



Transformative leadership competencies for organizational digital transformation



Giovanni Schiuma^a, Francesco Santarsiero^{b,*},
Daniela Carlucci^b, Yasar Jarrar^c

^a LUM Giuseppe Degennaro, 70010 Casamassima, Bari, Italy

^b DICEM: Department of European & Mediterranean Cultures, Environment, & Cultural Heritage, University of Basilicata Italy, Via Lanera, 20, 75100 Matera, Italy

^c Hult International Business School, Cambridge, MA 02141, USA

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Abstract Despite the flourishing literature on digital transformation (DT), there is still less research on the human side of DT—particularly on leaders' competencies required to successfully trigger and drive organizational transformation in the context of the digital age. The human-centric approach and the leadership role are essential to understanding how organizations navigate DT by integrating digital-based knowledge. To understand the competencies necessary for a leader to drive organizational DT, this study combines and analyzes the results from a literature review on leadership styles and the findings from the semistructured interviews with 64 leaders of SMEs across a wide range of industries engaged in a DT journey. The analysis proposes the notion of transformative leadership to determine the capacity leaders must have to navigate organizational DT and identifies and describes the six competencies that distinguish a transformative leader.

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1. Managing digital-based knowledge for digital transformation

The digital age has brought significant technological advancements that have changed how organizations function and create value with and for their stakeholders (Cohen et al., 2017). In today's highly evolving digital landscape, organizations are continuously challenged to rethink their strategic action fields (Peter et al., 2020) and redefine the

* Corresponding author

E-mail addresses: schiuma@lum.it (G. Schiuma), francesco.santarsiero@unibas.it (F. Santarsiero), daniela.carlucci@unibas.it (D. Carlucci), yasar.jarrar@faculty.hult.edu (Y. Jarrar)

existing organizational roles (Zoppelletto et al., 2023) and entrepreneurial working practices (Corvello et al., 2022). The absorption and exploitation of digital-based knowledge associated with digital technologies and solutions is the driving force behind integrating and applying digital technologies to improve organizational capacity for value creation (Schiuma et al., 2021). Despite extensive academic research (e.g., Berman, 2012; Peter et al., 2020; Reis et al., 2018; Santarsiero et al., 2022a; 2022b; Vial, 2021; Westerman et al., 2014) on digital transformation (DT), achieving the desired outcomes from digital investments remains a complex task—highlighting the existing gap between theory and practice. Organizations vary in digital maturity and can encounter cultural, cognitive, and economic barriers in their DT journeys (Ghosh et al., 2022). Most organizations achieved less than one-third of the impact they expected from digital investments (LaBerge et al., 2022). DT fails to produce all expected results because it is often considered as merely incorporating digital technology into all business areas rather than as an organizational transformation that manages digital-based knowledge combined with other complementary knowledge assets (Santarsiero et al., 2022b; Schiuma et al., 2021; Tabrizi et al., 2019). DT encompasses multiple dimensions, and digital-based knowledge's absorption, integration, and exploitation are essential. For this reason, organizational DT requires a learning process and the management of new digital technological knowledge (Guinan et al., 2019) by creating a receptive culture (Tabrizi et al., 2019) that allows restructuring of organizational working practices and business models (Ashkenas, 2015; Guinan et al., 2019). Several factors influence the creation of a receptive culture and the development of digital-based knowledge management capabilities (D'Este et al., 2012; Ghosh et al., 2022). Employee involvement is at the core of these factors (Schiuma et al., 2023), and it is crucial to ensuring success amid DT. As such, adopting a human-centric approach becomes essential to understanding how organizations can effectively navigate their DT toward absorbing, integrating, utilizing, and leveraging digital-based knowledge for enhancing organizational value creation.

2. The human-centred approach and the role of leadership in navigating DT

Many scholars suggest using agile, lean, design thinking, gamification, entrepreneurial, and continuous learning methods to manage DT in organizations (Barton et al., 2018; Sutherland &

Sutherland, 2014). These methods share the idea that human-based dynamics at the individual, team/group, and organizational levels are at the heart of successful organizational DT. Attitudes and behaviors affect the dynamics of the transformation process and its outcomes. Therefore, the human-centered approach—which puts individuals at the core and involves them in decision-making and cocreation of solutions (Barton et al., 2018)—is essential to navigating DT. Digital tools and technology can only boost efficiency and productivity if they are supported by human skills, competencies, mindsets, and dynamic capabilities based on continuous learning, unlearning, openness, and experimentation toward enabling change (Ghosh et al., 2022). Change can induce different reactions in people, depending on their experiences, values, and culture (Dickson et al., 2001). People may resist or embrace change, so it is essential to understand and leverage the diversity of individuals in a DT process and actively involve them in transforming and managing the impact of digital technologies on their attitudes, behaviors, and practices (Frankiewicz & Chamorro-Premuzic, 2020). Furthermore, people are central to absorbing, developing, and deploying digital-based knowledge to enable a DT process.

The leadership role is essential to engage people to embrace DT and apply digital-based knowledge (Sainger, 2018). It creates an organizational culture and context supporting, developing, and managing digital-based knowledge.

