Digital Leadership and Maturity as a Key to Successful Digital Transformation: Country Case Study of Croatia

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Abstract **- Organizations are facing a disrupted environment, which results in a need for managers who can quickly respond to volatile conditions. Such conditions lead to changes in traditional leadership and the construction of new leadership recognized by contemporary literature as digital leadership (DL). The main objective of this research paper is to examine the levels of DL and digital maturity (DM) in small and medium-sized Croatian companies in the context of digital transformation (DT). The research sample included 156 companies, and the results indicated relatively high levels of DL; indeed, nearly four companies achieved the highest level of DM. The results indicated a negative correlation between the level of DL and DM. Gender was shown to have an impact on the level of DL, while it was not indicated that gender has an impact on the level of DM.**

Keywords **– digital leadership, digital maturity, digital transformation, management, primary research.**

1. Introduction

Cortellazzo, Bruni and Zampieri [7] state that digital technology has irreversibly changed organizations.

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Mwita and Joanthan [20] state that "digitalization and DT can potentially change almost every aspect of our society." According to [10], 82% of respondents claim that they are sufficiently skilled in the use of digital technologies within workplace, and 15% of respondents think that they are not sufficiently skilled; moreover, managers are more likely to agree with this claim (91%) than manual workers (74%). [30] claim that changes in technology, work, organizations, and the human mindset have led to new views of leadership and emphasize the critical role leadership plays in managing organizational and technological changes.

Moreover, 80% of the respondents participating in a recent Global Human Capital Trends report [8] consider that 21st-century leadership entails unique requirements that are relevant for their organizations' success, such as the ability to lead through complexity and ambiguity, the ability to manage a workforce composed of a combination of humans and machines, and the ability to lead dynamically. On the other hand, only 41% of these respondents think that their organizations are able to meet new leadership requirements [8].

A literature review shows that the DL concept is not clearly understood and that a consensus on the definition does not exist [21]. Academics are trying to setup definition of DL and the specific of this kind of leadership as a result of Industry 4.0 [15]. Most companies must implement DT to maintain their business. A company that is ready for DT can benefit from advantages such as productivity increases, improved quality of service, and increased insights into customers' needs [35]. The advantages of DT place a greater focus on leadership to successfully manage this process with the aim of increasing company performance. [27] claim that, as with all change initiatives, DT requires that leaders lead their organizations' pursuit of digital innovation. Additionally, [18], [32] and [16] claim that the support of top-level management is crucial for the successful maintain of DT.

[15] state that exiting literature review emphasizes the growing presence of the term DL in scientific papers. Furthermore, the role of DL in DT and the level of DM is not adequately present in empirical studies. Over the last few decades, academics have been analyzing the effects of digitalization processes, but due to the rapid development of technology, an update on this topic is needed [7].

2. Literature review

This section will present a literature review of digital leadership, digital maturity and digital transformation. The research results of the previous study are presented.

2.1. Digital leadership

Zeike et al. [18] claim that increasing digitalization is rapidly changing modern work and that managers have to deal with new challenges; moreover, they emphasize the role of DL in managing such challenges and focusing on managerial skills needed for DT. [12] states that "digital leadership can be explained as leadership in a digital context and includes managing firms in a digital setting or by leaders with a personal digital background." [2] state that DL is companies' response to changing business environments and that Industry 4.0 require a new leadership method. [4] state that leaders who operate in today's market conditions have to embrace a global mindset in supporting an innovation culture. Modern leaders "must have skills and commitment to ensure successful digital transformation" [27]. [17] propose that "digital leadership implies the ability to involve all members of the organization in the digitalization process and to recognize and develop the skills and abilities needed to carry it out". [6] state that demands on managers are subject to DT processes, which have an impact on society's understanding of leadership.

[30] define DL as "a process of social influence mediated by technology to produce a change in attitudes, feelings, thinking, behavior and/or performance with individuals, groups, and/or organizations, which can occur at any hierarchical level in an organization and can involve one-to-one and/or one-to-many interactions". [1] define digital leadership as "the systematic use of an organization's digital data to accomplish corporate objectives", and they state that DL applies to both corporate and personal settings. DL focuses on new technologies, and digital leaders anticipate technological developments and have to communicate them internally and externally with a clear vision [2]. The role of digital leadership is crucial to manage digital transformation" [27].

