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Emerging Ethical Challenges of Leadership in the Digital Era: A Multi-Vocal Literature Review

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Abstract

The purpose of this study is to undertake a multi-vocal literature review (MLR) regarding how leadership work has transformed as a result of digitalization and what kinds of ethical challenges organizational leaders are facing in the digital era, particularly from 1985 to 2020. Hence, a total of 83 literature are reviewed, drawing up on the method of MLR. The findings of this study suggest that the digitalization of leadership work, i.e., delegation of personal (leadership) responsibilities to digital systems, is being accelerated by the ever increasing use of technologies based on Artificial Intelligence (AI) in organizational governance and operation, particularly during the last two decades. In the reviewed literature, ethical challenges of leadership in the digital era are often discussed in subtle forms, from the viewpoint of the ethics of digitalization in general and its apparent consequences in organizational systems – Specifically, an apparent lack of industry standards, codes of ethics and professional conduct, for AI-based digital technologies. Likewise, disruptions and complexities caused by digitalization trends in conjunction with globalization, climate change and sustainable development goals are noticed as posing further significant challenges for leaders, particularly in relation to ethical organization systems design in the digital era. Hence, this study outlines the three main conceptual fields of discussion towards deepening our understanding of the transformation of leadership work and emerging ethical challenges to leaders in contemporary organizations caused by the increased use of advanced digital technologies.

Key Words: Digitalization, artificial Intelligence (AI), leadership, ethical challenges, ethical organization systems design, contemporary organizations, multi-vocal literature review

Introduction

Brown and Tervino (2006) and Brown and Mitchell (2010) reveal that research work and writing on the topic of ethics and leadership are mostly focused on normative and psychological aspects. The writers note that there is a wide gap in the 'descriptive and predictive' social scientific approach to ethical and responsible leadership, while ethical standards are practically eroding in every kind of social institution and business organization throughout the world (Wood-Harper, Corder and Wood, 1996; Bolman and Deal, 2017). Hence, as maintained by the writers, the rationale for conducting ethical analysis on the societal impact of the ongoing re-engineering of business processes and organizational designs accelerated by the increasing use of information technology, is hardly disputable.

Likewise, Avolio et al. (2001, pp. 625 & 663) posit that an increased use of advanced technologies often causes leadership vacuum, which can have a drastic impact on social and organizational systems. Thus, they recommend conducting further research to systematically examine how technological advancement transforms the traditional role of leadership and organizational systems. As the field is ever evolving, the question is not whether to study this topic but where to start (Avolio et al., 2001; Brynjolfsson and Saunders, 2010).

As maintained by The Institute of Electrical and Electronics Engineers – The IEEE (2017) and Havens (2018), this is an alarming situation from an ethical leadership perspective, including a huge gap in transparency and accountability aspects in the use of AI-based digital technologies. Hence, in order to maintain human dignity, autonomy, and societal values, it is essential to intensify the much-needed discussion regarding the formulation of ethical frameworks for dealing with digital technologies, particularly AI and its ever-expanding implications (Davenport and Katyal, 2018).

In the Finnish context, Ala-Pietilä and Lundström et al. (2019, pp. 52-54, 107-109 & 123) maintain that the country is prepared to take the leadership role in

the area of human-centred and ethical data economy. In the final report of Finland's AI programme, the writers set a rather challenging and short-term deadline of the year 2025 for solving issues related to AI ethics, the use of data, transparency, and accountability in Finland, in order to become a global pioneer in this field. Hence, the timing and the industry reality within Finland and elsewhere suggests that this study has the potential to take on multidisciplinary implications and contributions.

It is apparent that nowadays all kinds of digital developments essentially involve some level of AI technology or system (Mitchel and Brynjolfsson, 2017; Koski and Husso, 2018). It is therefore difficult and no longer necessary to make distinctions between AI and other forms of digitalization, the writers posit. Thus, this research does not necessarily engage in making specific distinctions between AI and other forms of digitalization. Instead, the study, conducted as a multi-vocal literature review – MLR (more details are provided in the subsequent discussion), is focused on finding answers to how leadership work has transformed as a result of digitalization and what ethical challenges leaders have been facing due to widespread implementation of advanced digital technologies in contemporary organizations. It concentrates on the development and discussion within this field from 1985 to 2020. However, in order to establish a historical connection and a conceptual foundation for the topic, some classical literature and pioneering works published before 1985 are also examined. A total of 83 works of literature are reviewed and reported.