A *leader* refers to an individual with decision-making authority within an organization, primarily having the power to influence others—engaging and enabling them to embrace change. Leaders can encompass various roles, including managers, professionals, project managers, external consultants engaged in achieving specific objectives, and entrepreneurs. In the case of SMEs, entrepreneurs often assume almost exclusive leadership roles, while in larger enterprises, they may share or delegate the power of influence with managers and executives (Peter et al., 2020). The entrepreneur is frequently equated with a leader (Eyal & Kark, 2004; Vecchio, 2003), and in the context of DT and the digital era, compelling entrepreneurial capabilities are seen as indispensable for leaders aiming to foster DT (Chaniago, 2023; Zoppelletto et al., 2023). Proactive attitude, risk-taking, change propensity, agile decision-making, digital readiness, and the ability to identify and seize opportunities are essential entrepreneurial capabilities for leaders seeking to address the challenges of organizational DT (Corvello et al., 2022). In this regard, leadership is crucial for

guiding organizations through the DT journey by reevaluating existing structures and processes, promoting a culture of change, and leading individuals to adopt new mindsets, knowledge, attitudes, and working methods related to integrating digital-based knowledge. More specifically, the leader's role is vital in deploying managerial skills to coordinate organizational resources, creating an adaptive organizational context for incorporating new digital knowledge-based resources into the existing ones. The process of integration is context-specific and idiosyncratic to the organization. A leader guiding the organization through the DT journey has to understand the organizational strategy and the critical features of the organization's architecture to make sure that the DT fits, couples, and integrates with existing organizational resources. Leaders must also focus on how structuring, bundling, and leveraging resources and synchronizing practices across processes can assure value creation and higher levels of firm performance (Miles & Van Clieaf, 2017). As Miles and Van Clieaf (2017) suggested, leaders must balance strategy and organizational design—including management structure accountability and incentive design—to develop human capital that can deliver the desired behaviours and create value for the firm. A successful organizational DT closely depends on how organizational resources (e.g., employees' skills, digital technologies, culture, mindsets, practices, etc.) are allocated and orchestrated for strategy, organizational structure, and system. Leaders are responsible for creating the optimal conditions and environment for facilitating organizational DT.

Management literature suggests different labels denote the leadership styles to navigate an organizational transformation. In particular, the notions of transactional (e.g., Bass & Riggio, 2006; Burns, 1978), transformational (Bass & Avolio, 1994; Bass & Riggio, 2006; Odumeru & Ogbonna, 2013), entrepreneurial (Gupta et al., 2004; Hensellek, 2020; Leitch et al., 2013), and wise leaders (Nonaka & Takeuchi, 2019) are critical. These leadership styles highlight the importance of different leadership dimensions to drive organizational transformation. While transactional leadership focuses on rewarding followers for meeting predefined goals, transformational leadership emphasizes inspiration, motivation, and growth. Entrepreneurial leadership, on the other hand, features innovation and risk-taking in dynamic and uncertain environments. Lastly, wise leadership adds a moral compass to the mix, emphasizing the need for leaders to gain wisdom and align their decisions with the values and purpose of their

organizations. Referring to the DT, literature that addresses the essential traits that distinguish a leader who drives organizational DT toward the adoption of digital technology still needs to be completed (McCarthy et al., 2021).

In this vein, it is essential to understand what should distinguish a leader governing organizational DT (i.e., a *transformative leader*, or someone that recognizes the importance of continuous innovation and learning for survival, fosters collaboration and open communication within the organization, ensures that the organization is committed to the principles of continuous transformation, and creates an organizational context to embrace digital-based knowledge). But what are their distinguishing competencies? This study aims to provide further insights on the topic by answering the following research question: What are the critical competencies of a transformative leader essential for an organizational DT?

We adopted a grounded, theory-based approach from a methodological viewpoint (Watts & Henderson, 2006). First, we conducted a deductive literature analysis focused on leadership styles that affect organizational transformation. This analysis provided a preliminary guiding background for carrying out the second phase of the research. In the second phase, via an inductive approach, we conducted a qualitative empirical investigation using face-to-face, semistructured interviews to capture and understand the transformative leader's competencies. The combination of theoretical and empirical perspectives informed the development of a framework of the transformative leadership competencies as a compass to navigate organizational DT, outlining six key competencies distinguishing transformative leadership to navigate DT. We analyze these interviews in Section 3.

3. Interviews

The study employed semistructured interviews with 64 respondents—two representatives per firm (namely the entrepreneurs and a manager)—from 32 firms operating in a macroregion in southern Italy. These firms were involved in a Ministry-funded project to implement DT initiatives. The Ministry-funded project focused explicitly on DT initiatives, making it an ideal context for investigating the competencies of transformative leaders in driving organizational DT. The project was chosen because it aligned with the national agenda for promoting DT across various industries. It aimed to support and accelerate the DT journeys of participating companies by providing financial assistance, training programs (including leadership

training), and ongoing support throughout the different stages of the transformation process. The project's comprehensive approach ensured that the selected companies received early-stage guidance and training to successfully navigate the complexities of DT and financial resources only after achieving determined milestones. The Ministry monitoring board established specific success markers to assess the progress and achievements of the participating companies throughout their DT journeys. These markers encompassed various dimensions, including, but not limited to, the adoption of digital technologies, innovation capacity, performance improvement, and organizational change. By selecting companies that demonstrated progress and success across these success markers, our study aimed to capture the experiences and insights of transformative leaders who effectively drove and accomplished DT initiatives within their organizations.

The interviewees were all actively involved in the DT processes, from the design phase to the various stages of development. The interviews had an average duration of 60 minutes, were audio recorded, and transcribed. In addition to the interviews, we examined company websites, project descriptions, and other documentation provided by the interviewees to understand each enterprise and its domain better. Considering the focus on transformative leadership competencies in the context of DT, we considered it beneficial to include a range of sectors to represent the diversity of industries affected by digitalization. This approach allowed us to capture a broader spectrum of experiences and insights from transformative leaders across different sectors. While manufacturing could be one of the most recurrent sectors, we also considered it advantageous to include in our sample industries such as ICT, retail, agriculture, hospitality, healthcare, and professional services. By including a variety of sectors, we could better examine the transferability and applicability of the identified transformative leadership competencies across different industry contexts and determine the distinct competencies that are particularly relevant and valuable to leaders.

