic plan, or be driven by external factors, such as customer/user expectations or competitor actions (Westerman et al., 2014). Purpose synthesizes the digital strategy of the organization and is a powerful means of communication for digital leadership (AlNuaimi et al., 2022).

3.2. Digital transformation operational pillars

We identified four operational pillars of digital transformation. The first pillar, *Process,* includes the group of activities and organizational areas touched by the initiative (Margherita & Petti, 2010) and is necessary to achieve the initiative's goals and value. The second pillar, *People,* refers to both the internal and external individuals involved in the initiative who can either facilitate or hinder the digital transformation, depending on their level of participation, commitment, digital skills readiness, autonomy, and responsibility (Bonnet & Westerman, 2020). *Platform* encompasses the digital technologies directly or indirectly involved in supporting or enabling the

Figure 1.   The digital transformation canvas
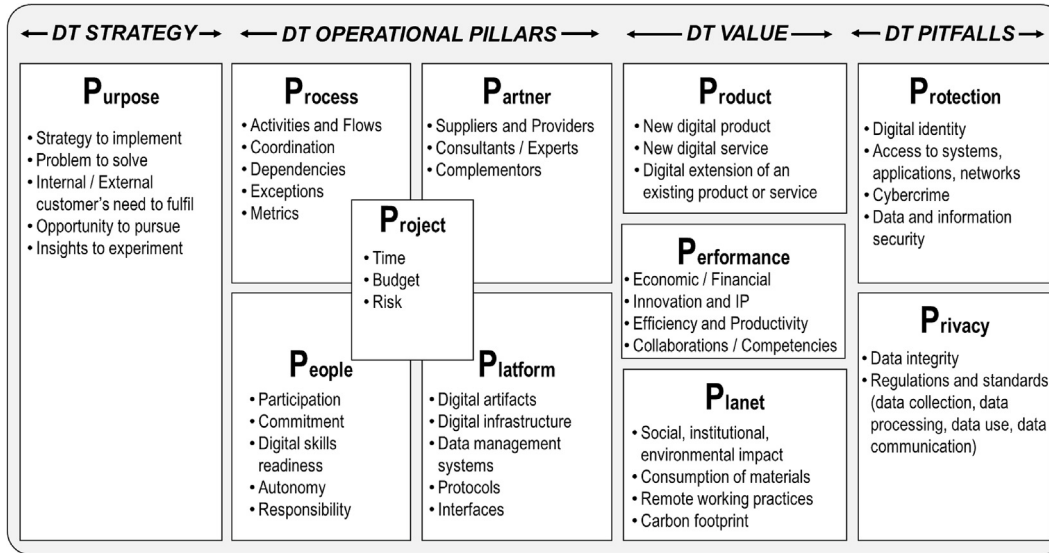
transformation process in terms of digital artifacts, infrastructure, and data management systems (Nambisan et al., 2017). Finally, the fourth pillar is *Partners*, which includes experienced external providers or complementors with the know-how, methodological assets, technological solutions, and tools to successfully implement the digital transformation initiative (Correani et al., 2020).

The four operational pillars—Process, People, Platform, and Partners—converge to form a purposeful *Project*, serving as the strategic and organizational initiative for digital transformation via experimentation and innovation (Secundo et al., 2021). Managing a digital transformation project involves addressing numerous generic and specific dimensions and requirements related to budget, timing, and risk. This information is crucial for the organization to build and evaluate a portfolio of digitally oriented initiatives, selecting those that best align with an organization's needs and capabilities.

3.3. Digital transformation value

The project implementation can produce digital value in three main areas. First, in the *Product* area through the creation of new digital products or services, or the digital extension of an existing product by adding new features (Nambisan et al., 2017). Second, the area of *Performance* includes economic and financial growth, as well as benefits in innovation, efficiency, competency development, the network of collaborations, and

intellectual property growth (Zhai et al., 2022). The third area, *Planet,* refers to the social, institutional, and environmental impact of the digital transformation initiative, which includes a reduction in the consumption of raw materials, an increase in remote work practices, and mitigation of carbon footprints (Huong & Thanh, 2022).

