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LEADERSHIP CHARACTERISTICS IN THE ERA OF DIGITAL TRANSFORMATION

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ABSTRACT

Digital transformation provoked by Industry 4.0 should not be just seen as a technological issue, it causes also fundamental changes in processes and in organizations of companies. Notably a new understanding of leadership can be counted on to them. The so-called “digital leaders” are expected to act rapidly and flexible in networked and distributed organization structures on the one hand and on the other hand they have to manage the digital transformation of the organization. Since most of the companies are still in the beginning of their digital transformation, there is a lack of a common understanding and a standard model of digital leadership. Most of the existing research works are visionary and predict the requirements for digital leadership on anticipated technological, economical and organizational changes; only few of them report about changes in leadership based on implemented cases. The objective of this study is to sum up main characteristics of the leadership in the era of digital transformation by applying content analysis of literature review as the method.

Keywords: Leadership 4.0, Digital Leadership, Digital Leader

JEL Classification: M12, M15

DİJİTAL DÖNÜŞÜM DÖNEMİNDE LİDERLİK ÖZELLİKLERİ

ÖZ

Endüstri 4.0 sonucu tetiklenen dijital dönüşüm, sadece teknolojik bir konu olmamakta, işletmelerin süreç ve organizasyon yapılarında da temel değişikliklere neden olmaktadır. Özellikle yeni bir liderlik anlayışı bu değişikliklerden sayılabilir. “Dijital liderler”in bir yandan ağ şeklinde dağıtılmış yeni organizasyon yapılarında hızlı ve esnek davranmaları beklenirken, diğer yandan da şirketin dijital dönüşüm sürecini yönetmeleri gerekmektedir. İşletmelerin çoğu hâlâ dijital dönüşümlerinin başlangıcında olduğundan, dijital liderlik hakkında ortak bir anlayış ve standart bir dijital liderlik modeli yoktur. Mevcut araştırma çalışmalarının çoğu vizyoner yapıdadır ve beklenen teknolojik, ekonomik ve organizasyonel değişiklikler ışığında gerekli dijital liderlik özelliklerini öngörmektedirler; bunlardan sadece birkaçı uygulanan vakalara dayalı liderlik değişiklikleri hakkında rapor vermektedir. Bu çalışmanın amacı, dijital liderlik hakkındaki mevcut kaynakları içerik analizi yöntemini uygulayarak incelemek ve bunun sonucunda dijital dönüşüm çağında liderliğin temel özelliklerini tanımlamaktır.

Anahtar Kelimeler: Liderlik 4.0, Dijital Liderlik, Dijital Lider

JEL Kodları: M12, M15

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1. INTRODUCTION

Digital Transformation is the buzzword of the last 2-3 years because of the rapid development and dispersion of many digital technologies and especially Industry 4.0. Digital transformation means a more comprehensive digitalization experience as previously which transforms businesses processes, business models, customer relations and operations and leads to destructive changes in all business structures. The management of the digital transformation is a big challenge for organizations today. One of the key success factors is the capabilities of the acting people, especially of the leading people of the digital transformation process (Burmeister, Lüttgens ve Piller, 2016). Also Schwab (2017) considers the leadership capacity of organizations as the first imperative of digital transformation.

Dynamic environments with rapid changes in digital technologies, accelerated globalization and easy communication of distributed organizational forms are challenges digital leadership is facing with (Wilson, Goethals, Sorenson & Burns, 2004). Unfortunately there is a lack of a common understanding of digital culture and skills in the organization and of the new expected form of digital leadership (Oberer ve Erkollar, 2018). Some of the existing studies investigate which skills and traits executives need to successfully master digitalisation-related challenges, while some contributions suggest and systematize leadership skills.

The aim of this work is to define main characteristics of digital leadership based on existing studies. As research method content analysis of literature review is applied. Content analysis is a transparent and systematic way for executing literature reviews and it is conducted in this work both in a qualitative and in a quantitative way. (Wilding, Wagner, Seuring & Gold, 2012). After the survey and filtering of literature resources their contents are analyzed to find descriptions of digital leadership, which are then brought together and categorized to find main characteristics of leadership in the context of digital transformation. The characteristics will be then ranked according to their frequencies in various sources and grouped according to their functional affiliations. This systematic way of digital leadership character analysis differentiates this work from the existing ones.

The paper is structured in five chapters. In the following chapter the terms digital transformation and digital leadership are defined. Then in the third chapter the literature content analysis approach of the work is presented, which consists of the phases survey,

elimination, data collection and categorization. In the fourth chapter of the work the characteristics of digital leadership are grouped and examined in detail. A conclusion and an outlook of further research points constitute the last chapter.

2. DIGITAL TRANSFORMATION AND DIGITAL LEADERSHIP

The digitalization in businesses started with the use of computers where digital data is managed. Then digitalization manifested itself in businesses as automation of business processes, and afterwards led businesses to change their business models with the support of various digital technologies, especially the Internet. With the rapid development and integration possibilities of new emerging digital technologies like Big Data, Cloud Computing, Social Media, Artificial Intelligence, Augmented Reality etc. within the fourth Industrial Revolution Industry 4.0, digitalization became more disruptive and started to be called as “Digital Transformation (DT)”, since the digitalization process in businesses includes a comprehensive transformation of business processes, business models and organizational structures (Berghaus and Back, 2016; Fitzgerald, Kruschwitz, Bonnet and Welch, 2014; Henriette, Feki and Boughzala, 2016; Hess, Matt, Benlian and Wiesböck, 2016). DT has remarkable effects on economy and on businesses, especially on how business are organized and led. Klaus Schwab, the executive chairman of the World Economic Forum, defined major impacts of DT on businesses (Schwab, 2017). According to him as a result of the changing customer behavior, since customers expect product experiences in real time and they share data about themselves and of the possibility to offer smart products and services enhanced with digital capabilities, companies develop new business models offering personalized product experiences. The companies should rethink their value chains and organizational structures and they are challenged to operate faster and flexible and they need appropriate leadership techniques to adapt to new market conditions and to keep their competitive advantage.

