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Digital Leadership in Transformation: A Qualitative Study of Leadership Roles, Processes and Competencies in the Textile Industry

Süleyman AĞRAŞ[1], Fatma ÇETİNKAYA[2]

ABSTRACT

Digital transformation is profoundly reshaping leadership roles, organizational processes, and managerial competencies, particularly in traditionally labor-intensive industries such as textiles. While existing research largely emphasizes technological adoption and performance outcomes, limited attention has been paid to how leaders interpret, enact, and experience digital leadership within sector-specific contexts. Addressing this gap, the present study explores how digital leaders in the textile industry perceive digital transformation and how it influences leadership roles, processes and required competencies. Using a qualitative research design, semi-structured interviews were conducted with managers operating at different hierarchical levels within the textile sector. The data were analyzed through thematic content analysis, resulting in an integrated framework capturing the antecedents, leadership orientations and organizational outcomes of digital leadership. The findings reveal that digital transformation not only redefines leadership roles toward data-driven, adaptive and participative forms but also restructures leadership processes by accelerating decision-making, enabling remote and flexible work practices and intensifying leader–employee interaction. Furthermore, digital leadership competencies extend beyond technological proficiency to include digital literacy, openness to change, strategic vision and the ability to manage generational diversity and resistance to transformation. The study contributes to the digital leadership literature by offering a sector-specific, multidimensional understanding of leadership transformation in the context of Textile 4.0. From a managerial perspective, the findings highlight the critical role of human-centered digital leadership in leveraging digital technologies to enhance organizational agility, competitiveness and sustainability.

Keywords: Digital Leadership, Digital Transformation, Textile Industry, Qualitative Research.

JEL Classification Codes: M10, L67, O30

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INTRODUCTION

The discourse surrounding leadership has been ongoing for decades, with scholarly investigations commencing in the twentieth century (Yukl, 2018). Leadership, a subject of interdisciplinary interest, has been extensively studied from administrative, psychological, sociological, political, and military perspectives, and has been scrutinized through philosophical and historical lenses as well (Turan, 2020).

The literature offers numerous definitions of leadership, often portraying it as a trait, behaviour, or process tailored to specific contexts. For instance Hemphill and Coons (1957) define leadership as the behaviours exhibited by individuals directing group activities towards a common objective, while Bryman (1992) underscores the social influence process catalysed by such behaviours. Yukl (2018) characterizes leadership as an intentional process of influencing individuals to guide, structure, or facilitate group or organizational activities and relationships. According to Rauch and Behling (1984), a leader is an individual influencing an organized group's pursuits towards a shared goal.

The evolution of leadership theories can be categorized into five primary phases: Great Man Theories (pre-1950), Trait Theories (1910 to World War II), Behavioural Theories (World War II to the 1960s), Contingency Theories (1960-1980), and New Leadership Theories (1980-Present) (Lee & Chang, 2006). Leadership, being a complex phenomenon, extends beyond leader personality traits, thereby motivating continuous research over the years. Reviewing the literature reveals that numerous factors have shaped leadership paradigms across its historical trajectory (Acar, 2022). Derived from models and styles, leadership theories have evolved alongside shifts in

[1] Düzce University, Akçakoca Bey Faculty of Political Science, Department of Political Science and Public Administration, suleyman.agras@duzce.edu.tr

[2] Düzce University, Graduate School, Department of Total Quality Management, fatma.mesut.cetinkaya@gmail.com

these paradigms, reflecting changes in organizational contexts (Sajjadi et al., 2014).

Changing work dynamics are prompting organizations to explore novel leadership approaches. Digitalization and digital leadership have gained significant traction among researchers, driven by profound changes in the entrepreneurial landscape during the Industry 4.0 era (Bach & Sulíková, 2021). Digital transformation is pivotal in transitioning from traditional to technology-centric management styles, emphasizing the demand for leaders proficient in steering digital adaptation processes (Ercan Önbıçak & Akkoyun, 2022).

This study aims to examine digital leadership competencies and behaviours among managers in Türkiye's textile sector. The research evaluates managers' proficiency in digital leadership, their approaches to technological transformation and innovation, and key behavioral competencies such as communication, problem-solving, change management, and teamwork, crucial in digital leadership.

LITERATURE REVIEW

Digital leadership, often referred to as Leadership 4.0, denotes a contemporary leadership approach that enables organizations to navigate digital transformation by fostering agility, flexibility, and innovation (Teilen, 2023). It involves the strategic use of digital resources to achieve organizational goals (Wright & Ritter, 2015) and requires leaders to rapidly implement innovative ideas, sustain a culture of innovation, and effectively integrate information technologies with business architectures (Pratama & Kurniady, 2020). Digital leaders are further characterized as globally oriented, digitally literate, and capable of adapting to diverse generational and cultural contexts while proactively managing change (Mert, 2021).

The literature consistently emphasizes the role of digital leadership in managing complexity and uncertainty. Fathony and Hendarman (2023) define digital leadership as the ability to leverage digital technologies to enhance organizational performance, while Sheninger (2014) highlights visionary leadership, data-driven decision-making, and sustainable change as core attributes. Teilen (2023) conceptualizes digital leadership through three interrelated dimensions: work environment design, organizational design, and technology design, which together shape employee engagement, organizational agility and customer-oriented technological development.

From a historical perspective, digital leadership represents the latest stage in the evolution of managerial roles. Dworschak and Karapidis (2023) demonstrate how leadership has shifted from control- and efficiency-oriented management in the Industrial Revolution to empowerment, agility and flexibility in the Digital Age (see Table 1). This evolution underscores the growing importance of adaptability, innovation, and strategic vision as defining competencies of digital leaders.

Despite its increasing relevance, the literature on the specific competencies and behaviours associated with digital leadership remains limited (Özmen et al., 2020). Early studies identify vision creation, collaborative execution and technological competence as key attributes (Westerman et al., 2014). Subsequent research describes digital leaders as agile, disciplined and team-oriented innovators with strong awareness of technological trends and their organizational implications (Oberer & Erkollar, 2018; Porfirio et al., 2020). Promsri (2019) synthesizes these perspectives by identifying digital literacy, vision, customer focus, agility, risk-taking and collaboration as core characteristics.

Abbatiello et al. (2017) further argue that effective leadership in the digital era requires profound cognitive, behavioural and emotional transformation (see Table 2). According to Liu (2022) leaders must think differently by managing complexity and uncertainty, act differently by collaborating across boundaries and embracing experimentation and react differently by demonstrating

Table 1: The evolution of digital leadership (Dworschak & Karapidis, 2023:885)

Industrial Revolution	Information Age	Digital Age
Management	**Leadership**	**Digital Leadership**
Control Command Administration	Vision Delegation Coordination	Enablement Development Influence
Efficiency and Productivity	**Rationality and Knowledge Accumulation**	**Agility and Flexibility**

Table 2: Leadership skills in digital world (Abbatiello et al., 2017; Liu 2022).

Leaders need to think, act and react differently to make thair organizations succeed in the digital world		
Cognitive Transformation (Think Differently)	**Behavioral Transformation (Act Differently)**	**Emotional Transformation (React Differently)**
Conceptualizing opportunities in the virtual world	Adapting to constantly shifting power and influence	Tolerating environments characterized by risk and ambiguity
Handling ever-increasing cognitive complexity	Collaborating effectively across diverse teams	Demonstrating resilience in the face of continuous change
Thinking divergently about new ways of working	Valuing the contributions of new partners and diverse stakeholder groups	Challenging established ways of working with confidence
Making decisions despite incomplete information	Embracing experimentation through continuous learning ("try, fail, learn, and improve")	Leading organizational change with confidence

resilience and confidence in driving change. These dimensions highlight digital leadership as a multidimensional construct encompassing behavioural, cultural and environmental elements, each contributing to governance effectiveness, innovation capacity and organizational sustainability.