3.4. Digital transformation pitfalls

Finally, as the protection of systems and privacy of digital data and information become increasingly important for businesses, individuals, and society, addressing these issues is critical for avoiding potential pitfalls in the digital transformation process. The two dimensions that emerged in this context are Protection and Privacy.

Protection concerns the strategies and tools to control and manage access to systems, applications, and networks (Bhave et al., 2020) to prevent any form of cybercrime and ensure the effective implementation of data and information security (Feliciano-Cestero et al., 2023). *Privacy* refers to the contextual integrity of data (Schneider & Kokshagina, 2021) to regulate personal data collection, processing, use, and communication with third parties. Therefore, organizations must comply with specific regulations and guidelines (e.g., the EU's General Data Protection Regulation: GDPR) to ensure that employees, customers, stakeholders, and society at large can trust that their personal data are managed appropriately using methods such as "privacy by design" (Cavoukian, 2009). Table 1 summarizes the key

elements of the canvas, which can help managers as they embark on a digital transformation project.

The canvas elements (Purpose, People, Process, Platform, Partners, Product, Performance, Planet, Protection, and Privacy), along with the main project constraints (budget, timing, and risk), enable the straightforward depiction and communication of any digital transformation initiative. Following this approach, all the initiatives ideated and proposed by employees within a functional area or project team are represented in Figure 2. This visual can serve as a tool for managers to select and identify the most suitable initiatives based on criteria that align with the organization's strategy.

For instance, let us consider the case of a company that may use the proposed approach to evaluate and select a set of digital transformation initiatives to implement. The company could launch an internal competition, encouraging employees to submit their ideas for enhancing the organization's competitiveness using digital transformation initiatives. After a predefined period, the company may register a total of 60 unique proposals submitted by employees. The organization may employ the framework (Figure 2) to assess and evaluate each initiative thoroughly.

With all such information gathered, managers should be able to effectively evaluate and compare the proposed digital transformation initiatives based on different objectives. For example, they could set a specific goal for their digital transformation strategy (e.g., enhance customer satisfaction in the North American market) and coherently identify which initiatives would be more aligned. Then, by focusing on this subset of initiatives, they could select those that need an investment consistent with the available budget (e.g., lower than $100K) and choose those few initiatives that fit within the time constraints (e.g., maximum 12 months) and risk constraints (e.g., low risk) to provide early evidence of the effectiveness of the initiative.

Through this approach, the Digital Transformation Canvas may successfully harness the creativity and expertise of its employees in an organized manner, thereby demonstrating its potential as an essential tool for organizational success amid digital transformation.

4. The role of multidimensional leadership

Effective leadership is critical for every digital transformation initiative. Modern digital transformation leadership extends beyond the individual to a multifaceted approach including peers, supervisors, the work environment, and culture (Larjovuori et al., 2018). As illustrated in Figure 3 and throughout Section 4, digital transformation leadership can be investigated and analyzed along four key dimensions: (1) Roles, (2) Competencies, (3) Behaviors, and (4) Enablers.

4.1. Roles

Roles refer to the individuals—existing or future—who initiate, facilitate, and accompany the digital transformation process. Roles can be categorized based on two dimensions: (1) the internal vs. external view (Hooijberg & Choi, 2000), and (2) task vs. relation orientation (Battilana et al., 2010). Based on this categorization, digital transformation leaders can operate in seven ways:

1. Mentors (nurture trusting relationships with employees and provide support and feedback);

2. Enablers (create interdisciplinary working spaces that encourage people to collaborate and test new ideas);

3. Networkers (establish and cultivate interdisciplinary relations within and outside the organization for sharing information and knowledge);

4. Innovators (conceive of creative ideas);

5. Managers (execute the work efficiently and coordinate resources effectively);

6. Mentees (seek advice from employees and learn from them); and

7. Pioneers (detect early digital trends and properly define a clear digital vision and strategy; Weber et al., 2022).

4.2. Competencies

Competencies are the set of abilities that enable leaders to promote and encourage the digital transformation process (Schiuma et al., 2022). These abilities include connecting digital tools with business challenges to solve business problems, catching business opportunities, and aligning business goals with societal wealth for sustainable growth. In addition, they include shaping contexts for knowledge creation and collaborative learning to facilitate organizational change, raising awareness about the digital future of the organization, motivating employees to undertake the digital transformation journey, and engaging people