Digital Transformation is a continual process rising the extent of digitalization within the organization (Ivančić, Vukšić & Spremić, 2019). By using digital technologies more business processes are digital transformed and more digital business models are created. In this manner the organization is moving to a more digital one. It can be captured that DT is a state with different digital maturity levels of the businesses. At the same time the transformation process has to be led by a digital leader facing the disruptive challenges of DT. According to Staffen & Schoenwald (2016) digital leaders have to lead the DT so they could bring the organization through Industry 4.0 by managing the disruptive changes and

by motivating the employees. In a similar way another work defines digital leaders' function by their contribution to the transition toward a digital organization (Wilson et.al., 2004). El Sawy, Kræmmergaard, Amsinck & Vinther (2016) define DL as doing the right things for a successful digitalization of companies. However DL is not only leading the DT process, the resulting digital organization has also to be led. For example Bawany (2019) defines Leadership 4.0 as leading new ways of working and leading high-performing teams. Albrecht (2017) also considers DL from the perspective of leading a virtual organization. As also in the above definitions confirmed, unfortunately there is no overall conciousness about required changes in leadership in the era of DT (El Sawy et.al., 2016), since DL means leading the digital transformation process but also leading an organization in a digital environment depending on which digital maturity level the organization has.

The leadership before the digitalization is the classical leadership. Beginning with digitalization, DL concerns both the DT process and leading the organization in a digital environment (see Figure 1). The more digital transformation is completed the more a digital organization has to be led. When DT would come to an end state, the organization would be totally digital, then leadership would have just the mission to lead a digital organization. Today most of the companies are in the transforming process. Thus in this work DL means both leading the DT and the organization in a digital environment. So the researched characteristics will respect both leading aspects.

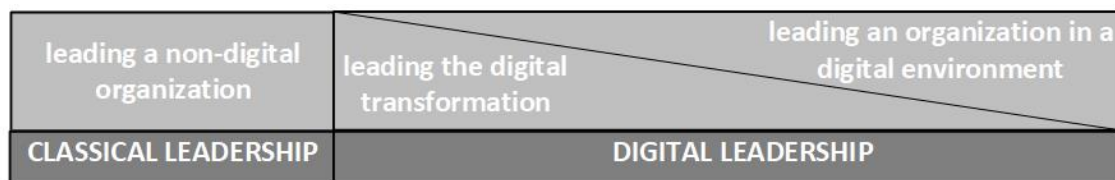


Figure 1. Digital Leadership

Source: Author

3. CONTENT ANALYSIS OF LITERATURE

The research method used in this work is content analysis of literature review. Content analysis is a systematic method for literature review that can be applied both in a quantitative and a qualitative way (Wilding, Wagner, Seuring & Gold, 2012). The qualitative content analysis is based on searching for some text elements in the material and then assigning categories to those text elements; the quantitative content analysis is based on calculating frequencies of those assignments (Mayring, 2015). Mayring's (1991) process model of content analysis consists in a summarized form of the following steps: Definition

and collection of the material to be analyzed, definition of analysis units, assesment of material according to analysis units including elimination of some material and building of categories. This process model is adapted for this work (Figure 2). After keyword search for literature survey, non-essential resources are eliminated by analysis of abstracts, table of contents and if necessary the whole textual content. Then the text of remaining literature sources is analyzed to find out words or phrases describing characteristics of digital leadership respectively digital leaders. In the last step describing words and phrases are categorized by similar meaning and the frequencies of each category in literature sources are calculated.

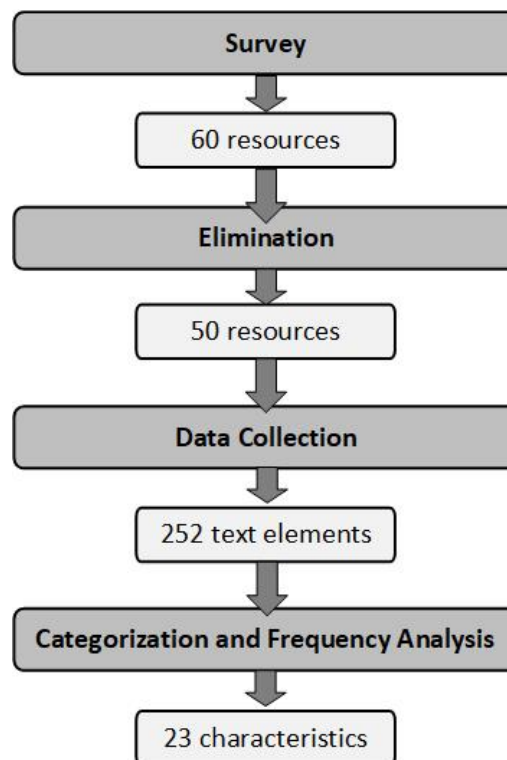


Figure 2. Overview of the Literature Content Analysis Approach

Source: Author

3.1. Survey

The literature search carried out is based on following keywords in three languages (English, German and Turkish): “*Digital Leadership/Leader - Leadership/Leader Digital Transformation - Leadership/Leader 4.0 – Change Leadership/Leader*”. The keywords are to be found in title, keywords or abstract. The search is conducted in known and accessible online databases. 60 resources are found in total (Table 1). The majority of reached resources are scientific articles in English.