Digital leaders must act rapidly and flexibly within networked and distributed organizational structures and manage organizations' DT [13]. [20] clarify that the characteristics relevant to digital leadership "are those that facilitate digital innovation and enable initiation and implementation of digital transformation within an organization while imparting knowledge and skills to subordinates."

[14] researched industrial companies in northwest Germany to define executives' leadership challenges, skills, and personality traits in terms of digital leaders. Their results indicate that the most frequently mentioned skills are the capability to motivate and to predict the future, and finally, a skill characteristic of the digital age, namely, big data skills. [14] state that "when hiring new executives, particular attention should be paid to ensuring that they have strong self-organization and IT skills, a strong ability to motivate others, and a profound ability to think and act entrepreneurially."

[27] conducted qualitative research on 41 construction industry professionals in the UK to define a taxonomy of DL. The results indicate that DL types can be characterized based on six themes, namely, proactive and forward-thinking, supportive, uncoordinated, cautious, resistant and visionless, and undriven; these themes shape the perceptions of the study participants on how the leaders in their organizations are managing or not managing the DT process [27]. [19] researched Indonesian telecommunication firms, analyzing 88 participating managers to determine the impact of DL on dynamic capability. The results reveal impacts of DL on alliance capability, dynamic capability, and market orientation, showing that the culture and behavior managers and companies that are adaptive to change and responsive to the market create value for customers and companies themselves. [13] conducted a content analysis of relevant literature and defined three groups of DL characteristics: “characteristics related to digital business (innovative vision, networking intelligence, digital intelligence, digital talent scouting, complexity mastery, business intelligence, ambidexterity), characteristics concerning social leadership attitudes (motivating coaching, role model status, democratic delegation, employee-orientation, social intelligence, openness, diversity championing, ethics) and general mindset characteristics (adaptable, agile, learning from errors, decisively courageous, creative, self-aware, knowledge-oriented, life-long learner).” [28] conducted a qualitative study in the USA, and they indicate that leadership plays a central part in the adoption of organizational changes, such as DT; however, they found no evidence showing that a specific leadership style is optimal in terms of its positive impact.

2.2. Digital maturity and digital transformation

[9] define DM as a term "which describes willingness and ability of the company to change and apply innovative technologies, depending on the trends, in order to remain competitive in the market." [22] state that a firm's DM is its current level of DT. [23] provide DM models to support management in defining plans for organizations' DT. [29] claim that DM enables companies to provide better services, achieve a higher level of competitiveness and create an environment that facilitates adequate reactions in disruptive environments. Many authors have defined models for assessing the level of DM, and these models include "dimensions and criteria, which describe the key areas of action, and the different stages that indicate the evolution path towards maturity" [26].

[31] claim that DM models are common in the literature, but research are relatively sparse. [34] investigated digital business maturity in European Union countries using data from the European Statistical Office database. The results show that Denmark, Malta, and Finland are in the "expert" class, while Croatia ranks 12th or within the "intermediate" class out of a total of 27 EU countries. [9] conducted research on the DM status of companies on The Baltic Main List; moreover, the results indicate that a higher level of DM is possessed by companies operating in the telecom, IT, health care, and energy industries, while the main laggards are firms in the real estate and materials industries. Additionally, the results indicate positive correlations between DM and a company's sales growth and capital profitability. [3] assessed DM of companies in 11 countries of Europe, and Croatia ranked 4th. [5] conducted research on Turkish SMEs, and the results indicate that DM positively impacts firm performance. [25] conducted research on 260 Brazilian companies, and the results indicate that DM reflects itself positively in digital strategy.

Companies are transforming their traditional workplaces into digital workplaces across various economic sectors regardless of organizational size [7]. [37] defines digitalization as a driving force of transformation in industries, and it gives rise to changes that affect all industry sectors, companies of all scales, employees, and all aspects of life. [27] claim that DT can be described as an opportunity for innovation in organizations. [13] states that DT is a digitalization experience "which transforms business processes, business models, customer relations and operations and leads to destructive changes in all business structures".

[19] state that the DT is essential to achieve better response and business agility. DT cannot be observed as just a technological proposition, and it causes significant changes in the process and organizational aspects of companies [13].