Table 1.   A synopsis describing the key elements of the canvas

Canvas element	Description	Key reference
Purpose	The business goal that justifies and motivates digital transformation (e.g., a problem to solve, a need to fulfil, an opportunity to pursue, an insight to analyze) *Examples: enhance customer satisfaction, increase sales in emerging markets, reduce returned products related to online sales*	AlNuaimi et al. (2022); Correani et al. (2020); Westerman et al. (2014)
Process	The group of activities the initiative impacts *Examples: marketing, sales, transportation, purchasing*	Margherita and Petti (2010)
People	Internal and external individuals involved in the initiative *Examples: marketing department employees, quality assurance operators, logistics partners, workers operating in reverse logistics*	Bonnet and Westerman (2020)
Platform	Digital technologies, infrastructure, and data management systems directly or indirectly involved in supporting or enabling the transformation process *Examples: CRM, ERP, collaboration suite, Big Data platform*	Nambisan et al. (2017)
Partners	Experienced external providers that support the organization in the transformation process *Examples: technology vendors, change management experts, logistic operators, research labs*	Correani et al. (2020)
Project	The formal initiative that combines Process, People, Platform, and Partners—possibly by providing information on the budget, timing, and risk of the initiative	Secundo et al. (2021)
Product	New digital products or services, or the digital extension of an existing product by adding new features *Examples: shoes equipped with sensors that collect data and analyze the user's walking style, smart parking services that suggest available parking spaces*	Nambisan et al. (2017); Lanzolla et al. (2021)
Performance	Economic and financial indicators, innovation metrics, level of competency development, size of collaboration network, intellectual property growth *Examples: increase in revenues, reduction of production costs, percentage of new customers acquired*	Zhai et al. (2022)
Planet	Social, institutional, and environmental impact of the digital transformation initiative *Examples: decrease of traffic jams, quantity of CO_2 saved, reduction of paper consumption, increase of remote work practices, mitigation of carbon footprints*	Huong and Thanh (2022)
Protection	Instruments and procedures to control and manage the accesses to systems, applications, and networks to prevent any form of cybercrime and guarantee security of information *Examples: security of connections with financial management systems or knowledge repositories*	Bhave et al. (2020); Feliciano-Cestero et al. (2023)

Table 1 (*continued*)

Canvas element	Description	Key reference
Privacy	The integrity of data and the regulation of data collection, processing, use, and communication *Examples*: controlled access to personal/financial data	Schneider and Kokshagina (2021)

toward a common objective. Developing such competencies makes digital transformation a shared responsibility, thus promoting new styles of working, innovating existing jobs, and stimulating automation, adoption, digitalization, and data processing.

4.3. Behaviors

Behaviors descend from the key qualities of the digital leader's profile and play a significant role in providing employees with a different mindset (e.g., openness to experimentation and innovation, tolerance toward risk and failure, workplace flexibility and job adaptability, information sharing and team building, emotional intelligence and empathy, open-mindedness, and creativity). These qualities can also promote horizontal and cross-functional collaboration, delegation of power and responsibility, integrity, and responsive-ness—all while maintaining a common vision with shared goals and plans (AlNuaimi et al., 2022; Henderikx & Stoffers, 2022).
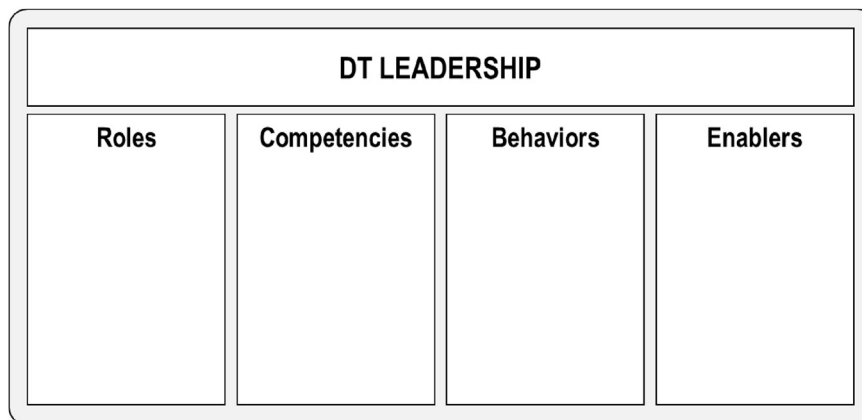
4.4. Enablers