The paper is structured as follows. The justification of the application of MLR methodology to this study is provided next, followed by theoretical and conceptual backgrounds to the topic. After that, a comprehensive explanation on research design and methodologies used in this paper, the literature search results and research findings as well as some recommendations for future studies are presented, respectively. Finally, the discussion and conclusions are presented at the end.

The Need for Multi-Vocal Litereture Review on This Topic

Ethics and leadership have been the topics of academic research and scholarly debate since ancient times. Despite being relatively new fields of study, business ethics and ethical concern of leadership in the information age also provide theories that have been debated and scrutinized (Wood-Harper and Wood, 1996). Hence, a vast amount of academic literature is available around the topics of ethics, leadership, and digitalization. However, most of the scientific publication in this field are focused on ontological debates on ethics, digitalization, and concepts of leadership, a situation which Wood-Harper and Wood termed as 'a failure to understand the human context'.

Hence, the literature search results in this study revealed only a small number of scientific literature published during 1985-2020, which directly discusses the emerging ethical challenges of leadership in the digital era as a unified concept. On the other hand, as the field is ever-evolving, high quality data (literature) are increasingly being produced in this field by a community of practitioners, regulatory authorities and business organizations. Therefore, it is important to include such grey literature (for instance: policy directives, white papers, industry standards guidelines, experts' opinions, newspaper and magazine articles, video material, etc.) in this study in order to offer an enriched, more comprehensive discussion. The decision was made in line with the guidelines for MLR methodology outlined by Garousi et al. (2019), and 'Guidelines for Working with the Grey Literature in Systematic Reviews for Management and Organizational Studies (MOS)', presented by Adams et al. (2017).

According to Garousi et al. (2019), an MLR is a form of a systemic literature review (SLR), and they share a large number of characteristics. However, the major difference between them is that an MLR allows the inclusion of so-called 'grey literature' (specified above) in the review, while an SLR strictly excludes any non-formal publication outside of the scientific and academic community. The writers assert that the inclusion of grey literature opens up new horizons of research work and provides the field with specific evidence often lacking in the scientific literature. Likewise, Adams et al. (2017) maintain that inclusion of grey literature in SLR is important to validate scientific outcomes with applied knowledge. In other words, they argue that inclusion of grey literature is essential in order to challenge established assumptions with the most up-to-date insights from real-life practitioners. Moreover, according to the writers, the inclusion of grey literature is vital to accommodate a multiplicity of narratives, or to take a pluralist stance for an academic project.

Hence, as asserted by Adams et al. (2017) and Garousi et al. (2019), inclusion of grey literature and implication of MLR methodology for research in an evolving field allows one to explore the most up-to-date knowledge and ensure a holistic understanding of the topic. Furthermore, such a study design contributes to bringing the world of academia and a community of practitioners together, thereby extending the scope of research findings with most recent empirical knowledge. This specific research topic deals with discussions related to the ever-evolving field of digitalization: big data, software, systems, AI-based technologies, etc. – and ethical challenges to leadership associated to the same. Hence, inclusion of grey literature and application of MLR methodology in this study is well justified.

Theoretical and Conceptual Backgrounds

Digitalization and Transformation of Leadership Work

The Digital Revolution, also known as the 'Third Industrial Revolution' began in the latter half of the 20th century along with the shift from mechanical, analogue electronic technology to digital electronics (Ceruzzi, 2012). The introduction of the world wide web and the widespread implementation of digital computing, record keeping, and communication technologies marked the advent of the information age during the late 1990s and early 2000s (Kizza, 2013). The digital disruption of the last few decades, accelerated by smart phones and AI-based computer systems introduced as an integrative manifestation of various other technological advancements in the field, has since then brought about sweeping changes in people's lives, organizational systems, and leadership work, and has challenged the established ethical and moral boundaries of human societies (Ceruzzi 2012; Royakkers et. al., 2018; Stone 2019).