Empirical evidence supports the positive organizational outcomes of digital leadership. Fathony and Hendarman (2023) show that a strong digital culture enhances digital leadership effectiveness, while Karademir and Özgeldi (2022) report that digital leadership explains 34.4% of firm performance among ISO 500 industrial enterprises in Türkiye. Their findings also indicate that ERP (Entreprenual Resource Planning) and CRM (Customer Relationsship Management) systems are the most widely adopted digital tools, with Big Data and Cybersecurity emerging as prominent Industry 4.0 applications. Similarly, Asri and Darma (2020) emphasize technology management and the mobilization of digitally skilled employees, whereas Harbani and Judiarni (2021) underline the importance of knowledge sharing, change management, accountability and conflict resolution.

The COVID-19 pandemic has further intensified the significance of digital leadership within volatile, uncertain, complex, and ambiguous (VUCA) environments. Budianto et al. (2023) identify innovative vision, digital intelligence, agility, diversity advocacy, and employee-centricity as critical leadership attributes in the post-pandemic "New Normal." The rapid expansion of digital workplaces and remote working models has also highlighted the moderating role of digital leadership in enhancing organizational performance. Chatterjee et al. (2023) demonstrate that while IT capacity, innovation capability, and workplace policies drive digital transformation, employee performance and work–life balance mediate its success.

Digital Transformation and Digital Leadership in the Textile Industry

The textile industry, traditionally labour-intensive, is undergoing significant transformation driven by digitalization and the adoption of Textile 4.0, which applies Industry 4.0 technologies to textile manufacturing (Rüßmann et al., 2015). Textile 4.0 aims to increase flexibility, speed, precision and reliability across production systems by enabling digitally interconnected supply chains and real-time data exchange among machines, materials, logistics systems and human operators (Hermann et al., 2014). Achieving these benefits requires a clear digital vision, the development of digital competencies and robust IT infrastructures supported by innovation-oriented ecosystems.

Leading textile and fashion brands have increasingly adopted digital transformation strategies to enhance competitiveness. Technologies such as big data analytics, the Internet of Things (IoT), artificial intelligence (AI) and wearable devices have enabled faster decision-making, operational agility and improved market responsiveness (Yılmaz, 2022). Notable examples include Hugo Boss, which integrates IoT, digital imaging and AI to reduce error rates, and Adidas, which utilizes robotic automation through Sewbot technology for large-scale automated production. Advances such as 3D printing further expand design capabilities, highlighting the role of cyber-physical systems, autonomous robots and advanced software in improving efficiency and sustainability (Bıçakçı, 2019).

Empirical studies across different national contexts reinforce the transformative potential of digitalization in the textile sector. Chen et al. (2016) demonstrate that digital transformation enhances SME (Small and Medium Size Enterprises) performance in Taiwan's textile industry, while Küsters et al. (2017) address resistance to digitalization in Germany and propose the digital factory

model as a facilitating mechanism. Bertola and Teunissen (2018) further show that Industry 4.0 reshapes business models, processes, and organizational structures in fashion, with strong implications for sustainability and customer-centricity. Research from China emphasizes that digital dynamics, rather than technology adoption alone, drive transformation performance (Shen et al., 2022), whereas studies from Russia and other contexts highlight the growing importance of digital skills development, e-commerce platforms and educational transformation (Makovskaya et al., 2022; Akhtar et al., 2022; Sözüer & Buluş, 2023).

Despite the transformative potential of digitalization, the textile industry continues to face a set of persistent and interrelated challenges that constrain the effectiveness of digital transformation initiatives. One of the most salient human-centered challenges concerns intergenerational leadership and workforce dynamics. The increasing presence of digitally native younger generations alongside more experienced but digitally less fluent employees often leads to differences in work values, communication styles, and expectations regarding authority and autonomy. Prior research suggests that such generational heterogeneity can intensify workplace tensions unless leaders are capable of managing intergenerational collaboration and mitigating conflict through inclusive and adaptive leadership practices (Howe & Strauss, 2000; Cennamo & Gardner, 2008).

Beyond human dynamics, technological and infrastructural limitations remain a critical barrier, particularly in an industry characterized by capital-intensive production systems. Continuous technological advancement requires ongoing investments in digital infrastructure, automation and data systems. Inadequate or outdated technological infrastructure not only disrupts operational processes but also increases costs and reduces the scalability of digital initiatives, thereby limiting firms' ability to fully capitalize on digital transformation (Forbes, 2020). Another major constraint relates to digital skills and knowledge gaps at both individual and organizational levels. As digital technologies become increasingly complex, insufficient technological competence among employees and managers hinders effective adoption and utilization. A lack of digital literacy, analytical skills and technological awareness can slow transformation efforts and amplify resistance to change, particularly in traditionally labor-intensive sectors such as textiles (Gülbahar & Mete, 2019).

These challenges are closely linked to competitive capability constraints. Firms that struggle to integrate digital technologies into their strategic and operational processes face increasing difficulty in responding to rapidly evolving market conditions. Digital transformation has become a key determinant of competitive positioning; consequently, organizations that lag behind in digital adoption risk diminished market relevance and reduced competitiveness in both domestic and global markets (Desmet et al., 2015). In addition, firms encounter difficulties in capturing emerging digital opportunities, despite the availability of advanced technologies such as cloud computing, the Internet of Things (IoT), artificial intelligence, and big data analytics. While these technologies offer substantial potential for value creation, many organizations lack the strategic vision, managerial capability, or organizational readiness required to translate technological availability into sustainable business opportunities (IBM, 2024). Finally, data security and privacy risks constitute an increasingly salient challenge in digitally interconnected textile value chains. The extensive use of digital platforms and data-driven systems heightens exposure to cyber threats, data breaches and intellectual property risks. Without robust cybersecurity measures and governance mechanisms, the benefits of digitalization may be undermined by growing concerns regarding data confidentiality and trust (Kizza, 2019).

These challenges underscore that digital transformation in the textile industry is not solely a technological endeavor but a complex socio-technical process. Effectively addressing these barriers requires digitally competent leadership capable of integrating technological investments with human, organizational and strategic considerations. Despite the growing body of research on digital leadership and digitalization across industries, existing studies largely focus on general leadership competencies, technological adoption and organizational performance outcomes. Within the textile industry, research has predominantly examined technological transformation, operational efficiency and sustainability implications, while the role of digital leadership remains underexplored, particularly from a qualitative perspective. Moreover, limited attention has been paid to how digital leaders in the textile sector interpret their roles, develop digital competencies, and navigate sector-specific challenges such as generational differences, skill gaps and infrastructure constraints. Addressing this gap, the present study seeks to explore the following research question: How do digital leaders in the textile industry perceive and enact digital leadership in the context of digital transformation?

METHODOLOGY

Purpose of the Research

This study aims to explore the digital leadership competencies and behaviors exhibited by managers in the textile sector. The research specifically targets managers from companies ranked among the top 100 in Türkiye for textile import and export. To gather in-depth insights, interviews were conducted with senior executives from 15 of these leading companies.

Research Method

This study employed a qualitative research approach, specifically utilizing the grounded theory model. Grounded theory is particularly preferred in cases where an existing theoretical framework is insufficient to explain a specific phenomenon. This method provides researchers with the opportunity to conceptualize phenomena through participants' experiences and to develop an explanatory model (Timonen et al., 2018). This model was chosen because studies on leadership behaviours that promote digitalization and digital transformation in the textile industry are limited. The primary objective was to investigate the digital competencies and behaviours of managers within the textile sector. Data were collected through interviews, which were conducted both face-to-face and online. The interview method is widely used in qualitative research to obtain an in-depth understanding of specific subjects.