Enablers are the organizational drivers that contribute to the success of a digital trans-

Figure 2. Operationalization of the digital transformation canvas

Figure 3. A multidimensional view of leadership

formation initiative. To be successful, enablers provide eight key functionalities:

1. A clear and widely communicated vision within the organization about the crucial role played by digital technologies;

2. An explicit top management commitment combined with *ad hoc* roles and allocated investment;

3. A deep cultural change that encourages creativity and risk propensity;

4. Promoting piloting and agile experimentation;

5. Coaching employees to develop autonomy;

6. Sharing responsibility amongst employees;

7. Involving customers in service design and development; and

8. Promoting virtuous collaborations with partners to share knowledge and develop new expertise (Larjovuori et al., 2018).

By leveraging these four dimensions—Roles, Competencies, Behaviors, and Enablers—organizations can develop and implement multiple styles of digital leadership integrating technological potential with human nature (Oberer & Erkollar, 2018). By following a distributed and participative approach, individuals may assume different roles to create a trusted and collaborative environment in which people can share knowledge and information, generate innovative ideas and projects, perceive new challenges, and transform them into opportunities. To achieve such results, middle and top management should support such internal changes by pushing digital technologies to communicate, execute activities, process data, make decisions, and provide feedback.

From a more practical view, executives should increase the delegation and empowerment of individuals not only to perform activities but also to discuss solutions and propose new initiatives. They should also encourage entrepreneurship and a spirit of initiative, as well as promote a culture that considers risk and failure to be learning experiences. Finally, leaders should instill within the employees a sense of responsibility that combines innovation, openness, and rigor. This will leverage creativity and technologies to generate new ideas and experiment with only the most promising in terms of potential value for transforming the organization and reinventing its business model (Schiuma et al., 2022).

In Appendices A2 and A3, we present an example case of the implementation of the Digital Transformation Canvas and Digital Transformation Leadership. Rather than illustrating a high-tech company, the case refers to a fast-food restaurant that aimed to increase customer engagement. The company management identified five potential digital transformation initiatives to pursue their goal: (1) the introduction of in-store ordering via mobile apps; (2) digital kiosks; (3) the creation of a digital loyalty card; (4) the opening of a drive-through service; and (5) the launch of a home-delivery service. These five initiatives were extracted from a real case study of digital transformation, and they have been used to prove the feasibility and applicability of the framework proposed. The Digital Transformation Canvas was used to conceptualize and describe each initiative (Appendix 2) and was integrated using the four dimensions of Digital Transformation Leadership (Appendix 3).

5. Conclusion

Successful digital transformation leverages digital technologies to reshape the customer value proposition, transform operational processes, and enhance interaction and collaboration with customers (Berman, 2012). Undertaking digital transformation involves many factors and enabling conditions related to the market (e.g., changing consumer behavior and digitalization of customer interactions), the organization (e.g., top management awareness of the importance of digital transformation and the subsequent change of processes, roles, and structure), and individuals (e.g., digital skills, readiness to change, and leadership attitudes).

To successfully operate in digital environments, organizations may need to undergo a profound change that requires cognitive, behavioral, emotional, and cultural abilities. In this perspective, a new style of leadership becomes fundamental in transforming organizations from doing digital to thinking and being digital. Most leaders need to think and act differently, playing the right roles, developing the right competencies and skills, operating with the right mindset and behaviors, and activating the right enablers and initiatives to keep their organizations competitive (Porfirio et al., 2021). They are called to operationalize their leadership by leveraging fast, cross-hierarchical, team-oriented, and cooperative structures, with a strong focus on innovation (Oberer & Erkollar, 2018). This style emerges from a mix of qualities and capabilities that include knowledge of and literacy in digital technologies,

vision, customer focus, agility, risk-taking, and collaboration (Promsri, 2019), which does not depend on gender, age, or previous managerial experience (Zeike et al., 2019). The complexity of the digital transformation effort, its competitive relevance, and the proliferation of definitions and approaches presented in the literature cry out for a canvas as a tool to ideate and define a set of initiatives for the digital transformation of the organization.