Likewise, the boundaries of industry domains have been disrupted along with technological advancement, and new business models based on a 'platform economy' are evolving (Brynjolfsson and Kahin, 2000). Coupled with the forces of globalization, the widespread digitalization of human lives, natural environments and artificial things has brought us to a world that is frantic, exceedingly complicated and largely unstable (Capurro, 2017; Bolman and Deal, 2017, p. 7; Urbach and Röglinger, 2019, pp. 1-10). Hence, digitalization challenges the very fabric of why an organization exists and begs for a radical transformation of organizational culture and leadership work. However, digitalization should not be mistaken for an 'immu-

table and inevitable object', as it is rather an ever evolving 'social construction' (Stone, 2019).

The volume, velocity, and variety of big data that have been made possible due to digital technologies has resulted in a 'management revolution' in contemporary organizations (McAfee and Brynjolfsson, 2012). The answers are already there in the data. Hence, McAfee and Brynjolfsson posit that the new role of leadership in this process is analysing those data sets carefully and critically, thereby promoting a new culture of questioning, and developing organizational strategies accordingly. Thus, organizational leaders should possess understanding and the ability to consciously interact with digital technologies in order to critically examine the contextual validity and significance of the information and work performed by AI-based digital systems (Bunz, 2017, pp. 250 & 251).

Petrin (2019, pp. 4 & 5) anticipates that AI will eventually replace human directors, managers and officers, ultimately creating 'fused boards' and 'fused management' of corporations. However, during the transition period, as humans and AI continue to work together, 'a number of challenges, ethical and legal questions' arise, particularly regarding liability and accountability of actions delegated to AI (Havens, 2018 and Petrin, 2019). Thus, while it is important to acknowledge and accept the positive impacts of digitalization (Floridi, Couls and Beltrametti et al. 2018), it is equally important to critically examine the 'technological mindset' (Mitroff, 2019, p. 59), where only positive benefits are typically considered and praised, while the negative impacts and ethical challenges associated with digitalization are underestimated or dismissed altogether.

Hence, in this study 'digitalization of leadership' refers to the adoption of AI-based advanced technologies, such as cloud computing, robotics, biometrics, persuasive technologies, virtual realities (VR) and augmented realities (AR), digital platform solutions, machine learning, and big data analytics as companions to, or complete replacements for, human leadership in organizational systems (discussed by, e.g. Avolio et al., 2001; Avolio and Kahai, 2003; Brynjolfsson and Saunders, 2010; Ceruzzi, 2012; Mitchell and Brynjolfsson, 2017; Brynjolfsson and McElheran, 2016; Stone, 2019; Royakkers et al., 2018; Urbach and Röglinger, 2019).

Ethics of Digitalization and Challenges to Leadership

The IEEE (2017), Havens (2018), Petrin (2019), and the EU (2019, 2020) recommend that ethical standards for advanced digital technologies such as AI systems can be built upon the foundations of classical ethics, such as deontological ethics, utilitarianism, and virtue ethics (discussed in e.g. Rogers, 1937; Foucault, 1983; Cragg, 1999; Alasdair, 1998; Mill, 2009; Lewis and Kellogg, 2011; Prastacos et al., 2012), so that ethical challenges to leadership in the use of such technologies can be minimized.

On the other hand, as noted by Johnston and Johnston (1999) the 'modern challenge to religion' and progress in 'psychological, social and cultural explanation' along with the 'success of science' have posed serious threats to traditional beliefs about right and wrong as well as the moral claims presented in the classical ethics theories. Hence, modernity and moral certainty are antithetical, and the struggle to reclaim ethics as a 'human creation' is still ongoing. Thus, if ethics is to survive, there is a need for 'radical reform' in the existing 'ethics symbols and moral boundaries' that is far from the 'scientific perspective' and the 'causal laws of the universe' (Johnston and Johnston, 1999) as well as the new reality of digitalization (Capurro, 2017).

Moreover, ethics and moral judgement vary across individu-

als, groups, religions, and cultures as well as the social contexts (Alasdair, 1998). In addition, the rapid transformation of societies that is being accelerated by digitalization and globalization leaves considerable room for various interpretation of the same (Capurro 2017). According to Capurro, in contrast to the traditional metaphysical and theological concept of humans as 'God's creation', Western modernity accepts humans as 'autonomous beings'. However, Capurro maintains that humans are limited to being 'networked objects' in the digital era – Hence, digitalization challenges this very idea of humans as autonomous beings.

