From conventional to digital leadership: exploring digitalization of leadership and innovative work behavior

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Abstract

Purpose – The leadership shift from conventional to digital comes from the compulsory digitalization of the workplace because the technological progress provides the opportunity of doing work remotely, and this is a great advantage of reducing costs that stem from the offline workplace. Thus, this research aims at demonstrating the relationship between digitalization of leadership and innovative work behavior.

Design/methodology/approach – Data were collected from 320 Turkish department managers in the Textile Industry through digital leadership and innovate work behavior scales. The hypotheses were tested using path analysis. The analyses were conducted by using SPSS and AMOS package programs.

Findings – The results show that the employees' perceptions of digital leadership have a positive and significant effect on all dimensions of an employee innovative work behavior. Also, the leaders with high digital skills were perceived positively by the employees and the employees tend to adapt innovative behaviors when they have the digitally skilled leaders.

Originality/value – This study contributes to leadership research by providing evidence for the role of leadership shift in innovative work behavior. Extending the verification of leadership shift in innovative work behavior that can be adopted in Turkey has also been considered.

Keywords Digital leadership, Innovative work behavior, Leadership styles, Digitalization, Turkey, Digital workplace, Leadership

Paper type Research paper

Introduction

A leader has a critical importance in an organization since he/she has a role to select, equip, train and influence one or more followers (Winston and Patterson, 2006). Also, when the follower(s) appreciate and feel connected with the leader(s), they are more motivated and ready to work enthusiastically rather than forced compliance (House and Baetz, 1979). Constantly changing era brings out different leadership styles starting from the conventional which is based upon controlling, competitive and aggressive concept (Lipman-Blumen, 1992). However, the role of leadership requires new capabilities to obtain a secure sustainability for the organizations, as the technological progress introduces many changes to the organizations, such as digitalization of

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work and the workplace. Conventional leadership refers to an approach that only considers the leaders and their functions by highlighting the concept as the sum of the leader's performance in an organization. Also, the concept points out the performance in leadership as "the result of characteristics of the leaders and the environment" (Barker, 2001: 474). In the new era, the leaders need to follow technological developments and gain knowledge regarding the recent changes in organizational structures. These changes bring inevitable requirements to the organizations to be able to become a part of the digitalization in the world of business. As a result, in comparison to the conventional leadership, the need for digital leadership emerges since today's organizations tends to transform into digital workplace that refers to "the physical, cultural and digital arrangements that simplify working life in complex, dynamic and often unstructured working environments (Dery et al., 2017: 136). This obligatory transformation from conventional to digital leadership provides a theoretical shift in the leadership literature from traditionally controlled manners to empathetic and skillful problem-solving perspectives.

The organizations require leaders with qualifications beyond those of simple behavioral and organizational management skills. In the context of a rapidly evolving and innovative digital landscape and in the face of increased globalization, it is equally, if not more important, for company leaders to stay abreast of developments in the digital sphere – for both their competitiveness and their survival. Survival of the organizations is important because changing technologies cause different expectations of customers or stakeholders; therefore, to be able to keep on producing in the marketplace, organizations should adapt their current conditions to the new developments in the technology. In a broader perspective, when customers or stakeholders explore the facilitation of the new technological development before the organization, this may result in changing the preferences of the customers and transferring to the other organization which can follow the new updates in the digital era. The digital era includes an approach which solves the sustainability and effectivity problems of the organizations through technological developments. The key point about the new era is that when the employees realize how important the digital world is, leaders are needed to deeply comprehend what it really means and be more conscious about the digitalization period of the 21st century (Dorner and Edelman, 2015). Thus, in this global world, organizations require leaders with qualifications rather than a manager. In addition to pursuing the new technology, organizations' needs such as human workforce have been one of the issues which may be overlooked among the other developments. Leaders have been expected to motivate this human workforce with different skills.

In leadership theory, digital leadership is described as the style of leadership that is a combination of transformation leadership style and the use of digital technology (De Waal et al., 2016). Scholars, who investigated different leadership styles, such as transformational leadership (Li et al., 2019), participative leadership (Fatima et al., 2017) or ethical leadership (Iqbal et al., 2020a), have discussed the relationship between these leadership styles and innovative work behavior of the employees; however, there is still a dearth of research on how digitalization shapes understanding of leadership that refers to "digital leadership" in our research, and what the effect of digital leadership on innovative work behavior because digitalization processes create digital workplace and it is not known much by the practitioners (Mihardjo et al., 2019). In a dynamic world of business, organizations require to be socially and digitally connected through technology and take advantage of the digital era for all the stakeholders. Even though some research demonstrates that digital leadership improves and encourages digital teaching and learning (Richardson et al., 2012) or digital leadership has been the interest of practitioners in the higher education field (Antonopoulou, 2020; Yusof et al., 2019), the research related to

the understanding the role of digital leadership in encouraging or discouraging innovative work behavior is scarce. Also, as innovative work behaviour is a critical factor to achieve organizational success, the question of how digital leadership shapes this type of behavior is critical to provide theoretical evidence to the leadership literature. For this reason, we aim at demonstrating the effect of digital leadership on innovation work behavior in the research. Besides, it is stated that following the digital developments and implementing them into each sector of business are essential for both future collaborations and being the industry in demand for all the stakeholders. Being a digital organization with a digitally skilled leader can provide quick responses to the changing multi-cultural network in the world and transform the organization a constant openness to change, in other words, make the employees ready for something new each day when they are at work (Litvinenko, 2020). Regarding the reality and necessity of having the digitally developed organizations with highly digitally equipped leaders, sectors regardless of the product or service can obtain competitive advantages. This superiority is evaluated and examined within the textile industry in the current study. As the garment types or styles are shaped by the preferences of the societies, it is challenging to catch up with the latest and trendy pieces of textile products for the textile organizations. Specifically, as for some countries, the garments require plenty of embroideries or patches which should be produced with great attention and rapidly to meet the demands of the market. With the help of the digital technology, digital embroidery techniques (Oliver, 2016) can be used to improve the approaches of the employees and let them implement their own imagination reflect on the technological designs of the garments. In addition to creative and competitive products in the textile industry, the recycled products should be produced by the organizations in the 21st century withing the hardships of the changing climate and limited natural resources. Thus, meeting the need of the consumers with different clothing choices, the organizations which can use and implement the digital technologies produce harmless products to the environment and can be preferred in the global market. Because textile industries are one of the biggest polluters in the world during the production and delivery process (Luque Gonzalez, 2018). Besides, the textile industry is one of the most productive sectors with small- or big-sized organizations, a sector that almost everyone is to some extent is included in the production and consumption chain (Luján-Ornelas *et al.*, 2020). For the textile organizations to follow up the newest and latest innovations, leaders are considered as the sources of the innovative culture and approaches. As it is stated in the report by one of the important textile companies, successful garment sectors will be leading the future's textile industry by using the latest automation technologies, and these will provide contribution to the innovation of the new products (TURKONFED, 2018). However, to be able to compete within the technological era, well-known leadership styles may not be sufficient, so another leadership style is required to manage the present digital environment effectively by not totally disregarding the conventional types of leadership but uniting all the leadership skills to apply and spread the idea of innovation within the organizations (Haddud and McAllen, 2018). Therefore, this study examines and attempts to reveal the importance of digital leadership and its effect on innovative work behavior which is the productive work outcome for all the organizations.

The current study has four main sections following on the introduction. First, we theorize digital leadership based on the literature. Second, we conceptualize innovative work behavior to understand how the concept can be considered within the context of this research. Third, we discuss both digital leadership and innovative work behavior to present the hypotheses of this study. Finally, we discuss and conclude our paper.