Table 1. Dispersion of Literature Survey

	English	German	Turkish	Σ
BOOKS	2	4	4	10
SCIENTIFIC ARTICLES	30	4	2	36
MAGAZINE ARTICLES	5	0	2	7
REPORTS	4	3	0	7
Σ	41	11	8	60

3.2. Elimination

The aim of the elimination phase is to filter out unnecessary literature sources. For filtering all resources are then analyzed regarding containing characteristics of digital leadership. While many studies comprise information on DL characteristics, some fail to provide this information and should be eliminated from further analysis steps. The content analysis for elimination is conducted on abstracts of articles and on table of contents of books. By insufficient information thereby the main content is analyzed in more detail. Ten of sixty resources are eliminated: The study of El Sawy, Kræmmergaard, Amsinck & Vinther (2016) is a report treating just the importance of Digital Leadership for DT (Source 2). In the study of Narbona (2016) only the returns of new technologies for digital leadership are described (Source 20). The source Nr. 24 is a study about education of DL with social media (Ahlquist, 2014). Dimitrov (2018) discusses digital leadership just from a transhumanistic perspective (Source 39). The source Nr. 46 is just illustrating how DT is conducted in a hospital (Tanniru & Khuntia, 2018). In the studies of Preusser & Bruch (2014), of Van Outvorst, Visker & De Waal (2017), of Van Outvorst, Visker & De Waal (2018) and of Santoso, Elidjen, Abdinagoro & Arief, (2019) DL characteristics are not mentioned (Sources 31,48, 49, 51). The study of Yücebalkan (2018) of the source Nr. 30 is just a summary of other resources about DL hence this work is eliminated and used for cross-referencing.

3.3. Data Collection

Data collection is conducted by searching in literature sources for listing of characteristics and for descriptions of digital leaders and digital leadership. From a total of fifty literature sources about 252 words or phrases as digital leader characteristics are filtered out (Table 2). A big group of the analyzed studies list and describe characteristics, skills and competencies of the digital leader directly and suggest frameworks for DL (Sources 6, 9, 15, 21, 22, 23, 25, 26, 29, 33, 40, 45, 47, 53, 54, 58, 59). Some of them concentrate only on one

characteristic of DL; for example in the source 50 the innovation capability is examined, the study in source 37 concentrates only on cultural intelligence. The rest of works assess the extent to which leadership has changed after three points of view: digital age, digital business transformation and Industry 4.0. Works treating leadership from the perspective of digital age assume that leaders face big challenges in the digital age and analyze requirements to leaders and specify how leaders in the new digital age have to be (11, 16, 18, 28, 32, 34, 38, 41, 43 and 52). Some of them bring out the required DL characteristics from a practical point of view for example by conducting interviews with some leaders (19). Works considering leadership from a transformational perspective concentrate on requirements on leadership for digital business transformation; for example the source 42 assumes that a digital business strategy is going to change every leader's life. In this context in many studies it is analyzed how the roles in leadership will change by the digital transformation and leadership characteristics and field of actions for digital transition and business model transformation are specified (4, 10, 27, 35, 36, 44, 55, 56, 57). Studies investigating leadership in the context of Industry 4.0 challenges list essential attributes and tasks of DL in the Industrial Revolution (3, 5, 7, 12, 13). Among the sources analyzed, there are also some other studies similar to this work reporting about digital leadership characteristics based on other sources (1, 60).

3.4. Categorization and Frequency Analysis

The contextual relationship between describing words and phrases are considered for categorization. All detected descriptions for DL are compared by their contextual meaning in order to find out the main categories of characteristics. The categorization process consists of three actions: (1) Finding out the duplicates, (2) finding out the ones with similar meaning, and (3) classifying them under the same category. Some descriptive words or phrases were identical, synonymous or similar in the meaning. For example "visionary" is a typical characteristics description that is identically used in many works. The attributes "experimenting" and "probing" are synonymous. And some descriptions have similar meanings, so they can be classified under the same category. For example the description "leading of distance employees" has a similar meaning as "leading virtual teams" and they belong to the same category. By doing this twenty three categories of DL characteristics are determined (Table 3).