The data analysis was conducted in two stages. First, we employed an in-case analysis for each firm (Eisenhardt, 1989) to identify patterns and recurring statements in the data that shed light on the behaviors and attitudes of transformative leaders. In the second stage, we identified common patterns and divergent perspectives among the interviewees by triangulating the data with our review of leadership styles to identify common competencies that distinguish a transformative leader. This approach

helped us develop a framework to outline transformative leadership competencies as a compass. While our study focuses on SMEs, it is crucial to highlight that SMEs constitute a significant portion of the business landscape and play a crucial role in driving economic growth and innovation in many economies. DT's fundamental challenges and opportunities are shared among SMEs—regardless of contextual differences in resources, organizational structures, and market dynamics. The competencies we identified in our study support the broader conceptual framework of transformative leadership, which encompasses the ability to navigate change, foster innovation, and drive organizational transformation. These competencies are not exclusive to a specific organizational size but reflect leadership qualities that can be essential in leading DT initiatives in any organization. Despite the specific focus on SMEs, the generalizability of our findings lies in the broader applicability of transformative leadership competencies to drive DT effectively in organizations of varying sizes and sectors. The framework's applicability to other sizes or types of companies can be considered a guideline for future research activities.

To guarantee quality and rigor—using multiple lenses and shifting our focus between specific firms and broader insights—we avoided premature conclusions and stayed grounded in the data. We drew conclusions by synthesizing our data analysis and literature review. The framework presented in this article then reflects and blends the interview responses while addressing the critical questions outlined in our interview protocol (see [Appendix](#)). To protect privacy, all company names have been anonymized.

4. The transformative leadership competencies framework: A compass to navigate DT

Based on theory and field observations, our research preceded on the fundamental assumption that leaders must adapt to the rapidly changing, unpredictable business and social landscape. Many leaders need help with new technologies, economic shifts, and other challenges. Our research identified six compelling competencies distinguishing transformative leaders who drive successful organizational transformation in the digital age: (1) pragmatic, (2) sustainable, (3) facilitator, (4) communicator, (5) catalyst, and (5) informed.

These competencies balance idealistic and pragmatic elements and consider digital transformative factors, allowing leaders to create and apply new

digital-based knowledge to support DT. They have been grouped in the framework presenting the transformative leadership competencies that can be considered a compass for navigating organizational DT (see Figure 1). Sections 4.1.–4.6. Discuss each transformative leadership competence and how leaders can use them to move their organizations toward DT.

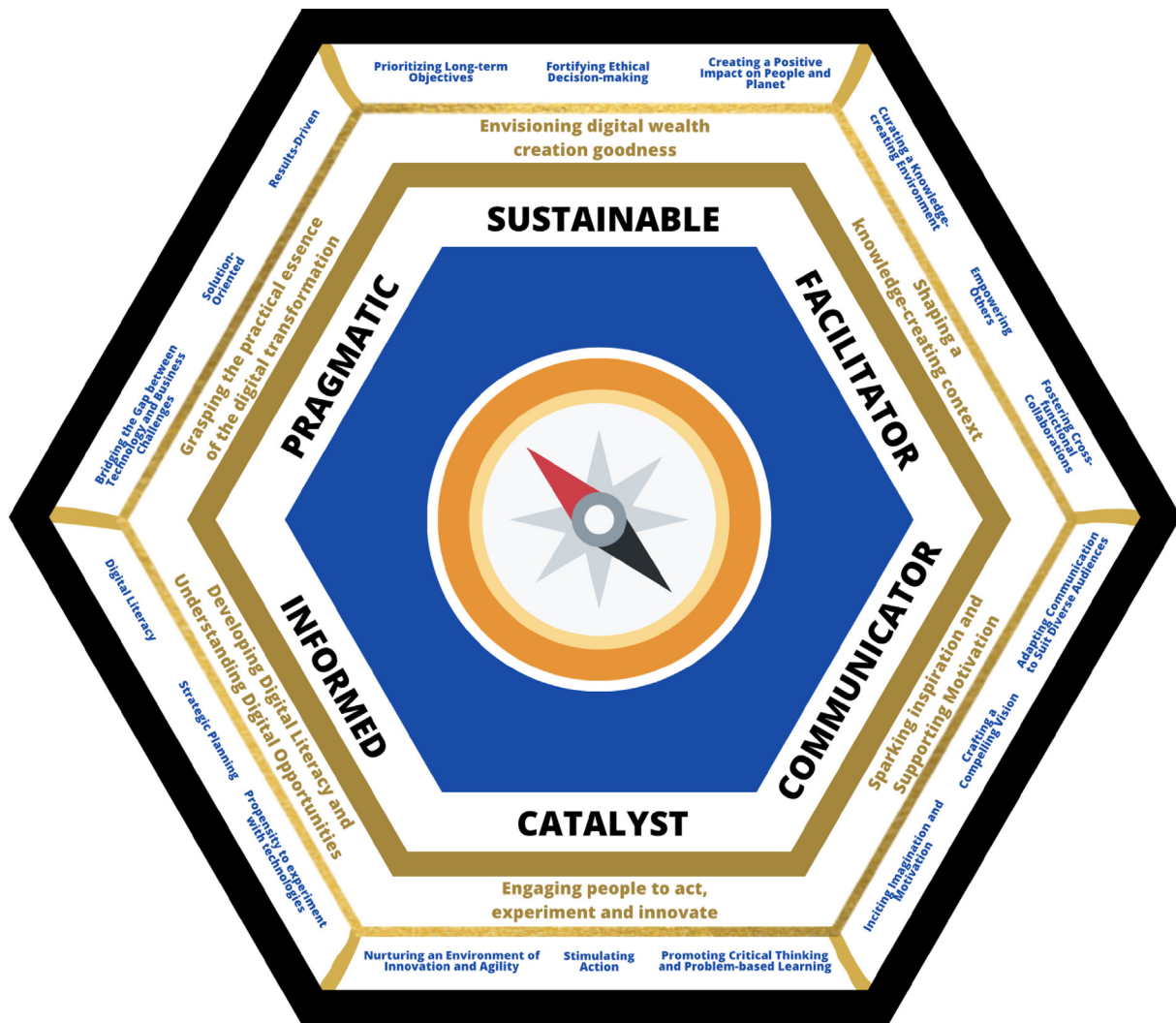
4.1. Pragmatic: Grasping the practical essence of DT

To effectively lead DT, leaders must be pragmatic in their approach. They need to grasp the practical essence of the challenges and opportunities the digital landscape presents and apply this understanding toward effective solutions. Several

respondents emphasized the importance of a practical approach, as one said: “Navigating the complexities of DT requires a practical perspective. It involves understanding the tangible impact of technology and identifying achievable solutions that align with our organization’s objectives.”