Interviews in qualitative research can be categorized as either structured or unstructured. Structured interviews involve the researcher posing a set of predetermined questions, with responses recorded in a consistent format, allowing for comparability across participants. Conversely, unstructured interviews offer greater flexibility, providing a broad framework for discussion and allowing participants to explore topics in more depth. This flexibility often results in richer, more nuanced data, as participants have the freedom to express their thoughts and experiences more openly.

Data Collection and Analysis Tools

This research aimed to investigate the digital leadership competencies and skills of managers in the textile sector using qualitative methods. Specifically, in-depth interviews were conducted with open-ended questions to gather comprehensive data on the subject. Interviews are employed to obtain detailed information and to understand the participants' emotions, thoughts, and experiences, thereby providing the researcher with nuanced insights into their subjective perspectives (Patton, 2002).

The interview protocol comprised two parts: the first section contained 12 questions aligned with the research objectives, while the second section included 4 questions designed to capture the demographic characteristics of the interviewees. After conducting the interviews, the responses to the 12 thematic questions were analysed. Prior to the interviews, the questions were shared with the managers to facilitate their preparation. A semi-structured interview approach was utilized, featuring a form with 12 questions divided into two sections.

The interviews lasted approximately between 45 minutes and one hour. Participants were contacted in advance, appointments were scheduled and the interview questions were shared prior to the meetings. This procedure enabled participants to familiarize themselves with concepts related to digital leadership roles and digital transformation terminology, thereby facilitating more comprehensive and reflective responses. However, the prior distribution of the questions may have encouraged participants to provide premeditated rather than spontaneous answers, which constitutes a potential limitation of the study. With participants' consent, all interviews were audio-recorded, and confidentiality was assured by informing participants beforehand that no personal information would be disclosed.

In the analysis phase, each manager was assigned a unique code to facilitate the clear identification of their perspectives. The interview responses were analysed thematically, with opinions categorized under defined themes and organized into tables. To emphasize key themes in the findings section, some participant responses were presented verbatim without modification. Despite this study was designed within the framework of grounded theory, the interview data were analysed using thematic analysis. This analytical approach was adopted to identify recurring patterns and meanings in leaders' narratives regarding the promotion of digitalization and digital transformation within the textile industry, while preserving the inductive and iterative nature of grounded theory.

FINDINGS

This section delineates the findings concerning the demographic profiles of the textile sector managers interviewed, alongside their perspectives on digital leadership competencies and behaviors. Detailed characteristics of the participants are presented in Table 3.

Table 3: Participants of interviews

Code	Position	Experience	Interview Mode	Duration
P1	Production Director	5 years	Face-to-face	60 min
P2	Senior Customer Representative	10 years	Online	60 min
P3	Deputy Manager of Quality Assurance and Customer Technical Services	9 years	Online	60 min
P4	Production Execution Systems Director	15 years	Online	45 min
P5	Garment Manager	17 years	Face-to-face	60 min
P6	Quality Assurance Manager	1 year	Online	60 min
P7	General Manager	25 years	Online	60 min
P8	Factory Manager	11 years	Online	60 min
P9	Factory Manager	12 years	Online	45 min
P10	Merchandising Manager	2 years	Face-to-face	60 min
P11	Chairman of the Board	30 years	Face-to-face	90 min
P12	R&D Engineer	3 years	Online	60 min
P13	Quality Assurance Manager	5 years	Online	60 min
P14	Factory Owner–Founder	2 years	Online	60 min
P15	Department Manager	8 years	Online	40 min

The research involved managers from fifteen distinct companies, representing a range of roles. Specifically, three participants were Quality Assurance Managers, two were Factory Managers and two held positions as Founders/Chairpersons of the Board. The remaining eight participants occupied various other managerial positions.

Effects of Digital Technology Use on Business Relationships

This section analyzes the effects of digital technology use on business relationships within the textile sector. The findings demonstrate that digital technologies primarily contribute to strengthened customer relationships, enhanced communication, increased efficiency, and improved data-driven coordination, while also introducing challenges related to competition pressure, reduced social interaction, and data security concerns. These relational dynamics reflect both enabling and constraining dimensions of digitalization in inter-organizational and intra-organizational contexts. The synthesized findings are presented in Table 4.

Some perspectives on this dimension are reflected in the following statements:

"The adoption of digital technologies has significantly reshaped business relationships in the textile sector by enhancing the speed and efficiency of communication with suppliers, customers, and global partners. Digital tools have also transformed data analysis and customer relationship management through big data analytics and CRM systems, enabling more personalized strategies and stronger customer loyalty. In production, automation and robotic systems have improved speed, quality, and cost efficiency, while VR and AR technologies have accelerated product design and prototyping processes. Moreover, digital technologies support sustainability and traceability initiatives, with blockchain increasing transparency across the supply chain." (P12)

Changes in Leadership through Digitalization

This section examines how the widespread adoption of digital technologies has reshaped leadership concepts and leadership processes in the textile sector. The findings indicate a clear shift toward digitally savvy leadership

Table 4: Effects of digital technologies on business relationships

Impact Direction	Effect Category	Key Effects	Frequency Range
Positive	Strong Impact	Strengthened customer relationships; Facilitated communication; Increased efficiency	7–8
Positive	Moderate Impact	Easier data analysis; Production management; Competitive advantage	5–6
Positive	Limited Impact	New business models; Remote working; Transparency; Reduced bureaucracy	1–3
Negative	Limited Impact	Falling behind in competition; Reduced socialization; Data security; Digital fatigue	1–2

Table 5: Changes in leadership through digitalization

Impact Direction	Leadership Dimension	Key Changes	Frequency Range
Positive	Strong Impact	Digital-savvy leaders taking the lead; Faster business processes	8
Positive	Moderate Impact	Leaders motivating employees toward technology; Emergence of virtual leadership; Increased efficiency; Remote management and work opportunities; Enhanced employee–leader interaction	3–4
Positive	Limited Impact	Increased automation; Reduced hierarchy and increased accountability; Creation of new business models; More transparent working environment; Changes in traditional leadership approach; Reframing the value of long working hours	1–2

profiles, the emergence of virtual leadership practices, and significant transformations in decision-making, communication, efficiency, and process speed. These changes reflect a broader reconfiguration of leadership roles and organizational dynamics under digitalization. The key patterns identified in managers' accounts are synthesized and summarized in Table 5.

Some perspectives on this dimension are reflected in the following statements:

"Digitalization has increased accountability and transparency while strengthening data-driven decision-making. Leadership has increasingly shifted toward digital and virtual forms, intensifying employee–leader interaction and fostering innovation. These changes have enhanced employee engagement and organizational loyalty, alongside increased automation and reduced hierarchical structures." (P4)

"The widespread use of digital technologies has transformed leadership concepts and processes by enabling data-driven decision-making and more efficient communication through digital platforms. Digital leadership supports remote team management and flexible working models, while also facilitating innovation, organizational growth, and competitive advantage." (P7)

"Digitalization has reshaped leadership by shifting leaders from command-oriented roles toward motivating and persuasive approaches. Easier access to data has strengthened analytical decision-making, while remote management practices have expanded through digital technologies. Leadership approaches that integrate innovation have consequently gained importance." (P11)

Key Characteristics of Successful Leaders in the Digital Economy

This section explores the key characteristics and competencies that define successful leadership in the textile sector under conditions of digitalization. The findings highlight that effective leaders are distinguished by digital literacy, openness to innovation, strategic awareness, collaborative orientation, and sustainability consciousness, alongside strong decision-making and managerial capabilities. These competencies collectively reflect the evolving demands placed on leaders operating within a digitally transforming industry. The integrated patterns emerging from managers' accounts are presented in Table 6.