Theorizing digital leadership
Digitalization has been considered as the cause of the emergence of the destructive consequences of the leadership practices (Bennis, 2013). For the organizations, it is essential to catch up with the digital age and to avoid these destructive consequences, thus leaders' cooperation skills, orchestration ability, creativity and following the beneficial practices play an important to be able to survive in the digital world (Beresford, 2018). This importance has caused the emergence of a new leadership approach different from the focus on "commanding and controlling" leadership. (Timurcanday Özmen et al., 2020). This approach develops the organization digitally experienced, successful and skillful by highlighting the leaders' digital intelligence (Kane et al., 2015). Toduk (2014) distinguishing the traditional leadership from the leadership of the digital era, has stated as "digital leadership", and marked the innovation ability, digital skills, strong networks, cooperation, participation and visionary as the most important aspects of these leaders. This point of view about the features of the leaders which Copeland (2016) and Du Toit et al. (2017) stated as "driving force" has overlapped.

Digital leadership has been defined as individuals who add value to the organizations by combining the abilities of the leaders with digital technologies (Rudito and Sinaga, 2017). Digital leaders are the leaders who manage the digital transformation processes in a consistent way, and adapt multiple leadership approaches (transformational, transactional, etc.) by providing competitive advantages with a strategic point of view (Sow and Aborbie, 2018). According to Mihardjo and Sasmoko (2019), digital leadership, which is also stated as the combination of digital culture and digital competencies, has been based on the Upper Echelons Theory. The theory, developed by Hambrick and Mason (1984), states that strong managers are the significant factor affecting and implementing the strategic decisions of the organization, and the power has been considered to determine the performance and success of the organizations directly. Besides, the theory has assumed that this power has come from the leaders' knowledge for future events, and accurate predictions, competencies, educational background and work experience. Thus, it can be stated that the digital competencies of the leaders are the power for the organizations and employees.

El Sawy et al. (2016) consider digital leadership as an approach that ensures the strategic success of digitalization for the enterprise and its organizational ecosystem. However, the environmental context for organizations are quite volatile, uncertain, complex and ambiguous for creating fast (re)actions. For this reason, it is critical to have certain characteristics for being a digital leader. The characteristics are the combination of agile, participative, networking and open leaderships (Petry, 2018). While agile characteristics identify critical issues and different scenarios (Rigby et al., 2016), participative characteristics use the knowledge of employees, as they cannot know everything in an organization (Pearce and Conger, 2002). Also, networking and open characteristics demonstrate the positive responses of the digital leaders to any criticism in the process of creating networks amongst the employees (Petry, 2018; Li, 2010). All required characteristics and definitions of the digital leadership demonstrate that it has a trust-based approach in any managing and operation process of enterprises.

Conceptualizing innovative work behavior
The rapid change in technology has required organizations to innovate to ensure the organizations' competitiveness and sustainability (Iqbal et al., 2020b). For this reason, organizations have been seeking revisions in many areas such as work design (Bysted, 2013). As digitalization has caused changes in customer demands, the need for employees to

show innovative behaviors, seeking new ways to meet the demands has also been increasing (Li *et al.*, 2019).

Innovative work behavior has been defined as behaviors related to initiating, directing and conducting new or useful ideas/products, work processes and procedures for the organizations (De Jong, 2006). As a multi-stage process, innovative work behavior (Sethibe and Steyn, 2017) is a motivational situation that is affected by the employees' knowledge, skills and experiences (Bammens, 2016). Innovative work behavior is a complex behavior, which positively affects organizational and individual performance, reveals and develops innovative ideas and requires extra role behavior (Janssen, 2000). It has been stated that innovative people are more willing than others to experience trial-error and risk-taking (Sönmez and Yıldırım, 2014). All behaviors to fulfill the organizational goals such as new methods, new technologies and searching and developing new techniques and providing all the sources have been addressed in innovative work behavior (Yuan and Woodman, 2010; Kheng *et al.*, 2013). De Jong and Den Hartog (2010) and Stoffers *et al.* (2014) conceptualize innovative work behavior as containing four dimensions: idea exploration (IE), idea generation (IG), idea championing (IC) and idea implementation (II). We discuss these four dimensions with digital leadership in the next section.

Digital leadership and innovative work behavior

Organizations are in an inevitable and stiff competition which requires them to become a part of the digital world to survive in the market and provide sustainability of their operations. To adapt the aforementioned changing environment, the organizations need to adopt a transformation from conventional to digital perspective in their operations and managerial practices through having leaders who have a digital mindset (Wagner *et al.*, 2019). While the leaders have a digital mindset, they should focus on work behavior of the employees who are amongst the intangible and valuable sources, as the employees face challenges and difficulties in the digitalization process of an organization. Specifically, the leaders with the ability to be fully coherent with the digital era have been considered to be more engaged with the innovative work behaviors. The digital leaders somehow adapt the recent technological developments and present the latest and most comfortable ways to reach the customers and employees which require to have leadership enhancing the adaptive culture of the organizations (Alos-Simo *et al.*, 2017). As Mintzberg (2010) suggests, leaders are the individuals who achieve technical competencies, today's leaders are required to be the first pursuers of the innovations of the digital world. Moreover, the young generation who are named as "digital natives" will be or have already been a candidate of the future leaders (Johansen, 2012); therefore, these upcoming leader candidates automatically can establish a digital organizational structure.

In the near future, by the changing rules of the conventional leadership, leaders are required to be equipped with digital skills, establish strong network, be collaborative, adopt a participative management approach and, most importantly, acquire entrepreneurship and innovation skills to be successful (Toduk, 2014). It is important to perceive innovative perspective as leaders; however, the leaders' followers have also been expected to be a part of a team who adopt innovation process as their leaders. Digital leaders, who are considered among the transformational leaders, should play a proactive role to achieve the organizational goals and objectives; by doing so, leaders can increase the motivation of their employees and encourage innovative and creative ideas. This approach reinforces the role of the leaders in the development of the employees' innovative behaviors (Chen, 2014). It has been stated that to fulfill the role in improving the innovative work behavior of employees, digital leaders have been required to have the capability to know and use the information

and communication technologies, new applications and new technologies such as communication technologies, cloud technology, big data, data analysis and to have business acumen including the business intelligence, ability to comprehend the business and strategic leadership skills (Yücebalkan, 2020). Besides, it has been known that transformational leaders with digital competencies have more tendency (Jung *et al.*, 2003) to share information, track innovative solutions to problems (Jansen *et al.*, 2009) and form creative and innovative organizational culture in an appropriate, free and encouraging environment to reveal the ideas that support the innovativeness of the organizations. In addition, digital workplaces created by the leaders increase the productivity of the organizations with the help of the technologies. The implementation of new technologies provides an environment that reinforces innovation, enables innovative efforts by integrating information technologies with production processes and facilitates the development of innovative services and products (Haddud and McAllen, 2018).

Transformation from conventional to digital leadership process includes considering the four dimensions of innovative work behavior to create a digital workplace and to reach higher productivity of employees in an organization. The first is idea exploration that refers to:

> the perceived extent of support that innovation toolkits provide in terms of exploring information about published innovations and customer needs and preferences, as well as market trends, which helps in developing new ideas (Ye, 2018: 428).

Leaders of the organizations face with digital transformations; they are expected to meet the needs of all the stakeholders, so the leaders are required to be open to new changes and able to evaluate from the innovative perspectives. For this reason, the digital leadership skills have a critical importance to uphold idea exploration. Besides, when the strong effect of the leaders on the employees are considered, leadership style plays an important role on employee behavior including performance (Iqbal *et al.*, 2015). Also, studies show that the role of leadership affects the organizational outcomes such as innovation ((Jung *et al.*, 2003). As innovation requires creativity, to support the innovative outcomes of the employees, leaders with innovative approaches or leaders who encourage creative ideas are crucial for the organizations. When Ekvall and Ryhammar (1998) stated the effect of direct influence of leadership on organizational outcomes, the authors also highlighted the importance of change, production and employee centered leadership model developed by Ekvall and Arvonen (1991). Employees led by the digitally skilled leaders can focus on the new ideas and attempt to reveal their new ideas to support the organizational goals. In other words, digital leaders let their employees present their new solutions to the current problems without hesitation. Unlike, conventional leadership style in which employees perceive the leaders decisions are only and accurate without questioning, leaders who are open to change and new exploration of the ideas can also provide benefits and facilitate the innovative developments. The hypothesis regarding the relationship between digital leadership's effect on idea exploration which is one of the dimensions of innovative work behavior is shown as follows:

H1. Digital leadership is positively and significantly associated with idea exploration.