The Digital Transformation Canvas described in this article provides a component-based definition of the digital transformation process, which includes the key pillars that act as conceptual constituents of a digital transformation initiative. In addition, the complex nature of digital transformation highlights the need for a new and multifaceted leadership style that can effectively drive and support this strategic change, and the canvas reveals itself as a straightforward tool to operationalize such leadership within the organization. By considering digital leadership as a process, the adoption of the canvas to collect initiatives of digital transformation proposed directly by managers and employees across the organization facilitates collaborative work among stakeholders—thus reducing cultural and knowledge barriers (Kane et al., 2019). The description of each initiative—accomplished by adopting the schema proposed in Figure 2—also enhances the transparency of communication for the resulting discussion and analysis, increases trust among stakeholders (Tigre et al., 2023), and empowers individuals and teams to pursue new initiatives (Kane et al., 2019). The architecture of the canvas encourages proponents to generate ideas quickly and adjust them continuously by involving the entire organization (Hensellek, 2020), combining a value-oriented view with risk evaluation and privacy protection (Lee, 2009). This quickly filters ideas and highlights the most promising initiatives for creating value for customers, thus sustaining a customer-centric and service-driven culture—which is crucial in digital leadership (Tanniru, 2018).

By also considering digital leadership as a capability, the canvas helps organizations elaborate and share a transformative vision for anticipating market requests and trends and solving complex problems in turbulent contexts (Kane et al., 2019). In addition, by familiarizing themselves with diverse digital technologies, organizations may develop the digital literacy to understand how they can generate new business opportunities. Finally, thanks to the modularity of its architecture, the canvas allows organizations to introduce changes within any element and reflect on the consequences. This makes organizations more adaptable in terms of change orientation and open-mindedness, and more entrepreneurial in terms of orientation towards experimentation (Kane et al., 2019).

Our article proposed a conceptual framework supporting digital transformation and contributes to the advancement of knowledge in this domain. The Digital Transformation Canvas offers a more systemic view than existing contributions on digital transformation processes (e.g., Andriole, 2017; Correani et al., 2020) that can guide an organization in ideating and implementing a digital transformation initiative by focusing on the key dimensions of technology, processes, people, and value orientation. It also meets the basic requirements of digital transformation extracted from the literature, which are the need for change, performance orientation, process transformation, multilevel impact (business, society, environment), and the key role of leadership required for the implementation.

The conceptual framework is also useful for managers and consultants who lead and implement digital transformation initiatives to address the key dimensions of organizational transformation (e.g., technology, processes, and value orientation; Holmström, 2022). Such characteristics endow the canvas with a multidimensional nature, developing a systems-thinking capability within managers that makes the overall process clearer and more controlled.

Overall, our research adds to the field of digital transformation by providing a practical and comprehensive framework for organizations to successfully navigate this strategic change. The canvas adopts a systemic approach to digital transformation, which helps organizations that lack comprehensive plans and coherent digital strategies (see Bresciani et al., 2021). It also aims to introduce changes in a company's operations and business model (Hess et al., 2016) by improving its value interfaces and structural elements using a combination of digital technologies that enhance computing, communication, and connectivity features (Gong & Ribiere, 2021; Nylén & Holmström, 2015; Vial, 2019).

Digital transformation involves both internal (e.g., people, processes) and external (e.g., partners, customers) elements of the organization and may lead either to valuable and successful results (e.g., Nest thermostat, Netflix) or failures (e.g., Nike+, Lego Digital Designer). There is no standard recipe to follow. Rather, it depends on a combination of factors including human capabilities, organizational choices, leadership style, process configurations, and technological systems.

The implementation of digital transformation initiatives—aligned with organizational strategy and industrial competitive dynamics—may result in a profound shift in business processes (Davenport & Westerman, 2018).