Some perspectives on this dimension are reflected in the following statements:

"In a digitalizing economy, leaders in the textile sector must effectively leverage digital technologies to sustain competitiveness and develop innovative solutions. Given the global nature of the industry, leaders are required to understand international markets and manage global business relationships, while ensuring efficient production and optimized logistics processes. As digitalization continuously reshapes the sector, flexibility, adaptability, strong communication, and teamwork skills have become essential. Moreover, successful leadership increasingly involves integrating sustainability into business practices, addressing both environmental and social concerns." (P7)

Impacts of Digital Transformation on Leadership Roles

This section addresses how digital transformation is unfolding in the textile sector and how this process is reshaping leadership roles and managerial responsibilities. The findings suggest that digital transformation extends beyond technological adoption to influence production systems, efficiency, data-driven decision-making, competitiveness, and leadership mindsets. At the individual level, leaders are increasingly required to demonstrate openness to change, adaptability, and engagement with advanced digital technologies, while actively guiding transformation processes within their organizations. The key dimensions of these sectoral and individual-level impacts are synthesized in Table 7.

Table 6: Intensity-based key characteristics of successful leaders in the digital economy

Impact Direction	Competency Dimension	Key Characteristics	Frequency Range
Positive	Strong Impact	Innovative and open to change; High level of digital literacy	11
Positive	Moderate Impact	Inclined towards teamwork; Closely monitoring the industry and market; Strong awareness of sustainability	6–9
Positive	Limited Impact	Strong management and persuasion skills; Strong decision-making abilities; Ability to identify risks and opportunities; Strategic decision-making; Customer-focused orientation; Enhancing competitive strength	1–5

Table 7: Intensity of digital transformation impacts on leadership roles

Impact Direction	Impact Dimension	Key Impacts Identified	Frequency Range
Positive	Strong Impact	Digital transformation spanning production; Open-minded leaders driving digital change; Leaders making data-driven decisions	6
Positive	Moderate Impact	Increasing efficiency and productivity; Strengthening customer relations; Adaptive leaders reaching new markets; AI transformation processes	3–5
Positive	Limited Impact	Waste management implementation; Cost reduction; Digitalization of product design; Increased transparency; Leaders participating in AI transformation; Boosting competitiveness; Increased teamwork; Risk-taking by leaders	1–2

Some perspectives on this dimension are reflected in the following statements:

"Digital transformation has initiated rapid changes across all fundamental aspects of the textile industry, including production, design, sales, and marketing. This transformation offers numerous benefits, such as enhanced efficiency, cost reduction, new product development, market discovery, and increased customer satisfaction. It is also influencing leadership. Factors such as investing in digital competencies to navigate the digital landscape and leveraging digitalization in analytical and decision-making processes are driving shifts in the demands placed on leaders." (P13)

Opportunities and Challenges of Digital Transformation for Leaders

This section focuses on the opportunities and challenges associated with digital transformation from the perspective of managers and leaders in the textile industry. The findings indicate that while digital transformation creates significant opportunities in terms of efficiency, data utilization, customer relationship management, and sustainability, it simultaneously poses substantial challenges related to investment costs, resistance to change, digital skill gaps, and security concerns. These dual dynamics, reflecting both enabling and constraining forces of digitalization, are systematically summarized in Table 8.

Table 8: Intensity of opportunities and challenges of digital transformation for leaders

Impact Direction	Impact Dimension	Key Opportunities / Challenges	Frequency Range
Positive	Strong Impact	Increased efficiency	11
Positive	Moderate Impact	Data analysis capabilities; Strengthening customer relationships; New product development; Sustainability; Faster decision-making; Cost reduction	4–7
Positive	Limited Impact	Traceability; Competitive advantage; Access to new markets; Quality improvement; Adaptation of older managers; Increased collaboration	1–3
Negative	Strong Impact	Resistance to digital transformation; High investment costs	9
Negative	Moderate Impact	Security issues; Lack of digital skills	6–7
Negative	Limited Impact	Workforce reduction; Difficulty in finding qualified personnel; Competition pressure; Strained customer relations due to machine interaction	1–3

Some perspectives on this dimension are reflected in the following statements:

"In production-oriented textile businesses, digital transformation primarily creates efficiency gains in production processes, alongside opportunities related to sustainability and traceability. However, high investment costs—particularly for robotics and autonomous systems—remain the most critical constraint, limiting the full realization of efficiency gains." (P4)

"Digital transformation in the textile industry offers managers opportunities such as innovative design, digitalized and optimized processes, data-driven trend forecasting, and enhanced customer relationships. At the same time, challenges persist in the form of resistance to change, inadequate technological infrastructure, data security concerns, and the high costs of digital transformation." (P7)

"While digital transformation provides managers with opportunities including efficiency gains, cost reductions, new product development, improved customer relationships, and data-driven decision-making, it also introduces challenges related to investment costs, skill gaps, resistance to change, data security concerns, and intensified competition." (P11)

Leadership Differentiation toward Subordinates through Digital Technology

This section explores how leadership practices are reshaped in geographically dispersed and digitally mediated work contexts, particularly in multinational settings where leaders manage subordinates without face-to-face interaction. The findings highlight how digital technologies transform communication patterns, trust-building processes, flexibility, empathy, and supervisory mechanisms, leading to leadership practices that differ markedly from traditional, co-located models. The key themes emerging from managers' cross-border leadership experiences are systematically presented in Table 9.

Some perspectives on this dimension are reflected in the following statements:

"In the textile industry, remote access programs serve as a pertinent example. These programs enable efficient collaboration with both customers and employees at any time. Furthermore, digital work tracking systems allow for effective monitoring of all employees, even in the absence of physical presence." (P4)

"With the increased use of digital technologies, leadership–subordinate interactions have increasingly shifted to digital channels, requiring leaders to adapt their leadership strategies. While digital communication enhances continuity and productivity, it also intensifies monitoring and control, thereby increasing the need for leaders to actively foster trust and confidence among subordinates." (P13)

Changes in Work Practices and Required Digital Competencies in Management

This dimension examines the changes in managerial employment and work practices associated with the adoption of digital technologies, with particular attention to remote and flexible working arrangements and the digital competencies increasingly sought in managerial roles. The findings indicate a reconfiguration of managerial work toward greater spatial and temporal flexibility, alongside heightened expectations regarding data analytics, technological proficiency, digital security awareness, and virtual leadership capabilities. The themes derived from managers' accounts are systematically summarized in Table 10.

Some perspectives on this dimension are reflected in the following statements:

"Although the transition to remote work initially posed challenges in the textile industry, it has become widespread—particularly after the pandemic—especially in support functions. Remote work has increasingly turned into a necessity, driven by the expectations of younger generations. Consequently, managers now differentiate

Table 9: Leadership differentiation toward subordinates through digital technology

Impact Direction	Impact Dimension	Key Differentiation Areas	Frequency Range
Positive	Strong Impact	Differences from traditional communication	8
Positive	Moderate Impact	Flexibility; Trust-related issues; Time efficiency	4–5
Positive	Limited Impact	Empathy; Accessibility; Increased collaboration; Motivation and job satisfaction; Cost advantage; Increased supervision; Tolerance	1–3

between remote and office-based tasks in work planning, while the use of digital tools and competencies (e.g., online meetings, remote presentations, and digital platforms) has become integral to daily managerial practices." (P4)

"The digital transformation of work practices has led to substantial changes in managerial employment. Observations regarding the digital skills required in managerial roles include: the ability to adapt to remote and flexible working conditions, proficient use of digital communication tools, a collaborative mindset, the capability to accurately interpret available data and make informed decisions, awareness of digital security, the ability to manage digital transformation effectively, and the capacity to adapt the organization to these changes." (P6)

Impacts of Digital Technologies on Work Behaviours and Firms

This dimension explores how digital technologies have reshaped the work behaviours of both managers and employees, as well as the organizational implications of these behavioural changes within textile firms. Drawing on managers' experiential accounts, the analysis reveals shifts toward greater flexibility, data-driven practices, strategic decision-making, and innovation, alongside firm-level outcomes such as faster communication, efficiency gains, and cost reduction. The key themes and patterns emerging from these accounts are systematically presented in Table 11.