Table 2. Results of Data Collection

Nr	SOURCE	DESCRIPTION	Nr	SOURCE	DESCRIPTION
1	Herder-Wynne, Amato & Uit de Weerd, 2017	<ul style="list-style-type: none"> ▪ social intelligence ▪ high creativity ▪ ability to rapidly align and engage empowered, networked teams 	9	Paulin, 2014	<ul style="list-style-type: none"> ▪ ability to understand complex systems ▪ open to change ▪ ability to develop skills to listen and to work with others
3	Bauer, Hämmerle, Schlund & Vocke, 2015	<ul style="list-style-type: none"> ▪ ability to link knowledge, skills and resources in a dynamic environment 	10	Durmuş, 2019	<ul style="list-style-type: none"> ▪ ability to develop an innovation-oriented culture (vision) ▪ ability to establish an external customer focus (ecosystem-centeredness) ▪ ability to invest in and implement new data platforms of the future ▪ ability to find ways to attract new high digital capabilities ▪ profitable digital capabilities
4	Doz & Kosonen, 2010	<ul style="list-style-type: none"> ▪ strategic sensitivity by anticipating, experimenting, distancing, abstracting and reframing high creativity ▪ leadership unity by dialoguing, revealing, integrating, aligning and caring ▪ resource fluidity by decoupling, modularising, dissociating, switching and grafting 	11	Boneau & Thompson, 2013	<ul style="list-style-type: none"> ▪ creative and innovativ ▪ scouts, prophets and pathfinders ▪ ability to get people think differently and act in concert ▪ ability to lead change, because change will be a constant stage.
5	Staffen & Schoenwald, 2016	<ul style="list-style-type: none"> ▪ encouraging the employees to embrace the disruptive changes ▪ shaping the team's trust in new technologies ▪ sensitizing the employees in all questions of data security ▪ taking away their fears regardig changing job requirements and even potential job loss ▪ acting as a role model ▪ shaping the corporate culture ▪ as the coordinator of ecosystems aligning internal and external partners in a flexible manner ▪ delegating tasks based on competencies ▪ creating room for innovations ▪ keeping balance between new and existing business areas ("Ambidexterity") ▪ entrepreneurial, an agile networker (coach of agile teams), strategic, visionary and capable of adapting to constant change. 	12	Davutoğlu, 2018	<ul style="list-style-type: none"> ▪ knowledge-orientation ▪ innovativeness
6	Wilson, Goethals, Sorenson & Burns, 2004	<ul style="list-style-type: none"> ▪ flexible ▪ adaptable ▪ possessing wide intellectual curiosity and a hunger for new knowledge ▪ willing to see value in sharply different perspectives ▪ being comfortable with uncertainly 	13	Yüksel & Genç, 2018	<ul style="list-style-type: none"> ▪ encouraging creative individuals ▪ providing suitable environments where creativity can come to life ▪ role modeling ▪ rewarding ▪ organizational flexibility ▪ delegation of authority and responsibility ▪ strengthening horizontal relationships
7	Raza, 2016	<ul style="list-style-type: none"> ▪ innovativ ▪ vertically and horizontally focused technical skills ▪ individual ownership of development (accountability) ▪ empowering team members for decision making process (collective leadership) ▪ critical thinking ability (having the ability to interpret complex situations) 	14	Oberer & Erkollar, 2018	<ul style="list-style-type: none"> ▪ ability to distribute tasks based on the situation and team competence ▪ linking the abilities of managers and employees to form a competence networking intelligence high level willingness ▪ ability for change ▪ encouraging high level agility between the market, customer, partners, and employees ▪ ability to control processes, evaluate tasks and results together with teams to use resources according to competence – cross-hierarchical and cross functional, ▪ creating an open atmosphere with the learning effect in errors and a collaborative atmosphere for handling conflict situations ▪ ability to create a transparent framework for information distribution ▪ knowing that innovation is learnable ▪ being able to transform old structures through the use of multidisciplinary teams, and creative processes and flexible work environments.
8	Tüzmen, 2017	<ul style="list-style-type: none"> ▪ digital intelligence (having a wide vision how things can be digital trasformed) ▪ futurist intelligence (entrepreneurial mentality) ▪ collaborative competitive intelligence (leaders collaborate with their competitors) 			

Nr	SOURCE	DESCRIPTION	Nr	SOURCE	DESCRIPTION
15	Bawany, 2019	<ul style="list-style-type: none"> ▪ creating a digital transformation strateg and ensuring it is aligned with the business strategy ▪ ability to create teams ▪ ability to keep people connected and engaged ▪ ability to drive a culture of innovation, risk tolerance and continous improvement 	23	Beeks, 2012	<ul style="list-style-type: none"> ▪ democratic ▪ flexible ▪ selfless ▪ ethical ▪ visionary ▪ willing to embrace modern-day changes while still maintaining many past traditions ▪ with courage ▪ with excellent decision-making skills and polarizing conflict situations
16	Toduk, 2014	<ul style="list-style-type: none"> ▪ entrepreneurship ▪ innovation ability ▪ digital capabilities ▪ constant communication with the employees ▪ building strong networks ▪ creating collaborations ▪ creating a vision together with teams ▪ having a sharing and democratic approach and supporting transparency and innovation 	25	Sow & Aborbie, 2018	<ul style="list-style-type: none"> ▪ willingness to change ▪ motivating others to support change ▪ flexibility
17	Herold, 2016	<ul style="list-style-type: none"> ▪ diversity (creating a diverse environment, embracing a wide array of opinions, perspectives) ▪ agile leadership (adapting to new business strategies, working across cultures, dealing with teporary virtual teams, being agile and flexible) ▪ ethical responsibility 	26	DGFP-Praxispapiere, 2016	<ul style="list-style-type: none"> ▪ digital role model ▪ picking up the right employees ▪ leading virtual teams ▪ leading in complex projects ▪ agile management ▪ innovation driver ▪ ability to understand big data analysis ▪ using social networks ▪ data based employee assesment
18	Banger, 2018	<ul style="list-style-type: none"> ▪ agile ▪ adaptive ▪ employee-oriented ▪ able to manage digital capabilities and learn through experiences 	27	Bygstad, Aanby & Iden, 2017	<ul style="list-style-type: none"> ▪ deep engagement with employees ▪ coaching
19	Doğa Koleji Öğrenci Meclisi, 2015	<ul style="list-style-type: none"> ▪ flexible ▪ connective ▪ innovative ▪ leading all teams ▪ listening and understanding everyone ▪ bringing out the right idea 	28	Sikora, 2017	<ul style="list-style-type: none"> ▪ ability to use relevant digital technologies and related network effects ▪ ability to establish an open, experimental culture in the company ▪ ability to develop new business models
21	Fisk, 2002	<ul style="list-style-type: none"> ▪ visionary ▪ engaging (coaching and supporting others) ▪ fusing (networking diverse ideas) ▪ collaborating ▪ having a deep understanding of technology and its market impact ▪ ability to manage ambiguity and to live with complexity ▪ transparency in communication ▪ role model 	29	Bolte, Dehmer & Niemann, 2018	<ul style="list-style-type: none"> ▪ carrying out intense communication between the management and employees ▪ having knowledge about the importance of change initiated by digitalisation ▪ implementing adequate company cultur ▪ coaching openness & transparency ▪ building trust and freedom within the workplace regarding time, place and content of work ▪ focusing on employees growth and wellbeing ▪ living in an error culture to enable innovations
22	Urçar, 2017	<ul style="list-style-type: none"> ▪ no hierarchies (flat and democratic) ▪ openness for innovative ideas ▪ believing and investing in ecosystems ▪ motivating cultural transformation 	32	Genner, Probst, Huber, Werkmann-Karcher, Gundrum & Majkovic, 2017	<ul style="list-style-type: none"> ▪ self leadership ▪ leadership of distance employees ▪ leadership through identification and goals ▪ participatory leadership ▪ leading on flatter hierarchies