Innovation can be considered as a requirement rather than something new. Organizations are asked for more creative and competitive products or services to meet the needs of the rapidly changing customer preferences. It has been more challenging to come up with flexible and creative solutions in a short period of time. Thus, the ideas emerge when faced with the expected and unexpected changes. Innovation process helps to find out and lets all

the stakeholders of the organization come up with new ideas, ideas which are known to be supported by their leaders who are open to changes by encouraging the emergence of the new ideas. In line with these, it should be emphasized that innovative ideas can be revealed by the support of the leaders in the organizations. Specifically, studies show that digitally skilled leaders make their employees feel free to express their opinions about the work process and feel that they are the essential part of the organization. In addition, since digital leaders have the ability to open a new era in the organizations by adopting certain technologies (Tremblay, 2017), following the latest developments in technology has been totally required. Idea generation is the other dimension of the innovative work behavior which is also the second step of the idea exploration (West, 2002) that refers to "the repetitive sequence of tasks that relate capturing, sharing and recoding ideas" (Gama *et al.*, 2019: 115). When organizations adapt the change in any areas, they are needed to share an openness to change which facilitates and encourages the innovation process (Auernhammer and Hall, 2014), and innovation also provides superior organizational performance (Sethibe and Steyn, 2015). In the digital world, how the organizations produce and what technology is used during the production matters at least as much important as what you produce or how qualified it is. Also, the production or service size of the organizations are not sufficient to catch the digital world around the businesses. In addition to the advantages of the organizations, leaders' awareness of their current skills has been considered as a crucial part of the today's leadership (Barrett, 2006; Bagheri and Akbari, 2018). The digital leaders have responsibilities about creating employees' attention to the tasks that specifically gain the current knowledge in the market and create strategies through presenting ideas to the enterprises (Bagheri and Akbari, 2018). Besides, employees with new ideas can be perceived as new opportunities by the leaders who are digitally active or easily adaptive to new transformations. In line with the literature, the presumed relationship is hypothesized as follows:

H2. Digital leadership is positively and significantly associated with idea generation.

Exploration and generation of the ideas can help lead the way through an innovative process for the organizations. This step of the innovative work behavior requires interaction and harmony between the leaders and the employees. Before the implementation of the innovative idea, the champion of the idea should convince the other allies around to reveal the advantages or the disadvantages of the newly improved or potentially improved ideas. In this context, it is essential to explain the third dimension of innovative work behavior which is idea championing. Idea championing refers to "the active promotion of a novel idea, necessary power to move the ideas into practice by convincing the allies" (De Jong and Den Hartog, 2010). Besides, innovative world needs champions/leaders who show extraordinary confidence in themselves and gain the commitment of others to support the innovation (Maidique, 1980). In addition to have leaders to generate new ideas, to make the occurrence of new changes possible in the organizations, employees must champion a new technology not to miss innovative opportunities (Kickul and Gundry, 2001). As employees are not often assigned formally to fulfill a completely new proposed idea, in contrast employees come up with that idea voluntarily to support the organizational goals (Kanter, 1988). The leaders show the necessity to use the digitalization to be able to catch up with the new technology, employees will follow and be enthusiastic to be a part of this digital transformation (Dittes *et al.*, 2019). Considering the fact that digital leadership is a combination between digital culture and digital competence (Mihardjo *et al.*, 2019), workplace environment should be supported by digitally skilled leaders convincing the employees to be a part of each novel

process. According to the relationship and the importance of the digital leadership resulting in innovative work behavior, the following hypothesis is presumed:

H3. Digital leadership is positively and significantly associated with idea championing.

After convincing the employees/allies through the idea championing phase, the last step of the innovative work behavior emerges which is the idea implementation. Idea implementation refers to implementing the idea of the champion. When the idea is accepted and appreciated by others in the organization, this gives the start of the implementation of the novel idea with enthusiasm (Fried and Hisrich, 1994). As having an approved idea by the others does not assure the implementation of those ideas (Baer, 2012), this dimension is considered as the completion of the innovation process as in the end of the journey (Perry-Smith and Mannucci, 2017). Thus, implementation of the ideas is the product/output of innovative work behavior; organizations become more digital, leaders should rush to be a part of this digital world and adapt to new digital business models (El Sawy *et al.*, 2016). However, this process has been considered as the final step of the innovation, employees are expected to get used to the innovative products/ services, culture and be enthusiastic to become a part of the innovation process with the guidance of their leaders who are digitally competent. On this basis, the following hypothesis is proposed:

H4. Digital leadership is positively and significantly associated with idea implementation.

Digital leadership, as it is assumed to have the effect on innovative work behavior, has been also claimed to improve through the purposeful use of technology (Sheninger, 2019). By implementing digital technology for the purposeful use, and when it is perceived as an innovation in the organizations employees can have the opportunity to go beyond the daily routines and have the need to do more search about the new technologies (Masood and Afsar, 2017). Besides, it is one of the crucial requirements of all the organizations to follow the new technological developments and benefit from the advantages. Organizations improve themselves and keep their long-term competitiveness by having high perception of innovative work behavior ((Domínguez-Escrig *et al.*, 2019). However, acquiring the new technology rapidly and applying it in the organization not only requires an innovative perspective but also digitally talented leaders who are also known with high digital literacy (Santoso, *et al.*, 2019) which facilitates to comprehend how to adapt the developments successfully and make the employees to become a part of this constant digitally innovative process.

Severe global competition both among the employees and the organizations can be managed following the requirements of the current and sudden technological changes in the world of industry. Thus, having digitally developed organizations are considered being one of the significant priorities in the societies which provide competitive advantage. Besides, leaders with digital interest or skill can follow the latest technological developments easier than the leaders who manage the organizations using the traditional leadership style.

Digitally talented leaders may know how to face with the new non-stop in other words 7/ 24 increasing changes and gain familiarity in the digital platforms. Thus, the current study highlights a strong emphasis on the digital leadership to experience more and high innovative work behavior which is one of the key sources of the sustainability of the organizations and natural shield in case of unexpected events such as the COVID-19 pandemic or disasters.

Research method

Sampling

According to the 2019 data, textile sector ranks as the third with 17.7% share in Turkey's export (Turkish Exporters Assembly [TIM], 2020: 16). Denizli province is one of the first place in the rankings famous for its textile reputation, and every one of the four employees has been working in the textile sector (Government of Denizli, 2020). There are 180 textile factories manufacturing in 4 organized industrial zones in Denizli. These factories have been rapidly going through the digitalization process. As a matter of fact, the factories in this region have been chosen as a pilot digitalization application area by Turkish Industry and Business Association (TÜSİAD), since the increase in productivity provided by digitalization is expected to be at a high level (TÜSİAD, 2016). For this reason, the sample of the research was carried out with department managers in the textile sector, where technology is used and followed intensively. All 180 companies were contacted to participate in the research. However, due to the intense and dynamic work pace of the textile industry and the fact that some organizations do not allow data collection other than certain researchers, not all department managers could be reached. Only 95 department managers responded. Hence, 76% of the questionnaires were returned. The data of the study has been collected between September and October 2021. The questionnaire has been delivered to 440 people in total, 335 of them have responded, 15 of them have been eliminated due to the missing and incorrect information. The analyses have been done by using 320 questionnaires. As Anderson and Gerbing (1984) state; the sample size of should be at least 150, and Bentler and Chou (1987) emphasize that a sample of ten times of the items should be reached providing that the sample is distributed normally. According to Schumacker and Lomax (2004), it can be said that the data show normal distribution if the skewness and kurtosis coefficients take values in the range of ± 1.5. In this study, the skewness and kurtosis coefficients are in these value ranges (Table 3). The sample of this study is considered to meet the normal distribution condition (95% confidence level and 5% margin of error), and its size is evaluated as sufficient. The analyses have been done by using 320 questionnaires. 50.3% of the participants are woman, 78.8% of them are married, 83.1% have bachelor's degree, the mean age of the participants is 38.5 (SD = 8.1) and the average tenure is 14.6 (SD = 8.7) years. The distribution of the participants according to the demographic characteristics is presented in Table 1.