Being pragmatic in DT means bridging the gap between technology and business challenges. Pragmatic leaders ensure digital initiatives are grounded in the organization’s objectives and address its unique needs. As another leader highlighted: “We aim to link digital competencies with our business needs, prioritizing practical solutions over the latest trends.” He explained how he led a DT project aimed at streamlining internal communication processes. This initiative evaluated communication channels, identified inefficiencies, and introduced Slack as a

Figure 1. The transformative leadership competencies framework as a compass to navigate organizational digital transformation



tailored digital solution integrated into the workflow. This pragmatic approach significantly improved communication efficiency, which aligned with the organization's goal of promoting productivity through collaboration.

As such, pragmatic leaders are solution-oriented and results-driven. They understand the fast-paced nature of the digital landscape and make well-informed decisions based on a solid foundation of digital knowledge. One leader explained: "Having a practical approach means swiftly evaluating available choices, assessing potential risks, and making decisive decisions. We can't dwell on uncertainties. We must act and deliver outcomes." He also argued that pragmatism proved necessary in selecting the appropriate IoT sensors deployed in the olive groves to monitor real-time soil moisture and weather conditions. The collected data were subsequently integrated into a tailored digital agricultural management system, optimising irrigation and olive harvesting, resulting in a 30% increase in oil yield and a substantial reduction in operational costs. Another leader—this time from a seafood restaurant—shared a project in which pragmatism emerged as a pivotal role in driving DT. Recognizing the need for enhanced data analysis capabilities, the leader first focused on understanding the specific result they were looking for in relation to the exploitation of a digital solution. Their interest was primarily to enhance customer satisfaction and increase table occupancy rates, so they implemented an AI-powered online booking system. This system enabled data analysis from past bookings and customer preferences to optimize table assignments and staffing. In addition, it incorporated a digital feedback system for real-time customer opinion collection. Consequently, the success of the DT initiative was related to its capacity to solve a practical problem (i.e., the understanding of its customers and how to better address their needs).

In summary, pragmatic leaders in DT possess a practical and realistic understanding of technology's implications. They align digital initiatives with the organization's challenges and problems so that the DT helps achieve performance goals and make informed decisions. By embracing pragmatism, leaders can better navigate the complexities of DT and achieve meaningful outcomes for their organizations.

4.2. Sustainable: Envisioning digital wealth creation goodness

In conceptualizing the wealth creation process in the digital era, it is incumbent upon leaders to embody the proficiency of upholding sustainability

and ethical rectitude underpinned by robust moral tenets. One leader emphasized during an interview:

Ethics and sustainability extend beyond mere contemporary catchphrases; we should all bear a greater responsibility toward future generations. In this, DT can play a crucial role. Companies must determine how to grow while considering both people and the environment, minimising waste to the best of their ability.

Sustainable leadership within the realm of DT must guarantee that organizations conduct their operations conscientiously (i.e., with awareness of the consequences of their actions on stakeholders and the environment). As confirmed by another entrepreneur:

While profitability remains our significant measure of success, it should not be pursued at the detriment of social and environmental stewardship. We maintain a fleet of freight vehicles with a moderate environmental footprint. Consequently, we choose to implement a GPS monitoring and telemetry system to encourage responsible driving practices and mitigate our environmental impact.

Leveraging the data collected allowed them to identify and incentivize drivers who complied with ethical standards, which enhanced the company's reputation and reduced fuel consumption. One example of a sustainability-driven approach in practice is a leader who initiated a DT project to improve the long-term sustainability and efficiency of its winery business. This winery implemented advanced vineyard monitoring systems via drones and IoT sensors to assess plant health. This method has been effective in preventing diseases, extending the lifespan of plants, and enhancing their overall quality.

Another example highlights a leader's commitment to positively influence their workforce. The leader prioritized DT initiatives to improve employee well-being via training, work-life balance promotion, and creating an inclusive work environment. The DT functioned as a lever to improve employee satisfaction, productivity, and loyalty. Other leaders emphasized the impact of DT on customers. For instance, the leader of an organic food company invested in a blockchain-based product traceability system that enables consumers to trace the supply chain, ensuring the ethical and sustainable sourcing of ingredients. The implementation of this initiative led to a boost

in consumer confidence and a rise in sales. In addition, by partnering with an established start-up, the company reduced food waste by offering unsold food at discounted prices, which benefitted the local community.

Transformative leaders prioritize sustainable values to create lasting impact. To promote sustainability, these leaders engage in activities that enhance their ethical judgment. Leaders can make enlightened decisions by acquiring wisdom, contemplating ethical precepts, striving for excellence, and expanding intellectual horizons through liberal arts engagement. These practices foster sustainable organizational growth and help build a superior society.

In conclusion, manifesting sustainability and ethical rectitude in the context of DT means prioritizing long-term objectives, fortifying ethical decision-making, and positively impacting people and the planet. Leaders personify this righteousness by making wise choices that align with sustainability, advocating for employee welfare, and sharing a moral compass oriented toward enduring value creation. By embodying these tenets, leaders foster a DT landscape that generates wealth and promotes social responsibility and environmental sustainability.

4.3. Facilitator: Shaping a knowledge-creating context

To optimally steer DT, leaders must be facilitators, curating an environment that nurtures the generation and cultivation of digital-based knowledge within the organization. As articulated by one leader: “My responsibility is to cultivate an atmosphere where knowledge is not merely acquired, but actively generated and disseminated. By endorsing curiosity, fostering collaboration, and promoting continuous learning, we can make sure that our projects of DT are impactful.”