[7] claim that leaders are the main actors in the development of digital culture, and they need to create relationships with numerous stakeholders and enable collaborative processes in complex environments while attending to ethical concerns. Effective digital transformation management is necessary to realize the positive impacts of DT, and leaders must possess the skills and commitment needed to ensure successful DT [27]. DT starts with DL and a vision to enable all activities and processes [19]. [13] defines DT as a state in which businesses have different DM levels. [27] state that DT is an opportunity for innovation in organizations, but [36] claim that the evolution of human capital slows down the process of DT.

3. Methods

In this section, research questions, sample, and research methods are defined. The results of the research are represented.

3.1. Research questions and sample

According to the statements of academics, the main aim of this paper is to analyze the impact of DL on DT and the level of DM in Croatian companies. Based on professional and scientific literature, specific research questions supporting an arguable thesis are defined:

RQ1: What is the level of DL in Croatian companies?

RQ2: What is the level of DM in Croatian companies?

RQ3: Does DL have a positive impact on the level of DM?

RQ4: Does gender impact the level of DM?

RQ5: Does gender impact the level of DL?

To answer these questions, a survey was conducted using a questionnaire. The initial research sample included small and medium-sized Croatian companies that operated in category J, namely, information and communication, of the National classification of economic activities. The analysis included companies that were active and had more than one employee. According to Financial Agency (cro. FINA), the total number of companies in this category was 2650. These companies generated 16.25 billion HRK in income and employed 27487 employees in 2020. The first phase of research involved collecting the contact information of these companies based on secondary data. Each company's official website and other relevant web pages with company data were used to collect this contact information.

After those without such information were eliminated, the target research sample included 1821 small and medium-sized companies. In line with the research questions, primary quantitative research was conducted. To collect data about the levels of DM and DL in the examined companies, we conducted a survey via email, as this is one of the most efficient data collection methods used to collect quantitative data. To measure the variable DM, the DM model for practitioners developed by [11] was used, which has a general focus, is linear, and adopts a self-assessment approach [33]. To measure the variable of DL, we used a scale developed by [18]. This scale, which is designed to assess the level of DL, includes six items, attitudes, competencies, and behavior related to the use of digital tools (items 1–3) and digital leadership skills (items 4–6). Data were collected between November and December of 2021. Gender, age, and managerial experience were identified as variables that could impact our analysis of DL [18], so we also collected information on these factors from the participants who completed our questionnaire.

3.2. Results and discussion

The research results showed an overall response rate of 8.3%, that is, 156 responses. Regarding the gender distribution of the respondents in the research sample, 69.20% were men and 30.8% were women (Figure 1). The company age distribution is presented in Figure 2. Most of the companies had been operating for more than ten years (51.30%). The distribution of the managerial experience of the respondents is presented in Figure 3. Most of the respondents had more than ten years of experience. The respondents held management positions in their companies such as CEO, management board member, and middle management.