Digital transformation can be regarded as a new industrial revolution that generates benefits at both the operational and strategic levels (Singh & Hess, 2017) by disrupting traditional business models, transforming existing processes, ideating new systems, and building better working conditions and innovation capacity (Cennamo et al., 2020).

Our study is not without limitations that future research could address. First, the elements included in the canvas are derived from the literature, but further validation in different empirical contexts should be performed (e.g., large, medium, and small enterprises in different sectors) to evaluate the role of its usage in ideating and supporting the digital transformation process. These new empirical investigations could provide useful insights for customizing the framework for different organizations. Second—which was beyond the scope of this article—the canvas could be expanded to better connect with practitioners in terms of managerial guidelines and methodological aspects to follow for supporting the transformation effort. Third, since digital transformation is tightly connected with digital readiness and digital maturity (Kokot et al., 2021; Pirola et al., 2020), future research could investigate such relationships by understanding how readiness and maturity influence each other concerning the digital transformation process. Finally, considering that digital transformation is an organization-dependent effort and the conditions under which transformation happens may change across organizational characteristics (e.g., SMEs vs. large multinational companies, private corporations vs. public institutions, manufacturing vs. service companies), the canvas could be extended to incorporate a further layer for customization.

Overall, a generic, valid framework needs further investigation to generate more customized or organization-dependent models. These limitations represent issues that can be investigated in further research.

Appendix 1. Main definitions of digital transformation

Authors	Definition
Neumeyer and Liu (2021)	An organizational transformation that integrates digital technologies and business processes.
Westerman et al. (2011)	The use of digital advances (e.g., analytics, mobility, social media, smart embedded devices) and the improved use of traditional technologies (e.g., ERP) to radically improve the performance by changing customer relationships, internal processes, and value propositions.
McDonald and Rowsell-Jones (2012)	Beyond merely digitizing resources and results to create value and generate revenues from digital assets.
Mazzone (2014)	The deliberate and ongoing digital evolution of the company business model, both strategically and tactically.
Westerman et al. (2014)	The implementation of innovation and new digital technologies to achieve business improvements.
Fitzgerald et al. (2013)	The use of new digital technologies (e.g., social media, mobile, analytics) to enable major business improvements (e.g., enhancing customer experience, streamlining operations, creating new business models).
Brown et al. (2014)	The cultural and organizational changes required to use the new digital technologies to achieve significant improvements.
Iansiti and Lakhani (2014)	The process that changes a business model in two ways: (1) how the organization creates value for its customers, and (2) how it captures that value.

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Authors	Definition
Matt et al. (2015)	Transformation of products, processes, and organizational aspects enabled by the new technologies.
Piccinini et al. (2015)	Leveraging digital technologies to enable major business improvements (e.g., enhancing customer experience, creating new business models).
Berghaus and Back (2016)	Digitization of processes with a focus on efficiency, and digitization of products with a focus on extending physical features.
Haffke et al. (2016)	Digitization of sales and communication channels to enhance the interaction with customers, digitization of firm's offerings to augment physical offerings, and digitization of business models to discover new ways to capture value.
Hess et al. (2016)	Digital-enabled changes of a business model in terms of products, organizational structures, and processes automation.
Solis (2017)	Pursuit of innovative and agile business and operational models that leverage digital technologies to create new value and experiences for customers, employees, and stakeholders.
Bekkhus (2016)	The use of digital technologies to radically improve the company's performance.
Parviainen et al. (2017)	Changes in ways of working, roles and business offering caused by the adoption of digital technologies within the organization and industry.
Karagiannaki et al. (2017)	The use of technology to radically improve performance and change customer relationships, internal processes, and value propositions.
Andriole (2017)	A planned digital shock to what may be a reasonably functioning system.
Mićić (2017)	The integration of digital technology into business that results in changes in business operation and delivery of value to customers.
Morakanyane et al. (2017)	An evolutionary process that leverages digital capabilities and technologies to enable business models, operational processes, and customer experiences.
Herbert (2017)	A company's ability to react and successfully utilize new technologies and procedures now and in the future.
Gaivoronskii et al. (2017)	Evolutionary and—above all—revolutionary changes in industries and technologies.
Legner et al. (2017)	IT-induced changes in political decision-making and judicial frameworks and related to supply and demand in labor markets.
Leodolter (2017)	A societal meta-development.
Hartl and Hess (2017)	The IT-enabled change in organizations through digitalization of products, services, core processes, customer touch points, and business models, which is different from previous IT-enabled business transformations in terms of velocity and holistic nature.
Hinings et al. (2018)	The combined effects of several digital innovations bringing about novel actors, structures, practices, values, and beliefs that change, threaten, replace, or complement existing rules of the game within organizations, ecosystems, industries, or fields.
Heavin and Power (2018)	An opportunity to innovate and redefine how organizations do business by leveraging technology for customer satisfaction.
Al-Ruithe et al. (2018)	A process to improve operational efficiencies and organizational performance by blending digital and physical business, as well as customer experiences.
Weill and Woerner (2018)	A business transformation focusing on increasing customer experience and operational efficiency.