Measures

The digital leadership and innovative work behavior scales were used to collect the data of the study. Each scales' items are rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). A biographical questionnaire was only used to collect some demographic information of the participants in this study. As such, this information was collected on gender, marital status, age groups, education level and tenure of the participants.

Digital leadership. To measure the employees' perceptions of digital leadership, "Informatics Leadership Scale" by Ulutaş and Arslan (2017) has been used. The scale has three dimensions with 6 items each, the 18-item scale in total has information, communication and orientation dimensions. There are no reverse coded questions in the scale. In this study, the orientation dimension's 6 items have been used. The reason for assessing only the orientation dimension in the current study is that Ulutaş and Arslan (2017) have stated that this dimension represents the digital leadership. The scale has a five-point Likert type. (1: strongly disagree, 5: strongly agree). Sample item is "Raises awareness of the organization's employees about the risks of information technologies". In the scale validation study, Cronbach's alpha has been calculated as 0.97.

Characteristics	Frequency	(%)
Gender		
Male	161	50.3
Female	159	49.7
Marital status		
Married	252	78.8
Not married	68	21.2
Age		
23-30	54	16.9
31-35	68	21.2
36-40	79	24.7
41-45	62	19.4
46 and above	57	17.8
Education		
Bachelor	266	83.1
Master	54	16.9
Tenure		
1-5	60	18.8
6-10	54	16.9
11–15	66	20.6
16–20	72	22.5
21 and above	68	21.2
Note: $n = 320$		

Table 1.
Sample
characteristics

Innovative work behavior. "Innovative Work Behavior Measure" developed by De Jong and Den Hartog (2010) has been used. The Turkish adaptation of the scale has been done by Çimen and Yücel (2017) with four dimensions. The idea generation (IG), idea exploration (IE), idea championing (IC) and idea implementation (II) has 10 items each. The scale has a five-point Likert type. (1: never, 5: always). Sample item is "How often do you generate original solutions for problems?" Scale has no reverse coded items. In the validation study, Cronbach's alpha coefficient has been calculated as 90, 0.88, 0.95, 0.82, respectively.

Results
Measurement model evaluation
In the analysis of the data in the current study, SPSS 26 program has been used to identify the mean, standard error, reliability correlation values of the variables. Besides, to test the validity of the scaled used in the study, AMOS 24 program has been used. In this context, the validity of the scales has been tested with the confirmatory factor analysis. To measure the reliability of the scales, the internal consistency coefficient has been chosen. The path analysis has been used to test the effects of the variables in the study. In testing the structural equation modelling, maximum possibility and Bootstrap 5,000 samples and 95% bias corrected confidence interval methods have been used.

Anderson and Gerbing (1988) state that when structural equation modelling was used in the studies first, the measurement then the structural model should be tested. For this reason, the measurement model was tested first. If the measurement model provides good fit values, the structural model should be tested. The results obtained from the measurement

Model	χ^2	df	χ^2/df	$\Delta\chi^2$	CFI	NFI	TLI	RMSEA
5 factor (DL, II, IG, IE, IC)	222,345	80	2,779	–	0.96	0.94	0.95	0.076
4 factor (DL, II, IG, IE + IC)	279,454	84	3,327	57,109***	0.95	0.92	0.93	0.085
3 factor (DL, II, IG + IE + IC)	606,081	87	6,966	383,736***	0.85	0.83	0.82	0.137
2 factor (DL, II + IG + IE + IC)	1299,990	89	14,607	1077,645***	0.66	0.65	0.60	0.207
1 factor (DL + II + IG + IE + IC)	1386,477	90	15,405	1164,132***	0.64	0.62	0.57	0.213

Table 2.
Comparison of measurement models

Notes: ***p < 0.001, DL: digital leadership, II: idea implementation, IE: idea exploration, IG: idea generation, IC: idea championing

model are shown in Table 2. As it can be seen in Table 2, the best fit values were obtained from the five-factor structure. It was determined that the goodness of fit value of the five-factor structure was in perfect fit (Hu and Bentler, 1999; Kline, 1998).

Composite reliability (>0.70), average variance extracted (>0.50) and Cronbach's α (>0.70) tests were done for the convergent and discriminant validity of the research model (Fornell and Larcker, 1981; Hair et al.,2012). As Table 3 shows, the results of the three tests are in the acceptable limits. Additionally, discriminant validity was analysed to examine whether a measurement is not a reflection of any other measurement or not. In this analysis, each of the square roots of AVE should be higher than the other correlation coefficients for adequate discriminant validity (Fornell and Larcker, 1981). As presented in Table 4, the square root of AVE for each variable is greater than the other correlation coefficients which indicate the discriminant validity is achieved. However, Harman's single-factor was used to determine whether there was a common method variance error (Podsakoff et al., 2003). As a result of the analysis, it was determined that the single factor structure explained 36.7% of the total variance. When this ratio is below 50%, it shows that there is no common method variance problem.

In Table 4, Pearson correlation analysis results have been presented to identify the relationships between the variables of the study. As it is indicated in Table 4, it has been clearly stated that digital leadership has an average and significant relationship between the dimensions of innovative behavior's idea generation, idea exploration, idea championing and idea implementation. In addition to this, there is an average and significant ($r = 0.787$, $p < .01$) relationship between digital leadership and innovative work behavior.

Structural model evaluation
In this level of the study, a structural equation modelling related to the research model has been established and good of fit values have been tested with the AMOS package program. The findings of the model have been revealed that the good fit values are as follows in the acceptable limits: (χ^2/d.f. = 1.31; CFI = 0.99; NFI = 0.99; TLI =0.99; RMSEA = 0.031).

According to the model (Figure 1), the textile sector employees' digital leadership perceptions have affected idea generation dimension ($\beta = 0.60$, p < 0.001, BC 95% CI [0.514, 0.670]), idea exploration dimension ($\beta = 0.56$, p < 0.001, BC 95% CI [0.462, 0.638]), idea championing dimension ($\beta = 0.70$, p < 0.001, BC 95% CI [0.620, 0.721]), and idea implementation dimension ($\beta = 0.48$, p < 0.001, BC 95% CI [0.357 0.577]) of the innovative

Item	Factor loading	CR	AVE	α
Digital Leadership	0.75	0.911	0.671	0.91
DL1: A digital leader raises awareness of the employees of the organization about the risks of the information technologies.	0.88			
DL2: A digital leader raises awareness of the employees about the technologies that can be used to improve the organizational processes.	0.81			
DL3: A digital leader determines required ethical behaviors for information implementations with all the stakeholders.	0.86			
DL4: A digital leader plays an informative role to reduce the resistance towards innovations brought by information technologies.	0.79			
DL5: A digital leader shares own experiences about technological opportunities that will increase the contributions to the colleagues for the structure of the learning organization.				
Idea Exploration	0.87	0.828	0.706	0.75
IE1: How often do you pay attention to issues that are no part of his daily work?	0.81			
IE2: How often do you wonder how things can be improved?				
Idea Generation	0.90	0.901	0.752	0.89
IG1: How often do you search out new working methods, techniques or instruments?	0.87			
IG2: How often do you generate original solutions for problems?	0.83			
IG3: How often do you find new approaches to execute tasks?				
Idea Championing	0.86	0.833	0.714	0.87
IC1: How often do you make important organizational members enthusiastic for innovative ideas?	0.83			
IC2: How often do you attempt to convince people to support an innovative idea?				
Idea Implementation	0.94	0.943	0.847	0.93
II1: How often do you systematically introduce innovative ideas into work practices?	0.93			
II2: How often do you contribute to the implementation of new ideas?	0.89			
II3: How often do you put effort in the development of new things?				