Nr	SOURCE	DESCRIPTION	Nr	SOURCE	DESCRIPTION
33	Lindner & Greff, 2019	<ul style="list-style-type: none"> ▪ agile ▪ leading of virtual teams ▪ arranging work-life balance 	43	Albrecht, 2017	<ul style="list-style-type: none"> ▪ adaptability and flexibility ▪ mentor and coach ▪ willingness to train for life ▪ professionally very well trained ▪ handling employees and customers with empathy ▪ ability to lead cultural different employees
34	Hammermann & Stettes, 2017	<ul style="list-style-type: none"> ▪ motivating ▪ ability to solve problems ▪ ability to networking ▪ load-bearing capacity ▪ readiness to transformation ▪ decisiveness ▪ creativity ▪ assertiveness ▪ negotiation skills 	44	Kofler, 2018	<ul style="list-style-type: none"> ▪ enabling creativity through diversity ▪ experimenting ▪ letting employees thinking ▪ talent recruitment and management ▪ networking ▪ coaching ▪ fault tolerance
35	Larjovuori, Bordi & Heikkilä-Tammi, 2018	<ul style="list-style-type: none"> ▪ strategic vision and action ▪ leading cultural change ▪ enabling networks (coaching, motivating and inspiring employees and promoting participation) ▪ leading networks (customer orientation and collaboration and partnership) 	45	Prince, 2017	<ul style="list-style-type: none"> ▪ transparency ▪ openness ▪ identifying inter-general cooperation ▪ forming visions
36	Mihardjo, Sasmoko, Alamsjah & Eli djen, 2019	<ul style="list-style-type: none"> ▪ creative ▪ though ▪ global visionary ▪ inquisitive ▪ profound ▪ always thinking innovatively 	47	Khan, 2016	<ul style="list-style-type: none"> ▪ transparency ▪ trust ▪ listening and respect for the follower ▪ self-awareness ▪ balanced processing ▪ influencer ▪ inspirational motivator ▪ intellectual stimulator
37	Rüth & Netzer, 2019	<ul style="list-style-type: none"> ▪ cultural intelligence 	50	Sasmoko, Mihardjo, Alamsjah & Eli djen, 2019	<ul style="list-style-type: none"> ▪ having a global vision ▪ having deep knowledge ▪ creative ▪ thinker ▪ inquisitive
38	Mirza, 2017	<ul style="list-style-type: none"> ▪ visionary and futurist ▪ investing in open and flexible talent management systems ▪ welcoming of the increasingly sensitized and connected World ▪ accepting diversity and inclusion as a core part of the organization ▪ embracing success with caution 	52	Berns, 2019	<ul style="list-style-type: none"> ▪ innovative ▪ globally sound technology experts
40	Petrucci & Rivera, 2018	<ul style="list-style-type: none"> ▪ connecting networked teams ▪ developing agile networks of team ▪ building critical skills in teams ▪ using traditional leadership concepts while embracing new trends 	53	Hearsum, 2015	<ul style="list-style-type: none"> ▪ adaptability ▪ collaborative ▪ innovative ▪ user-centred ▪ self and other awareness ▪ systematic intelligence ▪ understands digital technology and digital culture ▪ pace awareness (the concept of appropriate pace)
41	Haack, 2018	<ul style="list-style-type: none"> ▪ balance between innovation and integration ▪ digital culture ▪ networking with customers 			
42	Bennis, 2013	<ul style="list-style-type: none"> ▪ adaptive capacity ▪ resilience ▪ openness to the new ▪ ability to learn from failures and mistakes 			