Thus, as documented by Bynum (2015) and Capurro (2017) digital ethics, or ethics of digitalization, is the most recent field of study derived from computer and information ethics, which is believed to have been founded by Norbert Wiener (1894-1964). Writers like Manner (1980), Weizenbaum (1976), Bynum (2000), Parker et al. (1990), The Association for Computing Machinery – ACM (1992), Johnson (1985) and Moor (1985) have made subsequent further contributions to the development of this new field of ethics rooted in the foundations of Wiener's pioneering works (Wiener, 1948, 1950, 1954, 1964).

Hence, computer and information ethics has been used in many different ways, such as in relation to Western ethics theories (discussed above) on ethical challenges in the use of Information and Communication Technologies (ICT), computer and other digital technologies. It has been also equated with professional codes of conduct for computer professionals (Gotterbarn, 1991 and 2001; Johnson, 1985 and 1999; Moor, 1985; Walsham, 1996; Bynum, 2015).

Floridi (1999, 2008) and Bynum (2015) maintain that 'information ethics' is a more resonating term, one that likely covers the breadth of this new field of ethics. The purpose of human life from an information ethics perspective is to constantly engage in 'meaningful information processing', which is an innate capacity that humans already possess. According to the writers, the information ethics perspective sees human beings as sophisticated information-processing agents capable of making informed decisions and are thereby liable for the consequences in their own lives. However, for this to become a reality, a significantly high level of freedom, equality, benevolence and compassion should prevail in societies and organizational systems, particularly in the applied actions of leadership.

Wood-Harper et al. (1996, p. 169) have already observed the digital disruptions as being 'very radical and often brutal' with far-reaching ethical implications beyond the core technological field. In the same vein, Avolio and Kahai (2003) discuss how information systems change the 'human systems' dynamics in organizations, as information technologies are being applied in organizations without the necessary impact assessment. Since then, AI-based digital technologies have been largely implemented in various levels and domains of organization systems without many regulatory provisions. Consequently, discussions regarding serious challenges to leadership in terms of ethics, compliance and governance have been slowly taking centre stage in this field (e.g., Bunz, 2017; the IEEE, 2017; Havens 2018; Petrin, 2019; The EU, 2019 & 2020). The writers recommend that digital age leaders and managers should be able to clarify the relationship between 'professional ethics' and 'applied ethics' for advanced digital technologies, while constantly encouraging and empowering engineers and designers to 'voice the full range of ethical challenges' throughout the product lifecycle.

Hence, ethical challenges of leadership in the digital era in this study refer to difficulties in decision-making, moral dilemmas,

mandatory compliance and conflicts of interest with applicable local, national and international laws and regulations, as well as the pressure to go beyond meeting regulatory requirements – Along with the challenges posed by the general lack of 'industry standards' for AI-based advanced technologies and the fear of reputational damage due to unanticipated consequences of digitalization, digital fraud, fraudulent activities, etc. (as discussed in e.g., Capurro, 2017; the IEEE, 2017; Bunz, 2017; Royakkers et al., 2018; Davenport & Katyal, 2018; Havens, 2018; Petrin, 2019; the EU, 2019 and 2020).

In the applied part of this paper, protection of privacy, issues of data ownership and security, trust building, and ensuring systemic transparency, accountability and integrity as well as complexities in promoting ethical culture and ethical organization systems design are discussed as practical challenges of leadership (as discussed in e.g., Groarke, 1998; Singer, 2002; Dolgin, 2012; Bolman and Deal, 2017; Mitroff, 2019; Gharajedaghi, 2011; Kizza, 2013; Floridi et al., 2018).

Research Design and Methodologies

Formulation of Research Questions

The main research task of this paper is to undertake an MLR in order to investigate how leadership work has transformed as a result of digitalization from 1985 to 2020 and find out what kind of ethical challenges leaders are facing during this process. As recommended by Adams et al. (2017) and Garousi et al. (2019), the primary study of scientific publications and grey literature (specified above) was conducted first. Afterwards, the following research questions (RQs) were determined to further dissect the study into specific realms:

- RQ 1: What has been previously studied and is available about the transformation of leadership work as a result of digitalization?
- RQ 2: What kinds of ethical challenges have leaders been facing due to widespread application of digital technologies in contemporary organizations?