Leaders who adopt a facilitative approach create an atmosphere that encourages knowledge growth. In this context, employees are driven to explore innovative concepts, experiment, and disseminate their insights. Leaders across organizations emphasize creating platforms to foster innovation and exchange knowledge. For instance, a noteworthy initiative, the Knowledge Café program, was highlighted during one interview. In this program, employees from diverse backgrounds gather regularly to share their experiences, best practices, and innovative ideas related to DT projects. This culture of knowledge-sharing empowers individuals to leverage their peers’ expertise, accelerating the organization’s digital progress.

Empowerment forms another crucial facet of facilitative leadership. Transformative leaders fashion an environment wherein employees feel empowered to claim ownership, make decisions, and enact change. They furnish resources, provide support, and offer autonomy, enabling individuals to hone their digital competencies and contribute to the organization’s digital objectives. For instance, one leader launched a Digital Champions Program, selecting and training employees to act as advocates and mentors for DT within their respective teams. This empowerment supported individual growth and cultivated a network of change agents, which propels DT throughout the organization.

Leaders who embrace the facilitator competency acknowledge the significance of cross-functional collaborations for DT. They dismantle organizational silos and encourage collaboration across disparate companies, departments, and functions. By promoting diverse perspectives and areas of expertise, they equip the organization to address multifaceted digital challenges effectively. For instance, one leader assembled a cross-functional project team, which comprised of representatives from IT, marketing, and finance, and drew from internal and external sources to devise and execute a comprehensive digital marketing strategy. This collaboration resulted in a comprehensive strategy that utilized diverse skills and knowledge to achieve DT objectives.

In conclusion, the role of a facilitator in DT involves creating a knowledge-sharing environment, empowering others, and fostering cross-functional collaborations. Transformational leaders who embody this competency create platforms and initiatives to facilitate knowledge exchange, empower individuals to effect change, and promote collaboration across departments.

4.4. Communicator: Sparking inspiration and supporting motivation

To unlock the latent potential of DT, leaders must exhibit robust communication competencies—effectively sparking inspiration and supporting motivation through discourse. As elucidated by one leader: “The ability to vividly depict the future and inspire others is crucial, requiring the stimulation of their creativity and enthusiasm for DT.”

Leaders who excel in communication inspire creativity and motivation within their organization’s ecosystem to surpass traditional boundaries. An example of this is a leader who described how he regularly arranges internal brainstorming to

inspire employees to generate creative ideas for innovating products and internal processes. He motivates the entire organization to contribute while empowering individuals to explore new opportunities.

A vital attribute of a communicator in the DT paradigm is the ability to create a compelling vision. Effective leaders must communicate a clear and inspiring vision that aligns with the organization's digital goals. It is important for this vision to be well-articulated and integrated with the overall digital strategy of the organization. One retail company manager attributed the success of his DT project—which involved the integration of augmented reality to enhance the online shopping experience—to “presenting the technology in an engaging way during a company meeting to convey our vision and objectives firsthand.” Transformative leaders effectively use storytelling and persuasive narratives to inspire individuals to actively engage in the DT trajectory by delineating a desired future state of purpose.

A transformative leader also recognizes the importance of tailoring communication to connect with diverse audiences. They adapt their message and communication style to fit various stakeholders, including employees, customers, and partners. By comprehending their unique needs and viewpoints, these communicators ensure their message remains pertinent and impactful. For example, a leader should resort to technical jargon when dialoguing with the IT department while simplifying the message for nontechnical staff, ensuring transparency and engagement across the organization.

Transformative leaders build strong personal connections with their followers based on trust, empathy, and authenticity. They create a supportive and motivating environment by actively listening, demonstrating empathy, and expressing sincere concern. This connection engenders loyalty, dedication, and a shared sense of purpose in the DT expedition.

In conclusion, being a communicator within the DT framework entails inciting imagination and motivation, crafting a compelling vision, and adapting communication to suit diverse audiences. Transformative leaders inspire and motivate through efficacious communication techniques, clearly delineating a future vision, and nurturing personal connections with their followers.

4.5. Catalyst: Engaging people to act, experiment, and innovate

To facilitate effective decision-making, a transformative leader should act as a catalyst who

skilfully motivates individuals to actively participate. One leader articulated: “In our organization, we believe that a successful DT requires an engaged and dynamic workforce. Those who can inspire, motivate, and incite others to accept and contribute to change are a critical component of our journey.”

A catalyst leader places great emphasis on galvanizing individuals into action. They have the unique ability to inspire enthusiasm and unite individuals around the shared vision of DT. As conveyed by one leader:

When we started our digital transformation journey, we organized open forum discussions to share success stories from peers in our industry. The presentation of the potential benefits and opportunities offered by digital transformation was an effective tool to motivate our workforce and ignited their interest to explore new digital horizons.

The manufacturing enterprise frequently experienced interruptions caused by sudden machine failures. To mitigate slowdowns, the catalyst leader promoted an IoT initiative to monitor and optimize machine performance. To inspire colleagues, they organized town hall meetings and training sessions to educate the workforce about the advantages of IoT and its potential to enhance their daily tasks. This approach motivated the employees to engage in the IoT initiative actively. In addition, the leader fostered critical thinking among employees and encouraged them to utilize IoT to solve production challenges. They implemented a system of regular brainstorming sessions in which employees are encouraged to suggest solutions to specific manufacturing process issues. This method not only enhanced problem-solving skills but also fostered a culture of continuous learning within the workforce.

Cultivating an atmosphere that fosters innovation and agility is indispensable for a successful DT. A catalyst leader creates an environment that endorses experimentation and creativity. One leader affirmed: “Before adopting new technologies, we often seek advice from local Digital Innovation Labs. These platforms provide a safe space for testing ideas and learning.” By nurturing an innovative culture, organizations are better equipped to respond to fluctuating market demands and maintain a competitive edge in their industry.