Nr	SOURCE	DESCRIPTION	Nr	SOURCE	DESCRIPTION
54	Hanschke, 2018	<ul style="list-style-type: none"> ▪ spirit of research ▪ enthusiasm for digitization ▪ agility, end-to-end business understanding ▪ persuasiveness ▪ courage and perseverance ▪ listening, empathy ▪ social ▪ strategic ▪ persuasiveness 	58	Sullivan, 2017	<ul style="list-style-type: none"> ▪ digital literacy ▪ digital vision ▪ advocacy ▪ presence ▪ communication ▪ adaptability ▪ self-awareness ▪ cultural awareness
55	Kreutzer, Neugebauer & Pattloch, 2017	<ul style="list-style-type: none"> ▪ development of a vision ▪ development of innovative business models ▪ designing a digital organisation ▪ open innovation 	59	Klus & Müller, 2019	<ul style="list-style-type: none"> ▪ thinking and acting entrepreneurially ▪ having strong (self-)organisation and IT skill ▪ a profound ability to motivate others ▪ high degree of flexibility, commitment, and creativity
56	Junita, 2019	<ul style="list-style-type: none"> ▪ encouraging ▪ integrating ▪ inspiring ▪ visionary 	60	Sainger, 2018	<ul style="list-style-type: none"> ▪ vision and foresightedness ▪ being clear with digital trends and with the implications of these trends on business ▪ being a role figure with a digital vision and strategy
57	Bosch, Hentschel & Kramer, 2018	<ul style="list-style-type: none"> ▪ coach and mentor, who is building up trust and motivating the employees, ▪ ability to put teams together competently ▪ having empathy ▪ having dexterity ▪ having an inspiring vision 			

Table 3. Results of Categorization and Frequency Analysis

Category of DL Characteristics	Frequency	Category of DL Characteristics	Frequency
1. INNOVATIVE VISIONARY	%52	13. DECISIVE COURAGEOUS	%14
2. NETWORKING INTELLIGENCE	%44	14. CREATIVE	%12
3. ADAPTABLE	%34	15. OPENNESS	%12
4. MOTIVATING COACH	%34	16. SELF-AWARENESS	%12
5. DIGITAL INTELLIGENCE	%32	17. AMBIDEXTERITY	%10
6. COMPLEXITY MASTER	%24	18. KNOWLEDGE-ORIENTED	%10
7. SOCIAL INTELLIGENCE	%20	19. DIGITAL TALENT SCOUT	%8
8. DEMOCRATIC DELEGATIVE	%18	20. EMPLOYEE-ORIENTED	%8
9. AGILE	%16	21. BUSINESS INTELLIGENCE	%6
10. LEARNING BY ERRORS	%16	22. LIFE-LONG LEARNER	%6
11. ROLE MODEL	%14	23. ETHICAL	%4
12. DIVERSITY CHAMPION	%14		

Concurrently the frequency analysis based on Mayring (2015) is conducted (Figure 3). The frequencies of DL characteristics are calculated by the rate of mention of the corresponding category in all sources and they can be seen as a measure of the popularity of the DL characteristics in sources. For example 52 % frequency of the category “Innovative Visionary” means that this category is in more than half of the sources mentioned as a characteristic of DL.

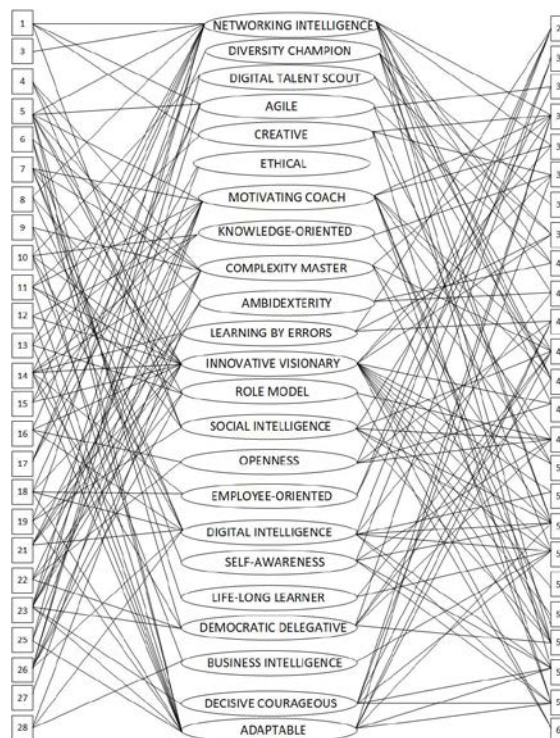


Figure 3. Frequency Analysis

Source: Author

4. CHARACTERISTICS OF DIGITAL LEADERSHIP

The DL characteristics obtained as a result of the content analysis are divided into three groups: Characteristics especially related to digital business, characteristics concerning social leadership attitude and general mindest characteristics (Figure 4).