Criteria and Strategy for Literature Search

Garousi et al. (2019) present the criteria for source selection in MLR based on the authority of the producer, the methodology applied, objectivity, publication date, position in the field, novelty, impact, and material outlet type. Hence, the MLR methodology criteria for selection of sources as well as the guidelines for quality assessment recommended by Garousi et al. are used in this study. Likewise, the sources were selected based on 'actual relevance' (Snyder, 2019) to the research questions as well as 'fit-for-purpose' (Adams et al. 2017; Paul and Criado, 2020) quality criteria. Grey literature was included simultaneously in coordination with the selection process for formal literature. As recommended by Adams et al. (2017) and Garousi et al. (2019) in order to define reasonable search chains, an informal pre-search was conducted for this study. Afterwards, general web search engines, specialized databases, individual contacts, and expert recommendations were utilized, as was the snowball method, which includes using reference lists and backlinks.

As demonstrated in Figure 1 (p. 34), a systemic literature search was conducted with the key words digitalization* AND 'Ethical concern* AND 'leadership and management' as an 'International e-material search' in Jyväskylä University's library database, JYKDOK, which is a part of nationwide Finna

search service for both electronic and print materials. This decision was made because it would include literature from diverse sources, covering all the major scientific databases (please see the list of literature sources included in appendix -1. 'English Language materials only' and the time period of '1985 to 2020', filters were applied.

As presented in Figure 1, the initial search resulted in 5,386 published materials. Next, only the literature from selected subject areas (please see the list of subjects in Figure 1 below) were considered to further narrow down the search. This resulted in a total of 1,046 publications. After that, only the articles that included the key words 'digitalization' AND 'Ethical concern' AND 'leadership and management' or related terms in their title, abstract or introduction chapter were selected. At the same time, duplicate articles from the abovementioned subject fields were automatically removed. This process resulted in 83 works of literature. However, after the first round of reading, any literature that was found not directly engaging in the discussion related to 'ethical concerns of leadership in the digital era' was excluded. Thus, only 15 pieces of literature searched from the library database met the inclusion criteria and were retained for reviewing.

Next, as recommended by Adams et al. (2017) and Garousi et al. (2019), the snowball method, the usage of backlinks, and expert recommendations were applied to add more literature to the review – Including books and essays on the 'history of computer ethics' and/or 'information ethics', the 'digitalization of leadership', and so on, in order to further enrich the discussion and ensure that the research questions are rightly answered (Snyder, 2019). None of the grey literature from the database search met the inclusion criteria. Hence, grey literature was added in the review through the same process of the snowball method, the usage of backlinks, and expert recommendations. Grey literature supporting relatively mature and bounded academic conversations (Adams et al. 2017) were automatically excluded from the selection process. Hence, after applying the strategies outlined above a total of 83 publications were identified and obtained for the final review.

A high number of the documents from the database search were excluded mainly due to their focus on micro-level analysis of digitalization in specific fields, while this study aims to highlight a general scenario within this topic. Therefore, it is possible to conduct more studies drawing from the excluded literature in specific contexts and particular fields, such as the use of social media tools, biometric technologies, and implications of AI for the health and wellness sector. More details on the recommended future research as well as some of the limitations of this study are presented in the subsequent segments.