In addition, a catalyst leader's role includes promoting critical thinking and fostering a problem-based learning environment. These leaders foster an ethos encouraging individuals to

challenge existing norms and contemplate digital opportunities analytically. For instance, the leader of a manufacturing SME empowered employees to participate in a problem-solving workshop, where they examined production bottlenecks and collaboratively formulated a digital tracking system. This demonstrated their critical thinking capabilities and problem-based learning approach.

When implementing organizational DT initiatives, a catalyst's role is to encourage action, foster an innovative and adaptable environment, and encourage critical thinking and problem-based learning. Leaders who drive transformation cultivate a culture of collaboration and experimentation, as well as provide training opportunities.

4.6. Informed: Developing digital literacy and understanding digital opportunities

The key to successful transformative leadership in the DT process is having a deep understanding of digital dexterity and technological knowledge. During an interview, a leader emphasized the importance of this skill, stating that it is highly relevant and significant: "In this digital era, we must be knowledgeable about cutting-edge technologies and their future applications. This enables us to strategically leverage digital platforms and tools, thereby promoting innovation and achieving our organizational goals."

An effective leader recognizes the potential of digital technologies to enhance organizational growth and success by identifying areas in which technology can be utilized to develop innovative solutions. For instance, a leader within a retail SME successfully employed digital analytics tools to scrutinize customer behaviors and preferences, which tailored marketing campaigns and bolstered customer satisfaction. Another leader in the manufacturing sector instated a digital manufacturing system, leveraging 3D printing in a critical area of the production chain: "I strategically planned this transition by identifying areas where 3D printing would be most suitable and evaluating the long-term return on investment. Consequently, we reduced production costs by 20% and provided customized products to our customers."

The intrinsic traits of an informed leader include curiosity and an unwavering commitment to continual learning. They keep pace with the latest technology trends and advancements, positioning themselves at the vanguard of digital innovation. This foresight enables them to recognize emergent technologies that could positively impact their organization. One leader, espousing

the ethos of continuous learning about new technologies, offered their viewpoint:

As a team leader, I encourage both myself and my team to be constantly learning and exploring new digital technologies. We set aside a budget for attending trade fairs and take turns participating, which helps us maintain our curiosity and openness to new ideas. This also allows us to proactively adopt new technologies that give us a competitive edge.

Informed leaders possess digital literacy, analytical acumen, and strategic planning skills. They understand the potential benefits of technology and can effectively communicate this to their employees and stakeholders. By cultivating a culture of digital literacy and offering training opportunities, leaders empower their workforce to harness digital tools and technologies. A leader emphasized the importance of digital literacy and mentioned that their organization invests in training programs to enhance the digital skills of their employees. This helps employees to confidently navigate the digital landscape and identify opportunities for improvement.

In conclusion, being informed in the context of DT requires a deep understanding of digital literacy and technological awareness. An informed leader understands digital technologies and leverages them to optimize processes and drive revenue growth. They embody curiosity, commitment to continuous learning, and a propensity to experiment with novel technologies.

5. Conclusion

DT is not merely related to adopting and exploiting new digital technology solutions but entails an organization's transformation driven by integrating new digital-based knowledge, developing a receptive culture to rethinking working mechanisms and adopting new practices and business models. Leaders are crucial in shaping organizational culture and context for nourishing, developing, and managing digital-based knowledge. They drive the organizational DT by rethinking old structures and processes, fostering a culture of change, and leading people to renovate their mindset, knowledge, attitudes, and working methods considering organizational strategy and the critical features of the organization's architecture. The management literature provided several leadership styles denoting a leadership capacity of activating, supporting, and managing an organization's transformation. Combining the results from the critical literature review on leadership

styles with the findings from the semistructured interviews with 64 entrepreneurs and managers from 32 SMEs engaged in a DT journey, we proposed the notion of transformative leadership to denote the capacity leaders must exercise for navigating organizational DT. We have identified and described the six competencies distinguishing a transformative leader. A transformative leader is a leader who is pragmatic (i.e., having a realistic understanding and application of digital knowledge to create effective solutions); sustainable (i.e., envisioning ethical and righteous digital wealth creation); a facilitator (i.e., being able to foster a knowledge-creating context for DT); a communicator (i.e., inspiring and having effective communication skills); a catalyst (i.e., being able to engage people to act with DT); and informed (i.e., being aware of digital technological knowledge). The on-field study provided insights about leaders' importance in successfully applying these competencies to drive organizational change, optimize processes, leverage digital technologies, and create value for stakeholders. Whether it is breaking down barriers to innovation, cultivating ethical principles, or empowering employees to embrace digital tools, these competencies impact is tangible and transformative.

It is essential to note that the six competencies we identified are interdependent and interconnected. Effective leadership in DT requires a holistic approach that encompasses all these competencies. They complement and reinforce one another, creating a synergy that enhances the leader's ability to navigate the complex digital landscape and guide their organization toward success.

Furthermore, the importance of these competencies lies in their alignment with the demands of the digital age. They address the key challenges organizations face in digital disruption, such as embracing new technologies, driving innovation, fostering a learning culture, and adapting to rapidly changing environments. By deploying these competencies, leaders can effectively lead their organizations through the DT journey, positioning them for long-term growth and competitiveness.

The study provides several significant contributions. Theoretically, the research points out the relevance of adopting a human-centred approach for organizational DT. It also contributes to the growing literature on leadership in the digital age by introducing transformative leaders as executives who can drive organizational DT by developing and applying digital-based knowledge and identifying a set of competencies—framed in the Transformative Leadership Competencies Framework—that leaders can use to guide organizational

DT effectively. The framework can be used for descriptive and normative purposes to understand the competencies that can employ and deploy digital-based knowledge. The study also holds practical implications. First, the framework is suggested as a tool that leaders can utilize for self-reflection on their possessed, transformative competencies and, simultaneously, for self-development to identify areas for improvement. Moreover, the framework can assist in selecting, developing, and comprehending leadership effectiveness. Second, the proposed framework can become a reference tool for transformative leaders—supported by assessment instruments that evaluate the maturity of critical transformative skills, as well as the readiness of an organization willing to embark on a DT journey.