Notes: CR – Composite reliability, AVE – Average variance extracted. Note2: DL6 was excluded from the analysis because of the low factor loading (less than 0.32)

Table 3.
Factor loading, CR, AVE and normality values

Variables	1	2	3	4	5
1. Digital Leadership	(0.819)				
2. Idea Exploration	0.557**	(0.840)			
3. Idea Generation	0.599**	0.398**	(0.867)		
4. Idea Championing	0.695**	0.594**	0.514**	(0.845)	
5. Idea Implementation	0.477**	0.231**	0.309**	0.310**	(0.920)
Mean	3.61	3.35	4.09	3.59	4.11
Standard Deviation	0.68	0.99	0.78	1.06	0.86
Skewness	−0.654	−0.421	−0.757	−0.654	−0.973
Kurtosis	0.200	−0.262	0.353	−0.314	0.953

Note: Values in parentheses are the square root of AVE for each variable

Table 4.
Correlation matrix of variables

work behavior positively and significantly. In other words, as the levels of digital leadership perception increase, the level of perception of the dimensions of innovative work behavior increases. Thus, *H1*, *H2*, *H3* and *H4* have been supported (Table 5).

Conclusion and discussion

In this study, we explored how digital leadership perception of the employees influences innovative work behavior. As the results demonstrated, the perception of digital leadership significantly predicted innovative work behavior of the employees. Previous studies focused on the effects of various styles of leaderships on innovative work behavior such as Afsar *et al.* (2014) and Yidong and Xinxin (2013). However, this study raises link digital workplace, digital leadership and innovative work behavior because innovation is a driving force of organizations, and the literature regarding digitalization of workplace and digital leadership are scarce (Sarros *et al.*, 2008). Based upon the idea that the innovation starts with creative ideas (Lace *et al.*, 2015), so leaders who can follow the businesses digitally are open to new changes in the organizations. This study is line with the previous study that digital leadership influenced business model innovation as part of digital transformation (Mihardjo *et al.*, 2019). From an organizational and individual perspective, Covid-19 pandemic highlighted the importance of digital era once again.

Organizations of the 21st century are fully expected to meet the needs of their stakeholders not only to raise the competitive advantage but also to keep the sustainability being among one of the best and respected for many years. However, unexpected events' occurrence may be overlooked and may cause various disadvantages for the organizations. Coping with these problems is required for many different parameters. In other words, leaders of the organizations are needed to have different kinds of skills, including real and virtual life management strategies. Meeting all stakeholders' needs, motivating the
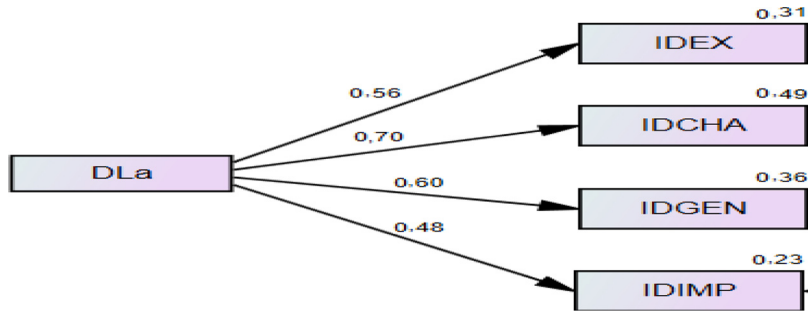

Figure 1.
Structural model results

Hypotheses	Relationship	B	β	C.R.	P Value
H1	Digital leadership–idea generation	0.54	0.60	13.369	***
H2	Digital leadership–idea exploration	0.64	0.56	11.978	***
H3	Digital leadership–idea championing	0.86	0.70	17.353	***
H4	Digital leadership–idea implementation	0.48	0.48	9.705	***

Table 5.
Results of structural model

Notes: ***$p < 0.001$; B: Unstandardized estimates; β: Standardized estimates; C.R.: Critical ratio

employees, following new changes and improvements in the technological world have been considered the priorities of the contemporary leaders of the organizations. Among the leadership styles, digital leadership has developed an entrepreneurial mindset as part of the innovation (Tanniru *et al.*, 2018). Thus, in addition to the other leadership styles, competence is required to become a fully digitalized leader as for all the organizations innovative aspect provides competitiveness (Fan, 2006).

Based on the results of the hypotheses tested, it can be concluded that digital leadership significantly affects all four dimensions of innovative work behavior. The results of the current study indicate that it is practically important for leaders to understand that to be able to obtain sustainability both for the organization and the employee, following the new technology and perceiving the necessity of innovativeness foster the organization. Employees who perceive their leaders as digitally sufficient have the continuity of the exchange interaction and feel confident towards the organization.

Implications

Theoretically, the findings of the study enrich comprehending the relationship between digital leadership and innovative work behavior of the employees. Digital leadership based on Hambrick and Mason's Upper Echelon Theory (1984), leadership is an important key in organizing the resources to sustain business in the future (Wasono and Furinto, 2018). Digitally skilled leaders stimulate innovative approaches of the employees, which leads to higher motivation and performance. This study sheds light on the importance of research regarding digital leaders' impact on employees. The implementation of the digital developments which facilitate organizational work outcomes should be encouraged to be used in the organizations by the leaders.

Leaders of the organizations apart from the leadership style have been expected to be more adaptable to the new technology to be able to make the employees adapt the current developments. It can be said that digitally oriented leaders specifically in developing countries such as Turkey need to follow the digitalization, digital developments closely and implement them rapidly to compete and survive in the global competition. COVID-19 pandemic also highlights the global change and innovation in all the industries. Organizations managed by digitally skilled leaders have been adapted to the inevitable changes as a result of the pandemic, unlike the organizations which have the low capacity to perform innovative approaches in both service and product organizations. Just like almost all the countries on earth, Turkey has also been experiencing the effects of the COVID-19 pandemic. Thus, the current study conducted in the Turkish organizations has revealed the importance of the organizations with digital leaders have had high innovative work behavior which helps these organizations to experience fewer devastating effects of the pandemic which is now thought and accepted as being one of the competition struggles for the organizations.

Practically, organizations require innovations to meet the changing needs and preferences of the customers/stakeholders as a result of the rapid technological developments. In addition to the vision of the leaders of the organizations, digitally skilled leaders support and motivate the employees and help them show innovation work behaviors. Organizations should pay attention to the digital transformation of the 21st century and develop business models based on innovative approaches.

Research limitations and future research directions

As with any study, this current study has potential limitations. For example, the study can be replicated in different cultural contexts. For the future studies, data can be gathered from

further samplings such as health care, tourism and education organizations. Longitudinal studies can be conducted by observing the effects of digitalization in the organizations. For the future studies, more variables such as extra-role behavior, psychological well-being, job satisfaction can be tested in the digital transformation contexts. Our research reveals the positive and significant effect of digital leadership on innovative work behavior, whereas future studies should go further by adding mediating or moderating variables such as emotional intelligence or employee indifference. The current study examined the effect of digital leadership; however, innovative work behavior is just one of the results that employees have been experiencing. For the future studies regarding the digitalization or as a leadership style being a digital leader can be taken into account as a core independent variable and the results which are obtained can provide contribution to the importance of being a competent digital leader. Besides, dependent variables can be gathered by conducting a qualitative study.