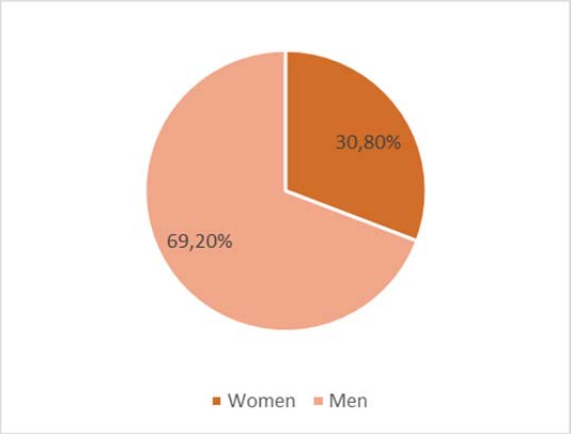

Figure 1: Gender of the respondents

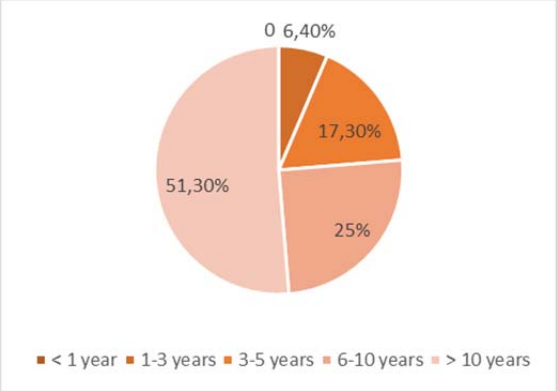

Figure 2: Company age

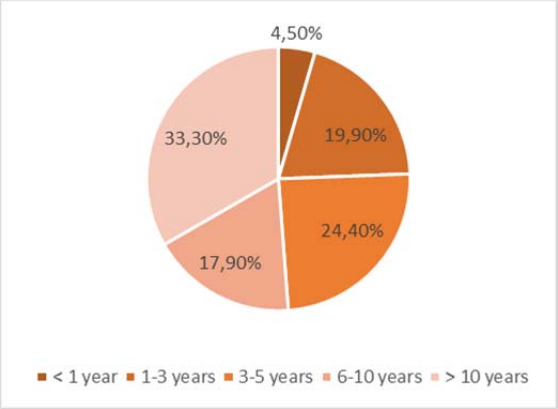

Figure 3: Managerial experience of the respondents

The level of digital maturity. Forrester's [11] model of DM includes 28 statements as follows: seven statements about culture, seven statements about organizations, seven statements about technology, and seven statements about insight. For each of these statements, the participants' answers were scored according to their level of agreement with each statement. A higher point score indicated a higher level of DM. The maximum possible number of points was 84. The scale defined four levels of DM (skeptics 0-33; adopters 34-52; collaborators 53-71; differentiators 72-84) (Forrester, 2016). The median level of DM was 57, indicating that more than 50% of the companies had reached the third or fourth level – collaborators or differentiators. The mean was 54, indicating that the average DM level was the third level, namely, collaborators. In general, 23% of the researched companies had achieved the highest level of DM, 39% of the companies had achieved the third level of DM, that is, collaborators, and 16% of companies were at the first stage of DM - skeptics (Figure 4). The results indicate that a significant number of the companies had reached the third level of DM; this reveals an opportunity for the researched companies to increase their level of DM. Generally, all the companies achieved their lowest scores on insight and their highest scores on technology.

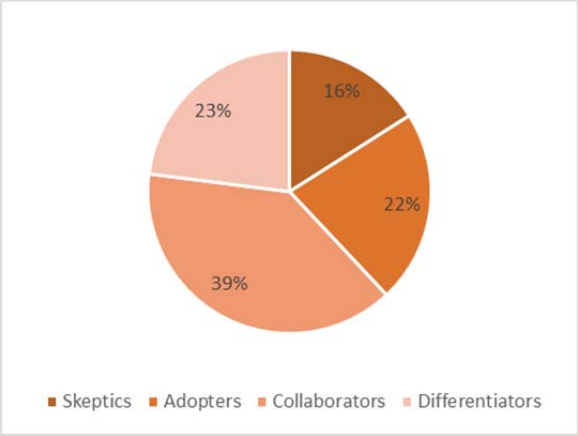

Figure 4: Level of digital maturity

The scale used to assess DL was developed by [18]. This scale designed to assess the level of DL includes six items, attitudes, competencies, and behavior related to the use of digital tools and DL skills. The respondents' answers ranged from 1 to 5, and a higher number of points indicated a higher level of DL. The maximum number of points was 30. The median level of DL was 25, indicating that more than 50% of the firms had a high level of DL. The mean was 25, indicating that the average level of DL was relatively high. Figure 5 shows the level of DL of the respondents. We defined three levels of DL (0-10 low level, 11-20 medium level, 21-30 high level). Most of the respondents, 92%, achieved a high level of DL. These results indicated that the respondents were aware of the importance of DL in the process of DT. In line with this, support from management was indicated; however, to achieve a high level of DM, other factors must be addressed.

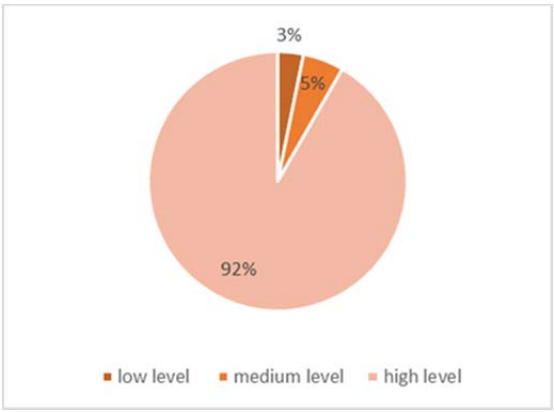

Figure 5: Level of digital leadership

Pearson correlation coefficient

To examine the impact of DL on the level of DM, we performed a Pearson correlation to test the empirical correlation. The Pearson correlation coefficient (-0,14875671) indicated that the analyzed variables had a weak and negative linear correlation.