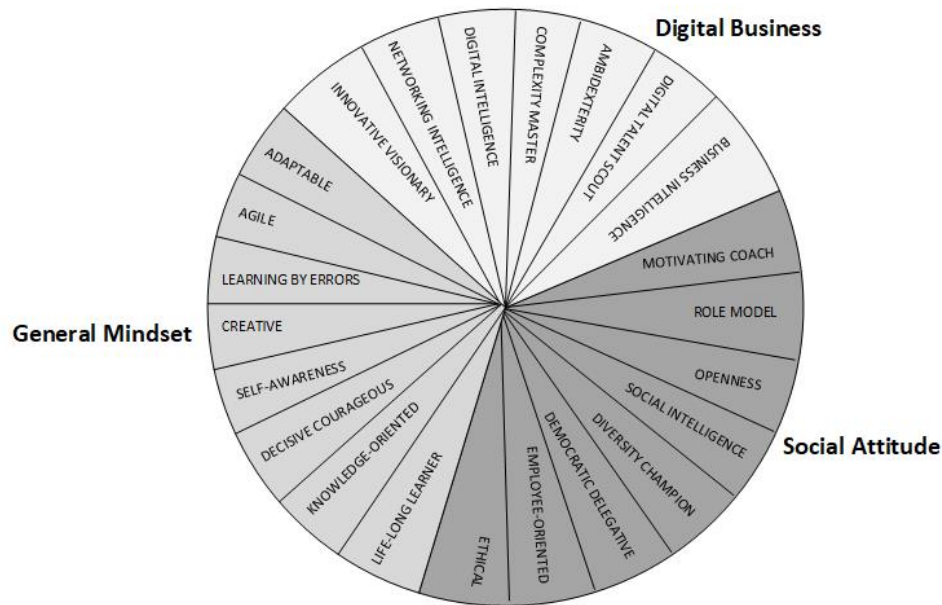


Figure 4. Digital Leadership Characteristics

Source: Author

Characteristics - Digital Business

The most distinguished leadership characteristic in the era of digital transformation, which is an extensive process companies are challenging today, is to be **innovative visionary**. To be a digital leader means to have a futurist entrepreneurial mentality (Sikora, 2017; Tüzmen, 2017). But it is not only enough for the leaders to have a vision for the future, it also has to be innovative (Toduk, 2014). In that case it is meant open innovation, whereby in addition to all employees, customers are also integrated in the innovation processes (Kreutzer, Neugebauer & Pattloch, 2017). The digital leader should have an inspiring digital vision (Bosch, Hentschel & Kramer, 2018; Sullivan, 2017) and a foresightedness for innovative business models (Kreutzer, Neugebauer & Pattloch, 2017; Sainger, 2018). On the other hand the digital leader should know that innovation is learnable (Oberer & Erkollar, 2018), so it creates room for innovations and an innovation-oriented culture in the company (DGFP-Praxispapiere, 2016; Durmuş, 2019; Staffen & Schoenwald, 2016). The innovative vision will be concretized in a digital strategy (Hanschke, 2018; Larjovuori, Bordi & Heikkilä-Tammi, 2018) and the digital leader has to ascertain that it is conformed to the overall business strategy of the company (Bawany, 2019).

In the era of digital transformation, building networks both from a technical point of view as well as from an organizational point of view is of great importance. That's why another important digital leadership characteristic is **networking intelligence**. Networking intelligence is the ability to quickly build and coordinate competent networked teams (Bawany, 2019; Herder-Wynne, Amato & Uit de Weerd, 2017). The digital leader should have the ability to link knowledge, skills and resources of teams, to control processes and execute tasks together with teams and the ability to distribute tasks based on team competence (Bauer, Hämmerle, Schlund & Vocke, 2015; Oberer & Erkollar, 2018). The challenge here is to lead virtual teams in the network and to motivate geographically dispersed team members to collaborate together and to create a vision together (DGFP-Praxispapiere, 2016; Lindner & Greff, 2019; Wilson, Goethals, Sorenson & Burns, 2004). Furthermore, the collaboration and the leadership role go beyond company borders; the digital leader is collaborating with other organizations and partners especially in ecosystems (Fisk, 2002; Staffen & Schoenwald, 2016).

Without understanding the possibilities of digital technologies in business it would not be possible to lead the company's digital transformation. Thus, to have **digital intelligence** is an expected characteristic of digital leadership. Digital intelligence incorporates having technical skills, IT-skills and skills about digital technologies and digital culture (Hearsum, 2015; Raza, 2016; Staffen & Schoenwald, 2016). The digital literacy about big data analysis and social networks is a must (DGFP-Praxispapiere, 2016; Sullivan, 2017). The digital leader should have a wide vision how things can be digital transformed and feel enthusiasm for digitalization (Hanschke, 2018; Tüzmen, 2017). In the digital company it is not enough to have a leader with digital intelligence, it is also very essential to hire the right employees with suitable capabilities (DGFP-Praxispapiere, 2016). Therefore the digital leader should act as a **digital talent scout**, who finds ways to attract new high digital capabilities (Durmuş, 2019). One possible way doing that is to invest in open and flexible talent recruitment and management systems (Kofler, 2018; Mirza, 2017).

DT evokes disruptive changes in companies and it is a transformation process with high complexity. Thus, the digital leader should be a **complexity master**, which means to be able to understand and to interpret complex situations and to solve problems in conflict situations (Hammermann & Stettes, 2017; Paulin, 2014; Raza, 2016). Digital leadership means systematic mastering the complexity by decoupling and modularising the conflicts (Doz & Kosonen, 2010; Hearsum, 2015).

As a result, DT companies need to develop new business models. According to this it is granted that **business intelligence** is an important digital leadership characteristic. Digital leaders should have the ability to develop new business models, to establish an external customer focus and have an ecosystem-centeredness and an end-to-end business understanding (Durmuş, 2019; Hanschke, 2018; Sikora, 2017). The balance between the new and the old must be maintained during the digital transformation. That's why one of the digital leadership characteristics is **ambidexterity**. An ambidexter digital leader provide for balance between new and existing business areas, between modern trends and past traditions and between innovation and integration (Beeks, 2012; Haack, 2018; Staffen & Schoenwald, 2016).