References

Afsar, B., Badir, Y.F. and Saeed, B.B. (2014), "Transformational leadership and innovative work behavior", *Industrial Management & Data Systems*, Vol. 114 No. 8, pp. 1270-1300.

Alos-Simo, L., Verdu-Jover, A.J. and Gomez-Gras, J.M. (2017), "How transformational leadership facilitates e-business adoption", *Industrial Management and Data Systems*, Vol. 711 No. 2, pp. 382-397.

Anderson, J.C. and Gerbing, D.W. (1984), "The effect of sampling error on convergence, improper solutions, and goodness-of-fit indices for maximum likelihood confirmatory factor analysis", *Psychometrika*, Vol. 49 No. 2, pp. 155-173.

Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: a review and recommended two-step approach", *Psychological Bulletin*, Vol. 103 No. 3, pp. 411-423.

Antonopoulou, H., Halkiopoulos, C., Barlou, O. and Beligiannis, G.N. (2020), "Leadership types and digital leadership in higher education: behavioural data analysis from university of Patras in Greece", *International Journal of Learning, Teaching and Educational Research*, Vol. 19 No. 4, pp. 110-129.

Auernhammer, J. and Hall, H. (2014), "Organizational culture in knowledge creation, creativity and innovation: towards the Freiraum model", *Journal of Information Science*, Vol. 40 No. 2, pp. 154-166.

Baer, M. (2012), "Putting creativity to work: the implementation of creative ideas in organizations", *Academy of Management Journal*, Vol. 55 No. 5, pp. 1102-1119.

Bagheri, A. and Akbari, M. (2018), "The impact of entrepreneurial leadership on nurses' innovation behavior", *Journal of Nursing Scholarship*, Vol. 50 No. 1, pp. 28-35.

Bammens, Y.P. (2016), "Employees' innovative behavior in social context: a closer examination of the role of organizational care", *Journal of Product Innovation Management*, Vol. 33 No. 3, pp. 244-259.

Barker, R.A. (2001), "The nature of leadership", *Human Relations*, Vol. 54 No. 4, pp. 469-494.

Barrett, D.J. (2006), "Strong communication skills a must for today's leaders", *Handbook of Business Strategy*, Vol. 7, pp. 385-390.

Bennis, W. (2013), "Leadership in a digital world: embracing transparency and adaptive capacity", *MIS Quarterly*, Vol. 37 No. 2, pp. 635-636.

Bentler, P.M. and Chou, C.P. (1987), "Practical issues in structural modeling", *Sociological Methods and Research*, Vol. 16 No. 1, pp. 78-117.

Beresford, J. (2018), "Digital business transformation: an Australian perspective", Gartner, pp. 1-17, available at: www.gartner.com/doc/3885879/digital-business-transformation-australia-perspective (accessed 9 December 2020).

Bysted, R. (2013), "Innovative employee behavior: the moderating effects of mental involvement and job satisfaction on contextual variables", *European Journal of Innovation Management*, Vol. 16 No. 3, pp. 268-284.

Chen, Y., Chang, C. and Lin, Y. (2014), "Green transformational leadership and green performance: the mediation effects of green mindfulness and green self-efficacy", *Sustainability*, Vol. 6 No. 10, pp. 6604-6621.

Çimen, İ. and Yücel, C. (2017), "Yenilikçi davranış ölçeği (YDÖ): türk kültürüne uyarlama çalışması", *Cumhuriyet Uluslararası Eğitim Dergisi*, Vol. 6 No. 3, pp. 365-381.

Copeland, M.K. (2016), "The impact of authentic, ethical, transformational leadership on leader effectiveness", *Journal of Leadership, Accountability and Ethics*, Vol. 13 No. 3, pp. 79-97.

De Jong, J. (2006), "Individual innovation: the connection between leadership and employees' innovative work behavior", available at: www.entrepreneurship-sme.eu/pdf-ez/R200604.pdfEIMBusinessandPolicyResearchinitsseriesScalesResearchReportswithnumberR200604 (accessed 15 December 2020).

De Jong, J. and Den Hartog, D.N. (2010), "Measuring innovative work behaviour", *Creativity and Innovation Management*, Vol. 19 No. 1, pp. 23-35.

De Waal, B., Van Outvorst, F. and Ravesteyn, P. (2016), "Digital leadership: the objective - subjective dichotomy of technology revisited", *12th European Conference on Management, Leadership and Governance ECMLG*, (November), pp. 52-61.

Dery, K., Sebastian, I.M. and van der Meulen, N. (2017), "The digital workplace is key to digital innovation", *MIS Quarterly Executive*, Vol. 16 No. 2, pp. 135-152.

Dittes, S., Richter, S., Richter, A. and Smolnik, S. (2019), "Toward the workplace of the future: how organizations can facilitate digital work", *Business Horizons*, Vol. 62 No. 5, pp. 649-661.

Domínguez-Escrig, E., Mallén-Broch, F.F., Lapiedra-Alcamí, R. and Chiva-Gómez, R. (2019), "The influence of leaders' stewardship behavior on innovation success: the mediating effect of radical innovation", *Journal of Business Ethics*, Vol. 159 No. 3, pp. 849-862.

Dorner, K. and Edelman, D. (2015), "What 'digital' really means", *McKinsey and Company, July 2015*, available at: www.mckinsey.com/industries/high-tech/our-insights/what-digital-really-means (accessed 15 December 2020).

Du Toit, A., Viviers, R., Mayer, C.H. and Visser, D. (2017), "Emotional intelligence and leadership in a South African financial services institution", *South African Journal of Labour Relations*, Vol. 41 No. 1, pp. 1-14.

Ekvall, G. and Arvonen, J. (1991), "Change-centered leadership: an extension of the two-dimensional model", *Scandinavian Journal of Management*, Vol. 7 No. 1, pp. 17-26.

Ekvall, G. and Ryhammar, L. (1998), "Leadership style, social climate and organizational outcomes: a study of a Swedish university college", *Creativity and Innovation Management*, Vol. 7 No. 3, pp. 126-130.

El Sawy, O.A., Kræmmergaard, P., Amsinck, H. and Vinther, A.L. (2016), "How LEGO built the foundations and enterprise capabilities for digital leadership", *MIS Quarterly Executive*, Vol. 15 No. 2, pp. 141-166.

Fan, P. (2006), "Catching up through developing innovation capability: evidence from china's telecom-equipment industry", *Technovation*, Vol. 26 No. 3, pp. 359-368.

Fatima, T., Majeed, M. and Saeed, I. (2017), "Does participative leadership promote innovative work behavior: the moderated mediation model", *Business and Economic Review*, Vol. 9 No. 4, pp. 139-156.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Fried, V.H. and Hisrich, R.D. (1994), "Toward a model of venture capital investment decision making", *Financial Management*, Vol. 23 No. 3, pp. 28-37.

Gama, F., Frishammar, J. and Parida, V. (2019), "Idea generation and open innovation in SMEs: when does market-based collaboration pay off most?", *Creativity and Innovation Management*, Vol. 28 No. 1, pp. 113-123.

Government of Denizli. (2020), "Textile sector", available at: www.denizli.gov.tr/tekstil-sektoru (accessed 20 December 2020).

Haddud, A. and McAllen, D. (2018), "Digital workplace management: exploring aspects related to culture, innovation, and leadership", *2018 Portland International Conference on Management of Engineering and Technology (PICMET): Technology Management for Interconnected World*, pp. 1-6.