(continued)

Authors	Definition
Bloomberg (2018)	The customer-driven business transformation that requires cross-cutting organizational change and the implementation of digital technologies.
Vial (2019)	A process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies.
Warner and Wäger (2019)	Strategic renewal that uses advances in digital technologies to build capabilities that refresh/replace the organization's business model and culture.
Schallmo et al. (2018)	A framework including the networking of business actors across all value-added chain segments, the application of new technologies, and the skills to extract, exchange, and analyze data to achieve actionable information enabling decisions.
Van Veldhoven and Vanthienen (2019)	The continuously increasing interaction between digital technologies, business, and society, which has transformational effects and increases the change process's velocity, scope, and impact.
Andriole (2017)	A consistent, repeatable, and impactful process that leverages current and existing technology to perform the following steps: (1) track technology-driven business models and processes; (2) track existing and emerging digital technologies; (3) conduct technology pilots; and (4) govern the enterprise architecture.
Li (2020)	A risky process of first introducing a new strategy, business model, or organizational structure enabled by digital technologies, and then putting the same into action with the purpose of dramatically improving performance and changing the company's future trajectory.
Margiono (2020)	A strategy used by the company to change the process and culture and overcome the barriers to survive and maintain the leadership in the market.
Sundaram et al. (2020)	A process that transforms business competencies, procedures, practices, and models to fully exploit the opportunities and developments of emerging technology and their effects in a strategic and prioritized manner by changing processes, operations, and products.
Magnusson et al. (2022)	The use of digital technology to produce new digital value streams, shift from existing business models to newer ones, and significantly transform industry and society.
Danuso et al. (2022)	A synonym of disruption of traditional business models, encoding information in a digital form to allow their analysis and algorithmic manipulations, and puzzling new management difficulties—including complicated internal and structural changes impacting the entire company.
Verhoef et al. (2021)	A multidisciplinary process that implements change at multiple levels by leveraging digital technologies to innovate the existing business models or shape new ones.
Gong and Ribiere (2021)	A fundamental change process enabled by digital technologies that aims to bring radical improvement and innovation to an entity (e.g., organization, business network, industry, society) to create value for its stakeholders by strategically leveraging its key resources and capabilities.
AlNuaimi et al. (2022)	A tool based on cutting-edge technology for transforming corporate processes, cultures, and organizational elements to meet changing market requirements and deliver goods and services.