Moreover, MLR methodology emphasizes the importance of clear stopping criteria based on, for example, 'theoretical saturation', 'effort boundedness' and 'evidence exhaustion' (Garousi et al., 2019). Therefore, for the additional literature search only the first fifty results from each of Google, Google Scholar, and the university database were considered, whereas, when using the snowball and backlinks techniques, up to three levels of references were explored. This criterion is justified due to the fact that the most significant literature sources often appear on top. 'Ethical challenges of leadership in the digital era' is an ever-evolving topic that is widely discussed, so to include more literature would have led to data enervation and also derailed the topic into a never-ending discussion.
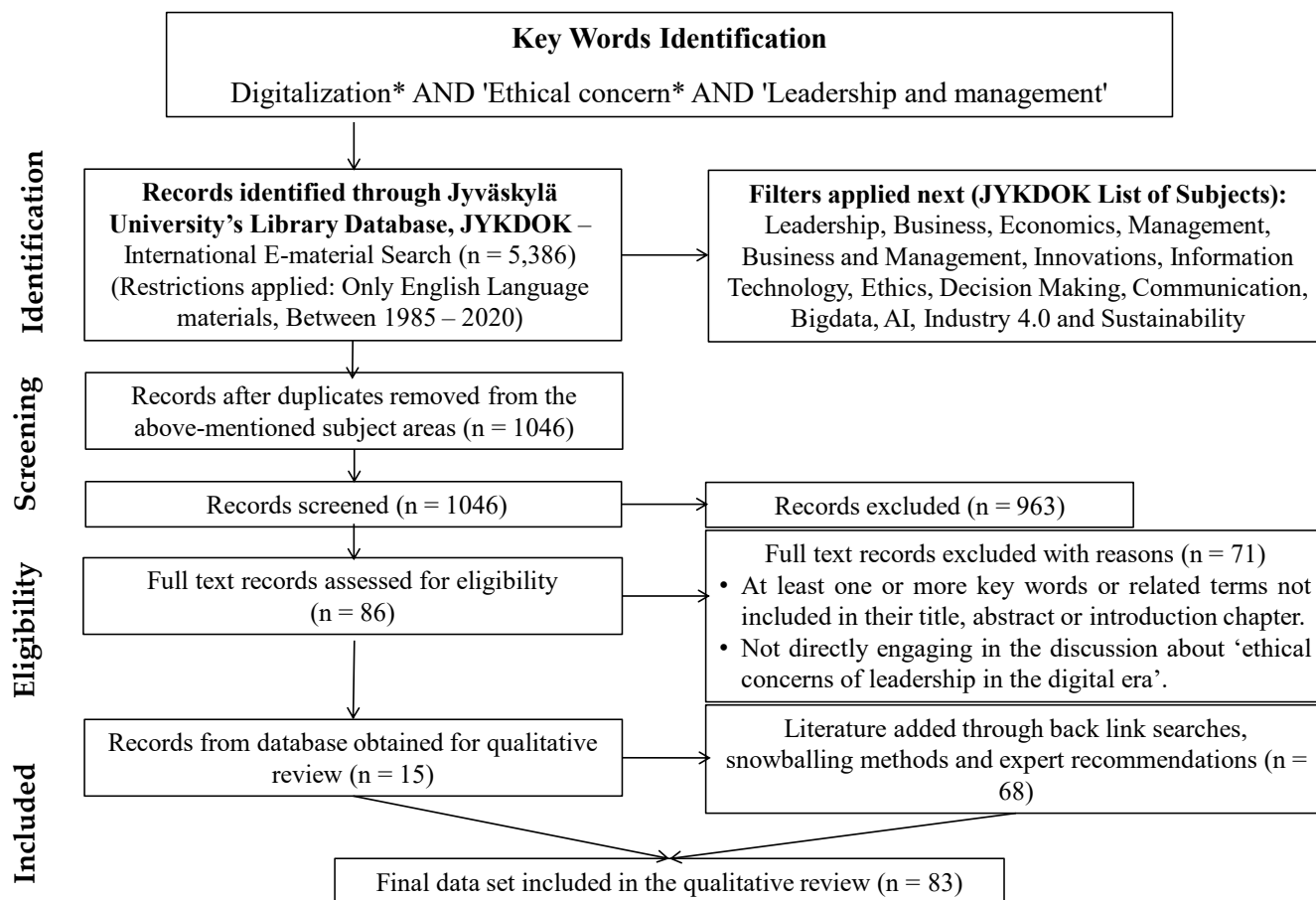
Key Words Identification

Digitalization* AND 'Ethical concern* AND 'Leadership and management'

Identification

Records identified through Jyväskylä University's Library Database, JYKDOK – International E-material Search (n = 5,386) (Restrictions applied: Only English Language materials, Between 1985 – 2020)

Filters applied next (JYKDOK List of Subjects): Leadership, Business, Economics, Management, Business and Management, Innovations, Information Technology, Ethics, Decision Making, Communication, Bigdata, AI, Industry 4.0 and Sustainability

Screening

Records after duplicates removed from the above-mentioned subject areas (n = 1046)

Records screened (n = 1046)

Records excluded (n = 963)

Eligibility

Full text records assessed for eligibility (n = 86)

Full text records excluded with reasons (n = 71)
• At least one or more key words or related terms not included in their title, abstract or introduction chapter.
• Not directly engaging in the discussion about 'ethical concerns of leadership in the digital era'.