Characteristics – Social Attitude

Motivation is crucial in managing digital transformation successfully. On this account, the digital leader should act during the DT process as a **motivating coach**. To be motivating means to be able to encourage the employees embracing the difficulties of the transformation, to take away their fears regarding changings in their tasks and positions and to build a culture of transformation (Bawany, 2019; Junita, 2019; Sow & Aborbie, 2018; Staffen & Schoenwald, 2016; Yüksel & Genç, 2018). The digital leader should do that by acting as a mentor or a coach by breaking down the organizational hierachies (Albrecht, 2017; Fisk, 2002). The leader of DT should not only be a coach for motivating the employees but also a **role model** for them. Digital leaders should act during the digital transformation as pathfinders and influencers (Boneau & Thompson, 2013; Khan, 2016). Furthermore, the digital leader should have a **democratic delegative** leading style. It should be able to create a flat organization with minimum hierachies and bureaucracy and to delegate tasks depending on employee competences (Oberer & Erkollar, 2018; Urçar, 2017). By hierachy removal and humanising effects softs skills like trust and respect come to the fore (Khan, 2016). Therefore, the digital leader should prefer trust instead of building up control (Bosch, Hentschel & Kramer, 2018). In addition, the digital leader should be also **employee-oriented** (Banger, 2018). Employee-orientation implies focusing on employee growth and wellbeing in the organization (Bolte, Dehmer & Niemann, 2018), which is possible such as by giving freedom regarding work content, time and place and by using special employee evaluation methods (Oberer & Erkollar, 2018).

A digital transformation project involves a large number of employees, external partners and customers. The required digital leadership characteristic to balance in such a

diverse social group is **social intelligence**. Social intelligence is the ability to listen to, to anticipate, to dialogue, to integrate, to care and to work with other people (Doz & Kosonen, 2010; Paulin, 2014). It means that the digital leader should be user-centered and handling with employees and customers with empathy (Albrecht, 2017; Bosch, Hentschel & Kramer, 2018; Hanschke, 2018; Hearsun, 2015). Good negotiation skills belong also to social intelligence (Hammermann & Stettes, 2017). The digital world can be characterized by transparency, as any kind of information is available anytime and anywhere. In order to adapt to this circumstance another required digital leadership characteristic is **openness**. Openness means to have transparency in communication of any kind. The digital leader should ensure to shape an open and transparent atmosphere in the company among the employees and outside the company with partners and customers (Bolte, Dehmer & Niemann, 2018; Urçar, 2017). Additionally, the digital leader should be a **diversity champion** in this multifarious communication environment and be welcoming of diversity as a core part of the company (Mirza, 2017). It is not only relevant to consider the gender or cultural diversity; accepting different opinions, perspectives, needs, requirements of employees, partners and customers is also one of the important diversity tasks of the digital leader (Herold, 2016; Rütth & Netzer, 2019). Last but not least the digital leader should be **ethical** (Herold, 2016; Beeks, 2012).

Characteristics – General Mindset

Since DT is an adaption process to technological and social novelties, an important DL characteristic is to be **adaptable**. The digital leader should adapt to constant change in a flexible manner (Yüksel & Genç, 2018) and should be able to lead the change process (Boneau & Thompson, 2013; Paulin, 2014). The speed of actions and reactions strongly contribute to the success of DT. So it is an advantage that the digital leader is **agile**. An agile leader has the ability to rapidly coordinate teams, adapt to new business models and to develop digital transformation strategies (Herder-Wynne, Amato & Uit de Weerd, 2017; Herold, 2016). The greed for innovation and the speed and agility of the DT process force the company to live in an open error culture (Bolte, Dehmer & Niemann, 2018; Sikora, 2017). In this context the digital leader should be **learning by errors**. Learning by probing, experimenting and from experiences and from failures and mistakes should be part of digital leader's life (Banger, 2018; Bennis, 2013; Kofler, 2018). In DT important steps are taken that require determination and courage. Based on this an important DL characteristic is to be **decisive courageous**. The digital leader should take actions with assertiveness, persuasiveness and perseverance (Hammermann & Stettes, 2017; Hanschke, 2018) and it

should be resilient towards of opposites and defend what he believes in (Bennis, 2013; Sullivan, 2017). In order to develop new organizational structures and new business models a digital leader should be **creative** (Hammermann & Stettes, 2017; Herder-Wynne vd. 2017; Klus & Müller, 2019). **Self-awareness** of the leader is another important issue in DT. With self-awareness it is meant to have strong self-organization (Klus & Müller, 2019). Extracting valuable knowledge from data analysis and information-distribution in various networks play a central role in digital business processes and models (Durmuş, 2019). Thus, the digital leader should be **knowledge-oriented**. That means the leader self is a curious, questioning and profound thinker (Mihardjo, Sasmoko, Alamsjah & Elidjen, 2019) and it supports information distribution, acquisition and analysis (Oberer & Erkollar, 2018). In the digital world, technologies are changing very fast. To learn the new technologies and trends and to be always updated the digital leader should be a **life-long learner**. The curious and knowledge-oriented digital leader has the readiness to learn for life with a spirit of exploration (Hanschke, 2018; Oberer & Erkollar, 2018).

5. CONCLUSIONS AND OUTLOOK

Digital Transformation provoked by Industry 4.0 technologies is a transformation process that leads to disruptive changes in companies and affects all business processes. In the transformation phase today, leaders should have the ability to manage both the digital transformation process and the new digital organization that is emerging. The aim of this study is to determine the characteristics of Digital Leadership by examining the literature sources about DL with the content analysis method. The research process consists of four phases: After literature search phase, the sources are checked according to their suitability in the elimination phase, then data about the digital leadership characteristics are collected and in the last phase features are categorized according to their similarity and their popularity frequencies are calculated. As a result of this analysis twenty three DL characteristics in total related to digital business, concerning social leadership attitude and concerning general mindest are identified.

The results of this study should further help building a conceptual framework for digital leadership combining the new leadership requirements with the existing leadership theories. First of all, the digital leadership characteristics found in this work will be verified and optimized by conducting a survey in a company. After that the existing leadership theories will be adapted or respectively expanded with the DL characteristics.

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