Hair, J.F., Sarstedt, M., Ringle, C.M. and Mena, J.A. (2012), "An assessment of the use of partial least squares structural equation modeling in marketing research", *Journal of the Academy of Marketing Science*, Vol. 40 No. 3, pp. 414-433.

Hambrick, D.C. and Mason, P.A. (1984), "Upper echelons: the organization as a reflection of its top managers", *The Academy of Management Review*, Vol. 9 No. 2, pp. 193-206.

House, R. and Baetz, M. (1979), "Leadership: some empirical generalizations and new research directions", in Staw, B. (Ed.), *Research in Organizational Behavior: An Annual Series of Analytical Essays and Critical Reviews*, Elsevier, Amsterdam, pp. 341-423.

Hu, L. and Bentler, P.M. (1999), "Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 6 No. 1, pp. 1-55.

Iqbal, A., Latif, K.F. and Ahmad, M.S. (2020b), "Servant leadership and employee innovative behaviour: exploring psychological pathways", *Leadership and Organization Development Journal*, Vol. 41 No. 6, pp. 813-827.

Iqbal, N., Anwar, S. and Haider, N. (2015), "Effect of leadership style on employee performance", *Arabian Journal of Business and Management Review*, Vol. 5 No. 5, pp. 1-6.

Iqbal, Z., Abid, G., Contreras, F., Hassan, Q. and Zafar, R. (2020a), "Ethical leadership and innovative work behavior: the mediating role of individual attributes", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 6 No. 3, p. 68.

Jansen, J.J.P., Vera, D. and Crossan, M. (2009), "Strategic leadership for exploration and exploitation: the moderating role of environmental dynamism", *The Leadership Quarterly*, Vol. 20 No. 1, pp. 5-18.

Janssen, O. (2000), "Job demands, perceptions of effort–reward fairness and innovative work behaviour", *Journal of Occupational and Organizational Psychology*, Vol. 73 No. 3, pp. 287-302.

Johansen, R. (2012), *Leaders Make the Future: Ten New Leadership Skills for an Uncertain World*, Berrett-Koehler Publishers, San Francisco, CA.

Jung, D.I., Chow, C. and Wu, A. (2003), "The role of transformational leadership in enhancing organizational innovation: hypotheses and some preliminary findings", *The Leadership Quarterly*, Vol. 14 Nos 4/5, pp. 525-544.

Kane, G.C. Palmer, D. Phillips, A.N. Kiron, D. and Buckley, N. (2015), "Strategy, not technology, drives digital transformation", *MIT Sloan Management Review and Deloitte University Press*, available at: http://sloanreview.mit.edu/projects/strategy-drives-digital-transformation, Vol. 14 No. 1-25, (accessed 20 December 2020).

Kanter, R.M. (1988), "When a thousand flowers bloom: structural, collective, and social conditions for innovation in organizations", in Myers, P.S. (Ed.), *Knowledge Management and Organizational Design*, Oxford, Butterworth-Heinemann, Vol. 10 pp. 93-131.

Kheng, Y.K., Mahmood, R. and Beris, S.J.H. (2013), "A conceptual review of innovative work behavior in knowledge intensive business services among knowledge workers in Malaysia", *International Journal of Business, Humanities and Technology*, Vol. 3 No. 2, pp. 91-99.

Kickul, J. and Gundry, L.K. (2001), "Breaking through boundaries for organizational innovation: new managerial roles and practices in e-commerce firms", *Journal of Management*, Vol. 27 No. 3, pp. 347-361.

Kline, R.B. (1998), *Principles and Practice of Structural Equation Modeling*, Guilford Press, New York, NY.

Lace, N., Buldakova, N. and Rumbinaitė, G. (2015), "Organizational creativity as a driving force for company's innovative development", *Entrepreneurship and Sustainability Issues*, Vol. 3 No. 2, pp. 137-148.

Li, C. (2010), *Open Leadership: How Social Technology Can Transform the Way You Lead*, San Francisco, John Wiley & Sons.

Li, H., Sajjad, N., Wang, Q., Muhammad Ali, A., Khaqan, Z. and Amina, S. (2019), "Influence of transformational leadership on employees' innovative work behavior in sustainable organizations: test of mediation and moderation processes", *Sustainability*, Vol. 11 No. 6, pp. 1594-1615.

Lipman-Blumen, J. (1992), "Connective leadership: female leadership styles in the 21st-century workplace", *Sociological Perspectives*, Vol. 35 No. 1, pp. 183-203.

Litvinenko, V.S. (2020), "Digital economy as a factor in the technological development of the mineral sector", *Natural Resources Research*, Vol. 29 No. 3, pp. 1521-1541.

Luján-Ornelas, C., Güereca, L.P., Franco-García, M.L. and Heldeweg, M. (2020), "A life cycle thinking approach to analyse sustainability in the textile industry: a literature review", *Sustainability*, Vol. 12 No. 23, p. 10193.

Luque Gonzalez, A. (2018), "Corruption in the transnational textile industry: an exception or the rule?", *Empresa y Humanismo*, Vol. 21 No. 2, pp. 123-184.

Maidique, M.A. (1980), "Entrepreneurs, champions, and technological innovation", *Sloan Management Review (Pre-1986)*, Vol. 21 No. 2, pp. 59-76.

Masood, M. and Afsar, B. (2017), "Transformational leadership and innovative work behavior among nursing staff", *Nursing Inquiry*, Vol. 24 No. 4, pp. 1-14.

Mihardjo, L., Sasmoko, S., Alamsjah, F. and Elidjen, E. (2019), "Digital leadership role in developing business model innovation and customer experience orientation in industry 4.0", *Management Science Letters*, Vol. 9 No. 11, pp. 1749-1762.

Mihardjo, L.W.W. and Sasmoko, S. (2019), "Digital transformation: digital leadership role in developing business model innovation mediated by co-creation strategy for telecommunication incumbent firms", *Strategy and Behaviors in the Digital Economy*, IntechOpen, London, pp. 1-18.

Mintzberg, H. (2010), "Managing on three planes", *Leader to Leader*, Vol. 57, pp. 29-33.

Oliver, K.M. (2016), "Professional development considerations for makerspace leaders, part one: addressing 'what?' and 'why?'", *TechTrends*, Vol. 60 No. 2, pp. 160-166.

Pearce, C.L. and Conger, J.A. (2002), *Shared Leadership: Reframing the Hows and Whys of Leadership*, Sage Publications, CA.

Perry-Smith, J.E. and Mannucci, P.V. (2017), "From creativity to innovation: the social network drivers of the four phases of the idea journey", *Academy of Management Review*, Vol. 42 No. 1, pp. 53-79.

Petry, T. (2018), "Digital leadership", in North, K., Maier, R. and Haas, O. (Eds), *Knowledge Management in Digital Change*, Springer, Cham. pp. 209-218.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. and Podsakoff, N.P. (2003), "Common method biases in behavioral research: a critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88 No. 5, pp. 879-903.

Richardson, J.W., Bathon, J., Flora, K.L. and Lewis, W.D. (2012), "NETS-A scholarship: a review of published literature", *Journal of Research on Technology in Education*, Vol. 45 No. 2, pp. 131-151.

Rigby, D.K., Sutherland, J. and Takeuchi, H. (2016), "Embracing agile", *Harvard Business Review*, Vol. 94 No. 5, pp. 40-50.

Rudito, P. and Sinaga, M.F. (2017), *Digital Mastery, Membangun Kepemimpinan Digital Untuk Memenangkan Era Disrupsi*, Gramedia Pustaka Utama, Jakarta.

Santoso, H., Elidjen, E., Abdinagoro, S. and Arief, M. (2019), "The role of creative self-efficacy, transformational leadership, and digital literacy in supporting performance through innovative work behavior: evidence from telecommunications industry", *Management Science Letters*, Vol. 9 No. 13, pp. 2305-2314.