Some perspectives on this dimension are reflected in the following statements:

"The widespread use of digital technologies has reshaped the work behaviours of both managers and employees. Managers increasingly rely on data-driven and agile practices, enhanced collaboration, frequent communication, and remote working, while employees experience greater responsibility, autonomy, adaptability, and improved digital skills. These changes contribute to higher efficiency, faster decision-making, cost reductions, and increased employee and customer satisfaction." (P4)

"Digital technologies enable more efficient management of business processes by supporting data-driven and strategic decision-making through tools such as analytics and artificial intelligence. They also enhance communication and collaboration for managers, while providing employees with improved task performance, remote work opportunities, and greater access to learning and development." (P7)

Changes in Leadership Processes with Digitally Skilled Employees

This section examines how the increasing presence of digitally skilled employees, particularly those from Generations Y and Z, reshapes leadership processes and leader–subordinate interactions within textile firms. Based on managers' accounts, the findings highlight emerging expectations regarding flexibility, communication frequency, participative leadership, and transparency, as well as tensions related to workload and time constraints in leadership development. The key themes derived from these experiences are summarized in Table 12.

Some perspectives on this dimension are reflected in the following statements:

"The widespread use of digital technologies and the increasing presence of Generations Y and Z have transformed leadership processes by shifting expectations away from authoritarian and hierarchical styles toward more participative and collaborative approaches. These generations value frequent and transparent communication, autonomy, responsibility, and empowerment. They also expect flexible working arrangements and remote work opportunities, which support work–life balance and enhance motivation." (P4)

Table 10: Intensity of changes in work practices and required digital competencies

Impact Direction	Impact Dimension	Key Changes / Competencies Identified	Frequency Range
Positive	Strong Impact	Data analysis skills; Technological proficiency	9
Positive	Moderate Impact	Knowledge of digital security; Virtual leadership; Remote work practices	6–7
Positive	Limited Impact	Adaptability to flexible and remote working; Flexible working arrangements; Digital marketing capability; Teamwork compatibility; Managing operations without travel restrictions; Ability to motivate employees; Following innovations; Effective use of AI and social media; Faster communication through digitalization; Partial suitability for remote work	1–4

Table 11: Intensity of digital technology ımpacts on work behaviours and firms

Impact Direction	Impact Dimension	Key Impacts Identified	Frequency Range
Positive	Strong Impact	Flexibility in work behaviours; Faster communication and decision-making in firms	8–9
Positive	Moderate Impact	Use of data analytics; Increased efficiency; Remote work practices	5–6
Positive	Limited Impact	Ease and convenience; Strategic decision-making; Innovation; Use of AI; Learning and development; Cost reduction; Strengthening customer relations; Competitive advantage; Teamwork; Ease in performance evaluation	1–3
Negative	Limited Impact	Increased susceptibility to manipulation	1

"Generations Y and Z expect rapid feedback and continuous communication, requiring leaders to establish effective digital communication channels. Work–life balance, flexible and remote working, and opportunities for continuous learning and career development are central to their motivation and organizational commitment. In addition, these generations place strong importance on social responsibility and sustainability, encouraging leaders to integrate these values into organizational practices." (P12)

Impacts of Digital Technologies on Task- and Person-Oriented Leadership

Drawing on thematic analysis of managerial interviews, this section examines the perceived influence of digital technologies on task- and person-oriented leadership behaviours. The analysis reveals that digitalization affects not only how tasks are managed but also how leaders relate to their subordinates. The synthesized themes and illustrative frequencies are presented in Table 13 to enhance analytical transparency.

Some perspectives on this dimension are reflected in the following statements:

"Despite the adoption of digital technologies, firms largely remain focused on business objectives rather than people. Truly people-oriented companies are rare, and investments in employees are limited; leadership continues to be predominantly results-driven." (P10)

"The integration of digital technologies has influenced leadership behaviours in business relationships by shaping both task-oriented and person-oriented approaches. Digital tools facilitate communication, enable closer interaction with subordinates, and enhance the efficiency of business processes." (P11)

"With the adoption of digital technologies, business relationships in our company have become more person-oriented. Increased communication and interaction through digital tools have fostered empathy between managers and employees and supported a more flexible working style." (P13)

Drivers of Task and Person-Oriented Leadership Behaviours

Drawing on the thematic analysis of in-depth interviews with textile sector managers, this section explores the personal and industry-related factors that shape whether digitally competent managers adopt task-oriented or person-oriented leadership behaviours. The analysis indicates that leadership orientation is influenced by a combination of individual-level drivers (such as values, experience, and openness to learning) and sector-specific dynamics (including customer relationships, competitiveness, and efficiency pressures).

Table 12: Intensity of changes in leadership processes with digitally skilled employees

Impact Direction	Impact Dimension	Key Changes Identified	Frequency Range
Positive	Strong Impact	Increased demand for flexible and remote work	9
Positive	Moderate Impact	Expectations for more frequent and regular communication; Preference for participative leadership styles	4–6
Positive	Limited Impact	Expectation of transparent communication; Desire to take responsibility; Preference for democratic leadership; Rapid adaptation to the environment; Valuing career development; Remote work practices	1–3
Negative	Limited Impact	Loss of team synergy; Problems arising from excessive workload; Time constraints for digitally skilled generations to become leaders	1

The synthesized themes and their empirical grounding are systematically presented in Table 14.

Some perspectives on this dimension are reflected in the following statements:

"There are numerous personal and sectoral factors influencing the task-oriented or person-oriented behaviours of textile sector managers with digital competencies. Personal factors can be categorized into four main areas: values, motivation, and experience, while sectoral factors encompass industry competition and customer demands." (P4)

"Textile sector managers with digital competencies adopt task-oriented or person-oriented behaviours in response to sectoral changes, competitive pressures, and evolving customer expectations. By leveraging their digital skills, these managers adapt to technological developments, sustain competitiveness, and align leadership approaches with market demands." (P7)

DISCUSSION

This study provides an in-depth qualitative examination of how digital leaders in the textile industry perceive and enact leadership amid digital transformation. By integrating multiple thematic findings, the results offer a comprehensive picture of digital leadership as a multidimensional and context-dependent phenomenon shaped by technological, organizational, and human factors. Overall, the findings corroborate and extend the existing digital leadership literature by illustrating how leadership behaviours, competencies, and processes evolve in response to sector-specific digitalization dynamics.

Consistent with prior research, the findings demonstrate that digital transformation acts as a primary catalyst reshaping leadership concepts and processes. Participants emphasized that digitally savvy leaders increasingly take the lead, while traditional leadership approaches give way to more agile, technology-oriented, and flexible practices. This shift aligns closely with Dworschak and Karapidis' (2023) depiction of leadership evolution from control-based management toward empowerment, agility, and flexibility in the Digital Age. Similarly, the emergence of virtual leadership and remote management practices in this study reflects the growing importance of flexibility and adaptability highlighted by Teilen (2023) and Budianto et al. (2023), particularly in post-pandemic VUCA environments.

The findings further support Sheninger's (2014) and Fathony and Hendarman's (2023) emphasis on data-driven decision-making and efficiency as core attributes of digital leadership. Faster business processes, increased automation, and enhanced transparency observed in this study illustrate how digital technologies reshape leadership processes by accelerating decision-making and reducing hierarchical constraints. These results extend existing literature by showing that, in the textile sector, such changes are not merely technological but deeply embedded in day-to-day leadership practices.