Third, the proposed framework can support HR management. It can serve as a practical guide for comprehending the fundamental skills for leaders in the digital era and planning proper training and management initiatives.

While the study aimed to capture insights from transformative leaders involved in DT initiatives across various industries, it is essential to acknowledge certain limitations that may impact the generalizability of the findings. These limitations open avenues for future research and exploration. One limitation is the sample size and geographic context of our study. While efforts were made to select a diverse range of industries, the sample size of 64 respondents from 32 firms in a specific macroregion in southern Italy may only partially represent the population of transformative leaders engaged in DT initiatives. Therefore, we acknowledge the potential limitation of the generalizability of the findings to a broader context. For this reason, the study represents the first step in future by including a more extensive and diverse sample of transformative leaders from firms, different regions, and industries. Another area for improvement is the focus on SMEs. While SMEs are crucial in driving economic growth and innovation, the findings may only partially capture the experiences and competencies required in larger enterprises or multinational corporations. Future research could explore the transferability of transformative leadership competencies across different organizational sizes and sectors to provide a more comprehensive understanding of their applicability. In addition, our study examined firms involved in an Italian-Ministry-funded project for implementing DT initiatives. The outstanding support and resources provided by the project influenced the experiences and outcomes of the

transformative leaders interviewed. Therefore, the findings may not fully reflect the experiences of transformative leaders in organizations that did not receive similar external support. Future research could investigate the experiences and competencies of transformative leaders in organizations without external support to gain a more comprehensive understanding of the challenges and competencies required in different contexts. While efforts were made to include a variety of sectors in our study, the selection of industries may only encompass part of the spectrum of industries affected by digitalization. The findings may be more relevant and applicable to the included sectors (e.g., ICT, manufacturing, retail, agriculture, hospitality, healthcare, professional services). They may need to capture the experiences and competencies required in other industries entirely. Future research could include a broader range of industries to enhance the generalizability of the findings.

In conclusion, this study contributes to the literature on transformative leadership in the context of DT by identifying and describing the six competencies that define transformative leaders. The proposed framework provides a comprehensive guide for leaders to develop the necessary skills, mindsets, and capabilities to successfully navigate the complexities of DT. Future research can enhance our understanding of transformative leadership in DT and its impact on organizational success by further exploring the generalizability of the proposed framework, investigating its adaptability to different organizational dimensions, and employing mixed methods and longitudinal approaches.

We hope that our findings and framework can serve as a valuable resource for researchers, practitioners, and organizations as they navigate the challenges and opportunities of the digital age.

APPENDIX. Interview protocol: Transformative leadership competencies for organisational digital transformation

Introduction:

This interview protocol aims to understand the role of leaders' competencies in implementing digital transformation initiatives. The information gathered through this interview will contribute to an ongoing research project to explain the importance of leadership behaviors and the competencies distinguishing a leadership capacity to facilitate a successful organizational digital transformation.

Participant:

- Name:
- Role (Entrepreneur/Manager):
- Industry:
- Organisational information:
 - N° of employees:
 - Approx turnover:

Instructions:

The interview will be structured into different sections. We aim to obtain a comprehensive overview of your experiences and competencies that you consider relevant for managing successful digital transformation initiatives within your organization. Please provide detailed responses, including specific examples where applicable. The interview will be recorded. Your answers will be treated confidentially and used solely for academic research purposes.

1. To what extent is it relevant for leaders to clearly understand the scope of digital transformation?
2. Do you consider it essential that the leadership role align the digital transformation with existing strategic organizational challenges, knowledge, and resources?
3. How should leaders approach digital transformation to a company's wealth creation?
4. How relevant is your capacity to foster collaboration and create an organizational learning context to facilitate digital transformation?
5. To what extent do you master communication techniques, such as storytelling or other methods, to effectively convey the importance and benefits of digital transformation?
6. To what extent do you consider important your capacity to make digital transformation objectives understood and shared across the organization?
7. Do you consider your role relevant in developing a continuous learning and experimentation culture to support organizational digital transformation?

8. How do you see your role in encouraging individuals to develop their digital and leadership skills?
9. How essential is your capacity to sense and seize the evolving digital landscape?
10. To what extent do you believe you should inspire and motivate people to think critically and be adaptable to digital transformation?
11. How necessary is digital knowledge for leaders to drive successful digital transformation?
12. Is there anything else you would like to share regarding your role as a leader in digital transformation or the competencies necessary for success in this field?

Thank you for your participation!