Sarros, J.C., Cooper, B.K. and Santora, J.C. (2008), "Building a climate for innovation through transformational leadership and organizational culture", *Journal of Leadership and Organizational Studies*, Vol. 15 No. 2, pp. 145-158.

Schumacker, R.E. and Lomax, R.G. (2004), *A Beginner's Guide to Structural Equation Modeling*, Lawrence Erlbaum Associates Publishers, New Jersey.

Sethibe, T. and Steyn, R. (2015), "The relationship between leadership styles, innovation and organisational performance: a systematic review", *South African Journal of Economic and Management Sciences*, Vol. 18 No. 3, pp. 325-337.

Sethibe, T. and Steyn, R. (2017), "The impact of leadership styles and the components of leadership styles on innovative behaviour", *International Journal of Innovation Management*, Vol. 21 No. 2, pp. 1-15.

Sheninger, E. (2019), *Digital Leadership: Changing Paradigms for Changing Times*, Corwin Press, CA.

Sönmez, B. and Yıldırım, A. (2014). "Bir üniversite hastanesinde çalışan hemşirelerin yenilikçi davranışları ve yenilikçi davranışlarını etkileyen faktörlere ilişkin görüşlerinin belirlenmesi: niteliksel bir çalışma", *Sağlık ve Hemşirelik Yönetimi Dergisi*, Vol. 1 No. 2, pp. 49-59.

Sow, M. and Aborbie, S. (2018), "Impact of leadership on digital transformation", *Business and Economic Research*, Vol. 8 No. 3, pp. 139-148.

Stoffers, J.M., Van der Heijden, B.I. and Notelaers, G.L. (2014), "Towards a moderated mediation model of innovative work behaviour enhancement", *Journal of Organizational Change Management*, Vol. 27 No. 4, pp. 642-659.

Tanniru, M., Khuntia, J. and Weiner, J. (2018), "Hospital leadership in support of digital transformation", *Pacific Asia Journal of the Association for Information Systems*, Vol. 10 No. 3, pp. 1-24.

Timurcanday Özmen, Ö.N., Eriş, E.D. and Süral Özer, P. (2020), "Dijital liderlik çalışmalarına bir bakış", *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, Vol. 25 No. 1, pp. 57-69.

Toduk, Y. (2014), *2023 Lideri-Dijital çAğın Liderlik Sırları*, Dogan Egmont Yayınları, Istanbul.

Tremblay, K. (2017), "Healthcare@ the speed of thought: a digital world needs successful transformative leaders", *Healthcare Management Forum*, Vol. 30 No. 5, pp. 246-251.Sage CA: Los Angeles, CA: SAGE Publications.

Turkish Exporters Assembly (TIM). (2020), "2020 Export report", available at: https://tim.org.tr/files/downloads/Strateji_Raporlari/%C4%B0hracat%202020%20Raporu.pdf. (accessed 25 December 2020).

TURKONFED. (2018), "Dijital anadolu 2 sektör bazlı dijital dönüşüm yol haritası", available from https://turkonfed.org/Files/ContentFile/dijitalanadolu_2_raporu.pdf (accessed 21 October 2021).

TÜSİAD. (2016), "Türkiye'nin küresel rekabetçiliği için bir gereklilik olarak sanayi 4.0", available at: www.tusiad.org/indir/2016/sanayi-40.pdf (accessed 20 September 2021).

Ulutaş, M. and Arslan, H. (2017), "Bilişim liderliği ölçeği: Bir ölçek geliştirme çalışması", *Marmara Üniversitesi Atatürk Eğitim Fakültesi Eğitim Bilimleri Dergisi*, Vol. 47 No. 47, pp. 105-124.

Wagner, M., Heil, F., Hellweg, L. and Schmedt, D. (2019), "Working in the digital age: not an easy but a thrilling one for organizations, leaders and employees", in Krüssel, P. (Ed.), *Future Telco Successful Positioning of Network Operators in the Digital Age*, Springer, Cham, pp. 395-410.

Wasono, L.W. and Furinto, A. (2018), "The effect of digital leadership and innovation management for incumbent telecommunication company in the digital disruptive era", *International Journal of Engineering and Technology*, Vol. 7, pp. 125-130.

West, M.A. (2002), "Sparkling fountains or stagnant ponds: an ıntegrative model of creativity and ınnovation ımplementation in work groups", *Applied Psychology*, Vol. 51 No. 3, pp. 355-387.

Winston, B.E. and Patterson, K. (2006), "An integrative definition of leadership", *International Journal of Leadership Studies*, Vol. 1 No. 2, pp. 6-66.

Ye, H. (2018), "Encouraging innovations of quality from user innovators: an empirical study of mobile data services", *Service Science*, Vol. 10 No. 4, pp. 423-441.

Yidong, T. and Xinxin, L. (2013), "How ethical leadership influence employees' innovative work behavior: a perspective of intrinsic motivation", *Journal of Business Ethics*, Vol. 116 No. 2, pp. 441-455.

Yuan, F. and Woodman, R.W. (2010), "Innovative behavior in the workplace: the role of performance and image outcome expectations", *Academy of Management Journal*, Vol. 53 No. 2, pp. 323-342.

Yücebalkan, B. (2020), "A view from the holistic perspective to current leadership: digital leadership + green transformational leadership", *International Journal of Disciplines Economics and Administrative Scienves Studies*, Vol. 6 No. 18, pp. 388-396.

Yusof, M.R., Mohd Faiz, M.Y. and Ibrahim, M.Y. (2019), "Digital leadership among school leaders in Malaysia", *International Journal of Innovative Technology and Exploring Engineering*, Vol. 8 No. 9, pp. 1481-1485.

Further reading

Bammens, Y., Notelaers, G. and Van Gils, A. (2013), "Employees as a source of innovation: the role of perceived organizational support in family firms", in Atinc, G. (Ed.), *Academy of Management Proceedings*, Academy of Management, Briarcliff Manor, New York, NY, 10510, (1), pp. 89-94.

İstanbul Sanayi Odası. (2020), "İstanbul bölgesi sanayide dijital dönüşüm analizi raporu", available at: www.istka.org.tr/media/132479/%C4%B0stanbul-sanayi-odas%C4%B1-%C4%B0stanbul-b%C3%B6lgesi-sanayide-dijital-d%C3%B6n%C3%BC%C5%9F%C3%BCm-analizi-raporu-plastik-ve-kimya-sekt%C3%B6r%C3%BC.pdf (accessed 25 October 2021).

Jöreskog, K.G. and Sörbom, D. (1993), *LISREL 8: Structural Equation Modeling with the SIMPLIS Command Language*, Scientific Software International, Lincolnwood, IL.

Khan, A.M., Jantan, A.H.B., Salleh, L.B.M., Dato'Mansor, Z., Islam, M.A. and Hosen, S. (2019), "The impact of transformational leadership effects on innovative work behavior by the moderating role of psychological empowerment", *Journal of Reviews on Global Economics*, Vol. 8, pp. 925-938.

Mihardjo, L.W.W. and Rukmana, R.A. (2018), "Does digital leadership impact directly or indirectly on dynamic capability: case on Indonesia telecommunication industry in digital transformation?", *The Journal of Social Sciences Research*, Vol. 2, pp. 832-841.

Millar, C.C., Culpin, V., Stoffers, J.M., Van der Heijden, B.I. and Notelaers, G.L. (2014), "Towards a moderated mediation model of innovative work behaviour enhancement", *Journal of Organizational Change Management*, Vol. 27 No. 4, pp. 642-659.

Mintzberg, H. (1973), *The Nature of Managerial Work*, Harper and Row, New York, NY.

Tabachnick, B.G. and Fidell, L.S. (2013), *Using Multivariate Statistics*, 6th ed., Pearson, Boston.

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