Another key contribution of this study lies in its detailed examination of how digital technologies affect business relationships. Consistent with prior studies emphasizing customer-centric digital leadership (Westerman et al., 2014; Promsri, 2019), the findings indicate that digitalization strengthens customer relationships, facilitates communication, and enhances supply chain and production management. The increased use of data analytics and digital tools enables leaders to respond more rapidly to market demands, supporting the competitive advantage highlighted by Karademir and Özgeldi (2022) and Yılmaz (2022). At the same time, the study confirms the ambivalent nature of digital transformation. Negative effects such as data security concerns, digital fatigue, and the risk of falling behind in competition echo challenges identified in the literature on Textile 4.0 (Kizza, 2019; Forbes, 2020). These findings

Table 13: Intensity of the impact of digital technologies on task and person-oriented leadership

Impact Direction	Leadership Orientation	Key Changes Identified	Frequency Range
Positive	Person-oriented	Enhanced effective communication; Increased training and development opportunities	4–6
Positive	Task-oriented	Increased efficiency; Improved performance evaluation; Easier task tracking; Use of data analysis and analytical approaches	1–2
Positive	Both task- and person-oriented	Evolution toward a balanced focus on tasks and people	4
Neutral / Limited	Person- or task-oriented	Perception that leadership orientation is not directly influenced by digitalization	1
Integrative	Task–person balance	Leaders consciously balance task requirements and people-oriented considerations	1

Table 14: Drivers of task- and person-oriented leadership behaviours

Driver Category	Driver Type	Key Drivers Identified	Frequency Range
Personal Drivers	Values and experience	Values; Professional experience	4
	Learning and development orientation	Openness to learning; Personal development	2
	Leadership orientation	Need for people-oriented management	2
	Innovation and entrepreneurship	Innovation; Entrepreneurial orientation	1–2
	Cognitive and communication skills	Quick decision-making; Analytical thinking; Effective communication	1
Industrial Drivers	Market and customer dynamics	Strong customer relationships	8
	Competitive pressures	Competitive advantage	6
	Operational efficiency	Increasing efficiency	5
	Sectoral transformation	Sectoral changes and trends	3
	Sustainability and cost concerns	Sustainability; Adaptation; Cost reduction	1

reinforce the argument that digital leadership must balance technological opportunities with human and organizational risks, a point also stressed by Abbatiello et al. (2017) in their discussion of emotional and behavioural transformation.

The findings regarding key leadership competencies strongly align with existing conceptualizations of digital leadership. Innovation, openness to change, digital literacy, teamwork orientation, and strategic awareness emerged as dominant characteristics of successful leaders. These competencies mirror those identified by Oberer and Erkollar (2018), Porfirio et al. (2020), and Promsri (2019), confirming that digital literacy and adaptability are no longer optional but central to leadership effectiveness.

Notably, sustainability awareness and market monitoring were also emphasized by participants, reflecting the textile industry's increasing focus on sustainable production and competitive positioning. This observation extends prior research by illustrating how digital leadership in the textile sector integrates technological competence with sustainability-driven strategic thinking, as suggested by Bertola and Teunissen (2018) and Shen et al. (2022).

One of the study's most significant contributions lies in its nuanced analysis of task-oriented and person-oriented leadership behaviours under digital transformation. The findings indicate that digital technologies predominantly reinforce person-oriented leadership behaviours—such as effective communication, employee development, flexibility, and empathy—while also enhancing task-oriented functions like efficiency, performance monitoring, and data analysis. This dual impact supports the notion of balanced or ambidextrous leadership, where leaders dynamically integrate task and people orientations depending on situational demands. This result resonates with Abbatiello et al.'s (2017) framework of cognitive, behavioural, and emotional transformation, suggesting that digital leaders must simultaneously manage performance expectations and human relationships. The findings also complement Chatterjee et al. (2023), who emphasize the mediating role of employee-related factors in digital transformation outcomes. In the textile industry, where labour-intensive processes coexist with advanced technologies, such balance appears particularly critical.

The presence of digitally skilled employees emerged as another important driver reshaping leadership processes. Participants reported increased expectations for flexible and remote work, participative leadership styles, frequent communication, and transparency. These findings align with literature on generational differences and digital-native workforces (Howe & Strauss, 2000; Cennamo & Gardner, 2008), highlighting how leadership increasingly becomes a reciprocal and interactive process rather than a top-down function. However, the study also reveals potential tensions, such as excessive workload, time constraints, and loss of team synergy, indicating that digital leadership must carefully manage the unintended consequences of flexibility and constant connectivity. This insight extends existing research by showing how digital leadership challenges unfold at the micro-level of daily leadership practices.

Consistent with prior studies, the findings confirm that digital transformation offers substantial opportunities for leaders, including efficiency gains, enhanced data

analysis, sustainability improvements and access to new markets (Asri & Darma, 2020; Harbani & Judiarni, 2021). At the same time, resistance to change, high investment costs, lack of digital skills, and security issues remain significant barriers, particularly in the textile sector. Importantly, the findings suggest that leaders' personal values, experience, and openness to learning interact with industrial pressures—such as customer expectations and competitive dynamics—to shape leadership orientation. This interaction underscores digital leadership as a socially constructed and context-sensitive phenomenon rather than a fixed set of competencies.

CONCLUSION

This study set out to explore how leaders in the textile industry perceive and enact digital leadership within the context of digital transformation. Drawing on rich qualitative evidence, the findings reveal that digital leadership in the textile sector is not limited to technological adoption but represents a profound transformation in leadership orientations, competencies, and relational practices. Digital technologies act as both enablers and stressors, reshaping leadership processes, business relationships and work practices while simultaneously generating new expectations among employees and stakeholders.

The results demonstrate that effective digital leadership in the textile industry is characterized by a balanced integration of task-oriented and person-oriented behaviours, supported by strong digital literacy, adaptability, and relational competence. Moreover, leadership practices are increasingly shaped by digitally skilled employees, remote and flexible work arrangements, and sector-specific pressures related to competitiveness, sustainability and customer-centricity. By addressing these dynamics holistically, the study contributes to a deeper understanding of digital leadership as a context-dependent and socially embedded phenomenon.

Theoretical Contributions

This study makes several important contributions to the digital leadership literature. First, it advances existing conceptualizations of digital leadership by empirically demonstrating that leadership in digitally transforming contexts is best understood as a dynamic and balanced orientation rather than a unidimensional leadership style. By showing how leaders simultaneously enact task-oriented and person-oriented behaviours, the findings extend prior models that emphasize either technological competence or transformational attributes, thereby contributing to emerging discussions on ambidextrous and hybrid leadership in digital environments.

Second, the study enriches the literature by contextualizing digital leadership within the textile industry, a sector that has been largely examined from technological and operational perspectives. By foregrounding leaders' lived experiences and interpretations, the findings respond to calls for more qualitative and sector-specific research (Özmen et al., 2020) and demonstrate how digital leadership is shaped by industry characteristics such as labour intensity, sustainability pressures and global competition. Third, the research contributes to theory by highlighting the reciprocal influence between digitally skilled employees and leadership processes. Unlike traditional top-down leadership models, the findings illustrate how employee expectations for flexibility, participation and transparency actively reshape leadership behaviours. This insight extends digital leadership theory by positioning leadership as a co-constructed process influenced by generational dynamics and digital work practices.

Finally, by integrating antecedents, leadership orientations, and outcomes into a coherent analytical framework (see figure 1), the study offers a process-oriented view of digital leadership. This perspective bridges cognitive, behavioural, and emotional dimensions of leadership transformation (Abbatiello et al., 2017) and provides a theoretically grounded explanation of how digital leadership contributes to organizational adaptability and resilience.

Managerial Implications

The findings of this study offer several practical implications for leaders and organizations operating in the textile industry. First, organizations should recognize that successful digital transformation requires leadership development alongside technological investment. Training programs should focus not only on digital skills such as data analytics and cybersecurity but also on communication, empathy and change management to support person-oriented leadership behaviours.