References

- Ashkenas, R. (2015, January 15). We still don't know the difference between change and transformation. *Harvard Business Review*. Available at <https://hbr.org/2015/01/we-still-dont-know-the-difference-between-change-and-transformation>
- Barton, D., Carey, D., & Charan, R. A. M. (2018). One Bank's agile team experiment. *Harvard Business Review*, 96(2), 59–61.
- Bass, B. M., & Avolio, B. J. (1994). Transformational leadership and organizational culture. *The International Journal of Public Administration*, 17(3/4), 541–554.
- Bass, B. M., & Riggio, R. E. (2006). *Transformational leadership*. London, UK: Psychology Press.
- Berman, S. J. (2012). Digital transformation: Opportunities to create new business models. *Strategy & Leadership*, 40(2), 16–24.
- Burns, G. P. (1978). *Leadership*. New York, NY: Harper Collins.
- Chaniago, H. (2023). Investigation of entrepreneurial leadership and digital transformation: Achieving business success in uncertain economic conditions. *Journal of Technology Management and Innovation*, 18(2), 18–27.
- Cohen, B., Amorós, J. E., & Lundy, L. (2017). The generative potential of emerging technology to support startups and new ecosystems. *Business Horizons*, 60(6), 741–745.
- Corvello, V., De Carolis, M., Verteramo, S., & Steiber, A. (2022). The digital transformation of entrepreneurial work. *International Journal of Entrepreneurial Behaviour & Research*, 28(5), 1167–1183.
- D'Este, P., Iammarino, S., Savona, M., & Von Tunzelmann, N. (2012). What hampers innovation? Revealed barriers versus deterring barriers. *Research Policy*, 41(2), 482–488.
- Dickson, M. W., Smith, D. B., Grojean, M. W., & Ehrhart, M. (2001). An organizational climate regarding ethics: The outcome of leader values and the practices that reflect them. *The Leadership Quarterly*, 12(2), 197–217.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532–550.
- Eyal, O., & Kark, R. (2004). How do transformational leaders transform organizations? A study of the relationship between leadership and entrepreneurship. *Leadership and Policy in Schools*, 3(3), 211–235.
- Frankiewicz, B., & Chamorro-Premuzic, T. (2020, May 6). Digital transformation is about talent, not technology. *Harvard Business Review*. Available at <https://hbr.org/2020/05/digital-transformation-is-about-talent-not-technology>
- Ghosh, S., Hughes, M., Hodgkinson, I., & Hughes, P. (2022). Digital transformation of industrial businesses: A dynamic capability approach. *Technovation*, 113, Article 102414.
- Guinan, P. J., Parise, S., & Langowitz, N. (2019). Creating an innovative digital project team: Levers to enable digital transformation. *Business Horizons*, 62(6), 717–727.
- Gupta, V., MacMillan, I. C., & Surie, G. (2004). Entrepreneurial leadership: Developing and measuring a cross-cultural construct. *Journal of Business Venturing*, 19(2), 241–260.
- Hensellek, S. (2020). Digital leadership: A framework for successful leadership in the digital age. *Journal of Media Management and Entrepreneurship*, 2(1), 55–69.
- LaBerge, L., Smaje, K., & Zimmel, R. (2022). *Three new mandates for capturing a digital transformation's full value*. New York, NY: McKinsey.
- Leitch, C. M., McMullan, C., & Harrison, R. T. (2013). The development of entrepreneurial leadership: The role of human, social, and institutional capital. *British Journal of Management*, 24(3), 347–366.
- McCarthy, P., Sammon, D., & Alhassan, I. (2021). Digital transformation leadership characteristics: A literature analysis. *Journal of Decision Systems*, 32(1), 79–109.
- Miles, S. J., & Van Clieaf, M. (2017). Strategic fit: Key to growing enterprise value through organizational capital. *Business Horizons*, 60(1), 55–65.
- Nonaka, I., & Takeuchi, H. (2019). *The wise company: How companies create continuous innovation*. Oxford, UK: Oxford University Press.
- Odumeru, J. A., & Ogbonna, I. G. (2013). Transformational vs transactional leadership theories: Evidence in literature. *International Review of Management and Business Research*, 2(2), 355–361.
- Peter, M. K., Kraft, C., & Lindeque, J. (2020). Strategic action fields of digital transformation: An exploration of the strategic action fields of Swiss SMEs and large enterprises. *Journal of Strategy and Management*, 13(1), 160–180.
- Reis, J., Amorim, M., Melão, N., & Matos, P. (2018). Digital transformation: A literature review and guidelines for future research. In *Proceedings of the world conference on information systems and technologies* (pp. 411–421). Cham, Switzerland: Springer.
- Sainger, G. (2018). Leadership in digital age: A study on the role of leader in this era of digital transformation. *International Journal on Leadership*, 6(1), 1.
- Santarsiero, F., Lerro, A., Carlucci, D., & Schiuma, G. (2022a). Modelling and managing innovation lab as catalyst of digital transformation: Theoretical and empirical evidence. *Measuring Business Excellence*, 26(1), 81–92.
- Santarsiero, F., Schiuma, G., Carlucci, D., & Helander, N. (2022b). Digital transformation in healthcare organisations: The role of innovation labs. *Technovation*, 122, Article 102640.
- Schiuma, G., & Santarsiero, F. (2023). Innovation labs as organisational catalysts for innovation capacity development: A systematic literature review. *Technovation*, 123, Article 102690.
- Schiuma, G., Schettini, E., & Santarsiero, F. (2021). How wise companies drive digital transformation. *Journal of Open Innovation: Technology, Market, and Complexity*, 7(2), 122.

- Sutherland, J., & Sutherland, J. J. (2014). *Scrum: The art of doing twice the work in half the time*. Sydney, Australia: Currency.
- Tabrizi, B., Lam, E., Girard, K., & Irvin, V. (2019, March 13). Digital transformation is not about technology. *Harvard Business Review*. Available at <https://hbr.org/2019/03/digital-transformation-is-not-about-technology>
- Vecchio, R. P. (2003). Entrepreneurship and leadership: Common trends and common threads. *Human Resource Management Review*, 13(2), 303–327.
- Vial, G. (2021). Understanding digital transformation: A review and a research agenda. *Managing Digital Transformation*, 28(2), 118–144.
- Watts, S., & Henderson, J. C. (2006). Innovative IT climates: CIO perspectives. *The Journal of Strategic Information Systems*, 15(2), 125–151.
- Westerman, G., Bonnet, D., & McAfee, A. (2014, January 7). The nine elements of digital transformation. *MIT Sloan Management Review*. Available at <https://sloanreview.mit.edu/article/the-nine-elements-of-digital-transformation/>
- Zoppelletto, A., Orlandi, L. B., Zardini, A., Rossignoli, C., & Kraus, S. (2023). Organizational roles in the context of digital transformation: A micro-level perspective. *Journal of Business Research*, 157, Article 113563.