Appendix 2. Example of the application of the digital transformation canvas

Digital transformation canvas

	Purpose	People	Process	Platform	Partners	Performance	Planet	Product	Protection	Privacy
In-store orderings via mobile app	- To evolve the customer experience	- Food preparation employees - Cashiers	- Ordering - Food preparation - In-store payment	- Mobile app	- Software development agency	- Percent of orders from mobile app - Percent of revenues from mobile app orders	- Decreasing of the health-related risk due to queues and crowded stores	- Extension of the traditional product through the online ordering service	- Authentication services for the customers - Authentication procedures for employees	- Explicit acceptance of the privacy management rules by the customer - Full compliance of the company to specific (country-based) privacy regulations
In-store orderings and payment through digital kiosk	- To evolve the customer experience	- Food preparation employees	- Ordering - Food preparation - In-store and online payment	- Digital kiosk - Software application - Digital payment gateway	- IT provider - Software development agency - Online payment service provider	- Percent of orders from digital kiosk - Percent of revenues from digital kiosk transactions	- Decreasing of the health-related risk due to queues and crowded stores	- Extension of the traditional product through the online ordering and online payment services offered by the digital kiosk	- Authentication services for the customers - Authentication procedures for employees	- Explicit acceptance of the privacy management rules by the customer - Full compliance of the company to specific (country-based) privacy regulations
Digital fidelity card	- To evolve the customer experience	- Marketing managers	-Marketing & sales	- Mobile app	- Software development agency	- Number of cards issued - Number of transactions registered	- Financing social and environmental projects based on fidelity points	- Extensions of the traditional product through additional (personalized) promotions based on the use of digital card	- Authentication services for the customers - Authentication procedures for employees	- Explicit acceptance of the privacy management rules by the customer - Full compliance of the company to specific (country-based) privacy regulations
Home-delivery service	- To evolve the customer experience	- Food preparation employees - Bikers	- Ordering - Food preparation - Online payment Packaging - Delivery	- Mobile app	- Software development agency - Online payment service provider	- Percent of orders from home delivery - Percent of on-time deliveries - Level of customer satisfaction on the delivery service	- Decreasing of the health-related risk due to queues and crowded stores - Increase of home deliveries thanks to the bikers	- Extensions of the traditional product through the home-delivery service	- Authentication services for the customers - Authentication procedures for employees	- Explicit acceptance of the privacy management rules by the customer - Full compliance of the company to specific (country-based) privacy regulations
Automated drive-thru	- To evolve the customer experience	- Food preparation employees	- Ordering - Food preparation - Online payment	- Conversational AI system	- IT provider - Software development agency	- Percent of orders taken from the drive-thru - Percent of revenues from the drive-thru - Percent of time saved for order delivery	- Decreasing the environmental impact by reducing waiting time at the drive-thru	- Extensions of the traditional product through the drive thru serviced	- Authentication services for the customers - Authentication procedures for employees	- Explicit acceptance of the privacy management rules by the customer - Full compliance of the company to specific (country-based) privacy regulations

Appendix 3. Example of the application of the digital transformation leadership

Digital transformation leadership			
Roles	**Competencies**	**Behaviors**	**Enablers**
The store manager operates as mentor of their employees by providing them with support for fulfilling in-store orders.	The store manager makes employees aware about the key role that in-store ordering may have to automatize such process and reduce customer service time.	The store manager converses with their employees about the importance of job reflexibility and adaptability.	The company launches a pilot phase to fine-tune with customers in the in-store ordering process and system.
An external expert collaborates with the company as both innovators and managers to combine creativity and efficiency.	An external expert connects their knowledge on digital kiosk with the company's need to increase efficiency in customer service and target a new customer niche.	An external expert promotes openness toward experimentation and innovation.	The company launches a pilot phase to fine-tune with customers the ordering and payment via digital kiosk.
The marketing manager acts as enabler of an internal interdisciplinary team that ideates the digital fidelity card.	The marketing manager engages the team's member to find a way to enhance customer loyalty.	The marketing manager promotes and encourages horizontal and cross-functional collaborations.	The company's top management supports explicitly the initiative by providing adequate funds and establishing a partnership with a digital marketing agency.
The communication manager acts as networker with social media influencers to share information about the new home-delivery service.	The store manager helps employees to reflect on the digital future of the organization, which may include new ways to serve the customers.	The store manager encourages employees to innovate existing jobs for meeting the new customers' needs and expectations.	The company launches the new service through a pilot program and free-of-charge experimentation, which grounds on a new collaboration with the local community of bikers.
The store manager operates as both pioneer and innovator by experimenting how new AI algorithms can enable the new drive-thru service.	The store manager promotes diffusely at every level of the company the importance of automation and digitalization.	The store manager is aware if the risk of failure but supports experimentation and innovation.	The store manager involves a group of customers to define the operational details of the new service and provide them both a financial and image reward.

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