Second, leaders should adopt a balanced leadership approach that integrates efficiency-driven, task-oriented practices with employee-centered, relational strategies. As digital technologies increase monitoring and performance measurement capabilities, maintaining trust, motivation and psychological safety becomes critical for sustaining employee engagement and

productivity. Third, the growing presence of digitally skilled employees calls for more participative and flexible leadership practices. Leaders should proactively design work arrangements that accommodate remote and flexible work while establishing clear communication routines to prevent overload, fragmentation, and loss of team cohesion. Fourth, given the identified challenges related to resistance, investment costs, and digital skill gaps, organizations should foster a digital learning culture that encourages continuous development and experimentation. Leaders play a key role in legitimizing learning from failure and aligning digital initiatives with long-term strategic goals.

Finally, in a sector increasingly shaped by sustainability and customer-centricity, digital leaders should leverage digital technologies to enhance transparency, traceability and responsiveness across the value chain. By doing so, leaders can not only improve operational performance but also strengthen competitive positioning and organizational legitimacy in global markets.

Limitations and Future Research Directions

Despite providing valuable qualitative insights, this study is subject to certain limitations. First, the research is based on a qualitative design with a relatively limited sample size, which restricts the generalizability of the findings. Future studies could employ mixed-method or quantitative approaches to test the relationships identified here on a larger scale and across different organizational contexts. Second, the data were collected from a single sector (textile industry), which has its own structural and cultural characteristics. To enhance external validity, future research could compare findings across different industries such as automotive, finance, or technology, where digital transformation dynamics may vary considerably.

Third, as the study focuses on managerial own perspectives from 15 companies, it does not fully capture employees' or customers' experiences of digital transformation. Further research could integrate multi-stakeholder perspectives, including subordinates and clients, to provide a more holistic understanding of digital leadership processes. Fourth, the findings represent a specific temporal context—a period when digital transformation was rapidly intensifying. Longitudinal studies could examine how digital leadership competencies evolve over time as technological innovations and organizational cultures mature. Fifth the research sample comprised fifteen managers from leading textile firms, which may restrict the generalizability of the findings to the broader industry. Furthermore, the data were derived from self-declaration information, which may introduce bias due to participants' subjective perceptions and interpretations. Nevertheless, the self-declaration obtained in this study offered robust indications that the participating managers possess the leadership roles, competencies, and behaviours necessary to successfully implement and sustain digital transformation within their organizations.

Additionally, future studies should explore how generational differences influence the adoption of digital leadership styles and expectations from managers. Investigating how artificial intelligence, automation, and data analytics tools reshape leadership decision-making could also offer valuable insights. Finally, while this study emphasizes both task-oriented and people-oriented leadership behaviours, future research could develop conceptual or empirical models that quantitatively assess how these behaviours interact in digital work environments. Examining the mediating roles of employee motivation, digital literacy, and organizational culture would further strengthen theoretical contributions to digital leadership research.

REFERENCES

Abbatiello, A., Knight, M., Philpot, S. & Roy, I. (2017). Rewriting the rules for the digital age: 2017 deloitte global human capital trends, United Kingdom: Deloitte University Press.

Acar, A.K. (2022). Geçmişten günümüze yönetsel metinlerde liderlik: Orhun Yazıtları, Siyasetname ve Nutuk'un eğitsel liderlik bağlamında değerlendirilmesi, Master's Thesis, Institute of Educational Sciences, Bursa Uludağ University, Bursa, Türkiye.

Akhtar, W. H., Watanabe, C., Tou, Y. & Neittaanmäki, P. (2022). A new perspective on the textile and apparel ındustry in the digital transformation era, Textiles, 2(4), 633-656.

Asri, A. A. S. M. A. N. & Darma, G. S. (2020). Revealing the digital leadership spurs in 4.0 Industrial Revolution, International Journal of Business, Economics & Management, 3(1), 93-100.

Bach, C. & Sulíková, R. (2021). Leadership in the context of a new world: Digital leadership and İndustry 4.0., Managing Global Transitions, 19 (3): 209–226.

Bertola, P. &Teunissen, J. (2018). Fashion 4.0. ınnovating fashion industry through digital transformation, Research Journal of Textile and Apparel. 22 (4), 352-369.

Bıçakçı, S. (2019). Tekstil sektöründe dijital dönüşüm ve yeni nesil ürünler, https://www.sanayinindijitaldonusumu.com/tekstil-sektorunde-dijital-donusum-ve-yeni-nesil-urunler/ (Access Date: 24.01.2023)

Bryman, A. (1992). Charisma and leadership in organizations, London: Sage Publications,

Budianto, S., Salim, U., Moko, W. & Khusniyah, N. (2023). Developing model of digital leadership for the new normal, W. R. Murhadi et al. (Eds.): Proceedings of the 19th International Symposium on Management, 321–330. DOI: https://doi.org/10.2991/978-94-6463-008-4_42.

Cennamo, K., & Gardner, H. (2008). Bridging the gap: How Technology support pedagogical ınnovation, Educational Psychology, 66 (3), 401-424.

Chatterjee, S., Chaudhuri, R., Vrontis, D. & Giovando, G. (2023). Digital workplace and organization performance: Moderating role of digital leadership capability, Journal of Innovation & Knowledge, 8, 1-10.

Chen, Y.Y.K., Jaw, Y.L. & Wu, B.-L. (2016), Effect of digital transformation on organisational performance of SMEs: Evidence from the Taiwanese textile industry's Web Portal, Internet Research, 26 (1), 186-212.

Desmet, D., Duncan, E., Scanlan, J., & Singer, M. (2015). Six building blocks for creating a high-performing digital enterprise. McKinsey & Company.

Dworschak, B. & Karapidis, A. (2023). Digitalisation and its impact on leadership competences in production work, 4th Conference on Production Systems and Logistics, 28.02.2023-2.03.2023, Santiago de Querétaro, Mexico, DOI: https://doi.org/10.15488/13507 ISSN: 2701-6277.

Ercan Önbıçak, A. & Akkoyun, B. (2022). Dijital liderlik çalışmalarının yönetim bilimleri kapsamında incelenmesi: Nitel bir araştırma, Malatya Turgut Özal Üniversitesi İşletme ve Yönetim Bilimleri Dergisi, 3 (2), 128-137.

Fathony, H. A. & Hendarman, A. F. (2023). The relationship between digital leadership and digital culture towards human capital readiness in the Industry 4.0 era: A case study of talent in financial state-owned enterprise, American International Journal of Business Management (AIJBM), 6 (7), 123-135.

Forbes (2020). Digital transformation challenges what is your strategy, https://www.forbes.com/sites/forbestechcouncil/2020/01/10/digital-transformation-challenges-what-is-your-strategy/?sh=283ce9dc6b10 (Access Date: 05.05.2024).

Gülbahar, Y. & Mete, S. (2019). Dijital Okuryazarlık: Kavramsal değerlendirme ve ölçme araçları, Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, 34 (1), 179-204.

Harbani, M. N. & Judiarni, J. A. (2021). Digital Leadership in facing challenges in the era Industrial Revolution 4.0, Webology: Special Issue on Current Trends in Management and Information Technology, 18, 975-990.

Hemphill, J. K., & Coons, A. E. (1957). Development of the leader behavior description questionnaire. In R. M. Stogdill & A. E. Coons (Eds.), Leader Behavior: Its Description and Measurement (pp. 120-133). Columbus, OH: The Ohio State University.

Hermann, M., Pentek, T., & Otto, B. (2016). Design principles for Industrie 4.0 scenarios. In T. X. Bui & R. H. Sprague Jr. (Eds.), Proceedings of the 49th Hawaii International Conference on System Sciences (HICSS),3928–3937). https://doi.org/10.1109/HICSS.2016.488

Howe, N. & Strauss, W. (2000). Millennials rising: The next great generation, New York, NY: Vintage Books.

IBM, (2024). Major, technologies made possible by predictive analytics https://www.ibm.com/tr-tr/topics/major-technologies-made-possible-by-predictive-analytics"Our Services" (Access Date: 15.02.2024).