These results mean that companies with a high level of DL have relatively low DM. According to the literature, we expected a positive correlation between these variables. These results could be the consequence of overly critical self-assessments on the part of respondents with higher levels of DL. The DL and DM variables were self-assessed, that is, they were dependent on the assessment process and the respondents' characteristics. Indeed, respondents with high levels of DL and much knowledge of DT may tend to rank a firm's DM lower due to their relatively extensive knowledge of DT. The lack of empirical studies in this field prevented us from comparing these results with those of existing studies.

Impact of gender on the levels of digital maturity and digital leadership

We analyzed whether gender has an impact on the level of DM and DL. We performed an ANOVA test to examine whether there was a significant difference between the two groups (male and female participants) in terms of DM and DL. The results of the ANOVA test for DM (Table 1) showed that there was no significant difference between the male respondents and the female respondents regarding DM (p value: 0,444577). These results indicated that self-assessments of DM are not impacted by gender.

Table 1: ANOVA: Gender and digital maturity

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Digital maturity male	108	5712	52,89	478,61
Digital maturity female	48	2674	55,71	383,79

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P value*	*F crit*
Between Groups	264,16	1	264,16	0,587	0,445	3,903
Within Groups	69248,58	154	449,67			
Total	69512,74	155				

The results of the ANOVA test for DL (Table 2) showed that there was a significant difference between the male respondents and the female respondents regarding DL (p value: 0,012613). These results indicated that self-assessments of DL are related to gender. The male participants had a higher average level of DL. Self-assessments of DL are relatively subjective assessments of individuals' characteristics rather than assessments of companies' DM levels. Therefore, in this assessment, gender had an impact because sets of individual characteristics have more impact on responses in this context. These results regarding the impact of gender on the level of DM and DL cannot be compared with empirical results because this relationship has not been analyzed.

When participants need to assess their DL abilities, women tend to believe that success results mainly from working hard, not from the possession of abilities [24], so this could be a result of this difference between the genders.

Table 2: ANOVA: Gender and digital leadership

SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Digital leadership male	108	2739	25,36	18,42		
Digital leadership female	48	1123	23,40	24,07		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P value*	*F crit*
Between Groups	128,35	1	128,35	6,371	0,013	3,903
Within Groups	3102,40	154	20,15			
Total	3230,74	155				

4. Limitations

The most significant limitation of this research is the self-assessment of the DL and DM variables. However, we collected results from individuals involved in managing companies who had the required knowledge about the DM and DL of their companies. Nevertheless, self-assessment tools allow for less-objective answers, and respondents' characteristics can influence answers. Respondents can be more or less critical than others when they complete questionnaires. It could be that some of the respondents who indicated a high level of DM were more critical in providing answers.

Another recognize limitation of this research is that one industry was examined, J Information and communication. This industry has some specificities that could have an impact on our general results. As [9] state in their research, a higher level of DM is exhibited by companies operating in the telecom and IT industry. Analyses must include companies from all sectors to obtain general results. Additionally, the lack of existing research in this scientific field is a limiting factor because the indicated results cannot be compared with results from other studies. Additionally, the lack of a valid assessment scale for DL is a limitation of this research.

5. Conclusion

The research results indicated that the examined Croatian companies reported a high level of DL. These results showed that leaders recognize the current market conditions and the importance of DL in Industry 4.0. The results indicated that the level of DL is higher than that of DM, which aligns with the results of [19], who state that DT starts with DL and a vision to enable all activities and processes.

Thus, it can be concluded that companies have laid the foundation for further DT to achieve a higher level of DM. The results reported a statistically significant difference between the responses of men and women, which is in line with the results of [18], who show that gender can have an impact on DL. The results indicated that 23% of the researched companies had achieved the highest level of DM but that 16% of them were at the first stage of DM; thus, most of the examined companies had the opportunity to increase their level of DM. Generally, all the companies achieved their lowest results in relation to insight and their highest results in relation to technology, indicating that digital leaders recognize that technology is the most important element of DT; however, other aspects such as insight are underestimated.

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