Karademir, İ. & Özgeldi, M. (2022). Endüstri 4.0'ın firma performansına etkisinde dijital liderliğin rolü, İşletme Araştırmaları Dergisi, 14 (4), 2848-2866.

Kizza, J. M. (2019). Computer network security and cyber ethics, McFarland.

Küsters, D., Praß, N. & Gloy, Y. S. (2017). Textile learning factory 4.0–preparing Germany's textile industry for the digital future, Procedia Manufacturing, 9, 214-221.

Lee, Y. & Chang, Y. (2006). A Study on the characters of leader and followers of charismatic leadership the example of employees at a port authority, The Business Review, Cambridge, 5(1), 295–300.

Liu, Y. (2022). The impact of digital leadership on enterprise sustainable development under the background of Industry 4.0, G. Ali et al. (Eds.): Proceedings of the 2022 6th International Seminar on Education, Management and Social Sciences, 1445-1454, DOI:https://doi.org/ 10.2991/978-2-494069-31-2_171

Makovskaya, N., Korabava, A. & Aliakseyeva, A. (2022). Skills development for digital transformation in textile, In AIP Conference Proceedings, 2430 (1), AIP Publishing LLC.

Mert, G. (2021). Dijital dünyada yeni bir boyut: Dijital liderlik, Satınalma Dergisi, 9 (97), 50-51.

Nafz, R., Schinle, C., Kaiser, C. & Kyosev, Y. K. (2022). Digital transformation of the textile process chain state of the art, Communications in Development and Assembling of Textile Products, 3 (2), 79-89.

Oberer, B. & Erkollar, A. (2018). Leadership 4.0: Digital leaders in the age of Industry 4.0. International Journal of Organizational Leadership, 7 (4), 404- 412.

Özmen, Ö. N., Engin, E. R. İ. Ş. & Pınar, Ö. (2020). Dijital liderlik çalışmalarına bir bakış, Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 25 (1), 57-69.

Patton, M.Q. (2002). Qualitative Research and Evaluation Methods. Sage Publications.

Porfirio, J., Carrilho, T. & Jardim, J. (2020). Leadership characteristics and digital transformation, Journal of Business Research, 124 (C), 610-619.

Pratama, M. A. N. & Kurniady D. A. (2021). Influence of digital leadership models on the performance of educators and educational personnel in the COVID-19 Pandemic in the first middle school, Proceedings of the 4th International Conference on Research of Educational Administration and Management, 278-280. DOI:https://doi.org/ 10.2991/assehr.k.210212.061

Promsri, C. (2019). The developing model of digital leadership for a successful digital transformation, GPH-International Journal of Business Management (IJBM), 2 (8), 01-08.

Rauch, J. C. F., & Behling, O. (1984). Functionalism: Basis for an alternate approach to the study of leadership. In J. G. Hunt, D. M. Hosking, C. A. Schriesheim, & R. Stewart (Eds.), Leaders and managers: International perspectives on managerial behavior and leadership (45–62), Pergamon Press.

Rüßmann, M., Lorenz, M., Gerbert, P., Waldner, M., Engel, P., Harnisch, M. & Justus, J., (2015). Industry 4.0: the future of the productivity and growth in manufacturing ındustries, Boston Consulting Group, Inc.

Sajjadi, A., Karimkhani, M. & Mehrpour, M. (2014). New emerging leadership theories and styles, Technical Journal of Engineering and Applied Sciences, 4 (3), 180-188.

Shen, L., Zhang, X. & Liu, H. (2022). Digital technology adoption, digital dynamic capability, and digital transformation performance of textile industry: moderating role of digital innovation orientation, Managerial and Decision Economics, 43 (6), 2038-2054.

Sheninger, E. (2014). Digital leadership: Changing paradigms for changing times. Thousand Oaks: CA: Corwin Press.

Sözüer, D. & Buluş, H. E. (2023). Dijitalleşme sürecinin tekstil ve moda tasarımı eğitimindeki avantaj ve dezavantajları üzerine bir inceleme, Journal of Communication Science Researches, 3 (1), 74-84.

Teilen, B. (2023). Digital Leadership: Competencies, Leadership Styles and Challenges of the Leader 4.0, https://consultingheads.com/en/blog/on-the-job-en/digital-leadership-competencies-leadership-styles-and-challenges-of-the-leader-4-0/ (Access Date: 20.01.2024).

Timonen, V., Foley, G. & Conlon, C. (2018). Challenges when using grounded theory: A pragmatic introduction to doing GT research, International Journal of Qualitative Methods, 17, 1–10.

Turan, S. (2020). Liderlik nedir? Liderlik: kuram- araştırma uygulama, (Edt: Kürşad Yılmaz). Ankara: Pegem Akademi Yayıncılık.

Westerman, G., Bonnet, D. & McAfee, A. (2014). The Nine elements of digital transformation, MIT Sloan Management Review, 55 (3), 1-6.

Wright G. & Ritter, J. (2015). Digital leadership, https://searchcio.techtarget.com/definition/digital-leadership (Access Date: 22.03.2024).

Yılmaz, P. (2022). Dijitalleşen tekstil üretimi ve tüketimine genel bakış, tasarım açısından dijital tekstil baskıcılığı, Proficiency in Art Thesis, Mimar Sinan Fine Arts University, Institute of Fine Arts, Department of Textile and Fashion Design, Textile and Fashion Design Program.

Yukl A. G. (2018). Leadership in organizations, New Jersey: Prentice Hall.

APPENDIX 1. Integrated summary of digital leadership dimensions and outcomes in the textile industry

Core Dimension	Sub-Dimensions	Key Integrated Findings
Antecedents of Digital Leadership	Personal antecedents	Leaders' values, professional experience, openness to learning, innovation mindset, digital literacy, analytical thinking, and communication skills shape leadership orientation in digital contexts.
	Industrial antecedents	Competitive pressure, customer-centricity, efficiency demands, sustainability requirements, sectoral digital trends, and cost considerations drive leadership behaviours.
Digital Transformation Context	Technological transformation	Adoption of data analytics, AI, automation, digital design, ERP/CRM systems, and digitally integrated production and supply chains.
	Organizational transformation	Faster processes, increased efficiency, transparency, new business models, remote and flexible work practices.
Leadership Orientation	Person-oriented leadership	Emphasis on communication, empathy, motivation, employee development, participation, trust-building, and relational leadership.
	Task-oriented leadership	Focus on efficiency, performance monitoring, task tracking, data-driven decision-making, and process optimization.
	Balanced / hybrid leadership	Leaders dynamically combine task and person orientation depending on situational and organizational needs.
Leadership Processes	Changes in leadership processes	Acceleration of decision-making, reduced hierarchy, increased automation, enhanced leader–employee interaction, virtual and remote leadership practices.
Leadership Competencies	Core digital leadership competencies	Innovation, openness to change, high digital literacy, teamwork orientation, strategic vision, sustainability awareness, market sensitivity.
Employee-Related Dynamics	Digitally skilled employees	Increased expectations for flexibility, remote work, frequent communication, transparency, participative and democratic leadership styles.
	Challenges	Workload pressure, time constraints, loss of team synergy, generational tensions.
Business Relationships	Internal relationships	Enhanced collaboration, communication, trust, and efficiency; risk of reduced socialization and digital fatigue.
	External relationships	Strengthened customer relationships, improved supply chain coordination, competitive advantage.
Outcomes of Digital Leadership	Organizational outcomes	Increased efficiency, productivity, agility, innovation capacity, competitiveness, sustainability, and organizational resilience.
	Negative outcomes / risks	Resistance to digital transformation, investment costs, lack of digital skills, data security concerns, stress and fatigue.

APPENDIX 2: Figure 1: Integrated model of digital leadership in the textile industry