Included

Records from database obtained for qualitative review (n = 15)

Literature added through back link searches, snowballing methods and expert recommendations (n = 68)

Final data set included in the qualitative review (n = 83)

Figure 1. Literature search strategy and selection criteria.

Source Selection, Data Extraction and Synthesizing

It is essential to disclose that some of the literature included in this study does not exclusively discuss the topical issues of 'digitalization' 'ethical challenges of leadership' and 'contemporary organization'. The intention behind this decision is to offer a comprehensive and holistic view of the topic, with adequate background information, historical foundations, systemic coherence, and interdisciplinary relationships.

Moreover, the studied topic itself is very closely intertwined with topics like human resource management (HRM), public administration, e-governance, and cybersecurity, among others. This automatically demands the inclusion of some literature from those domains as well. However, as recommended by Adams et al. (2017), Garousi et al., (2019), Snyder (2019), and Paul and Criado (2020), only sources that provide direct theoretical, methodological, and empirical evidence to the review topic and research questions were included.

Adams et al. (2017) highlight that despite the apparent benefits of grey literature, proper methodological guidance is remarkably rare concerning its inclusion, particularly in the field of MOS. Garousi et al. (2019) also share this view. The researchers also claim that the inclusion of grey literature entails even greater challenges regarding data management, extraction, and synthesizing. This study primarily follows the guidelines presented by Adams et al. (2017) and Garousi et al. (2019) for data extraction and synthesizing.

During the review process, a specific literature review specification table was developed. At the same time, the literature was categorized into three conceptual areas of discussion:

1. Big data, algorithmic decision-making and the changing role of leadership

2. Computer and information ethics to AI ethics and emerging challenges to leadership

3. Ethical organization systems design and the emerging challenges to leadership in the digital era

As per the guidelines of Adams et al. (2017), grey literature in this study is mainly included as supplementary evidence, rather than a competing form of evidence. Likewise, this study includes mainly the 'Tier-1' and 'Tier-2' grey literature, with a few exceptions of 'Tier-3' materials (ibid, 2017, p. 435). Hence, the included grey literature is of 'similar status, findings and confidence levels' with the scientific literature. Thus, there was no need to report them separately. The qualitative data synthesis as determined by the research questions and the review results are discussed next.

Results

Literature Sources

Literature search results have revealed that publication of new literature from 1985 to 2020 on the topic of digitalization and ethical challenges of leadership generally increased since 2010 and skyrocketed during the last few years in particular. The literature review specification table in Appendix 1 consists of all the references, primary sources, publication titles, and numeric indications of 3 main conceptual areas of discussion as listed above. Hence, it provides answers, particularly to RQ 1, concerning what has been previously studied and is available surrounding this topic.

For the purpose of this study, literature sources have been divided into three categories: Research literature (scientific, peer-reviewed articles), White literature (academic and theoretical

books) and Grey literature from other sources (please refer to the Appendix -1 for more details).

As presented in the table in Appendix 1, a total of 83 works of literature were reviewed in this study. Among them, there are 40 scientific peer-reviewed journal articles, 23 academic and theoretical books, and 20 grey literature. Hence, both theoretical and conceptual as well as empirical studies are included, while all the research literature included in this review is comprised of qualitative papers. Seventy-eight of the reviewed literature works were published during 1985–2020, except for five, which are considered classical and foundational works within this field of study, and therefore important to include in the review. Please also refer to the detailed explanation of the criteria and strategy for the literature search, presented above.

Findings

The descriptive information and a synthesis from the review of literatures, included in Appendix 1, in terms of their effects on and contributions to (Snyder, 2019) the three main conceptual areas of discussion is presented below. This section thus provides answers to research questions stated above in 'Research Design and Methodology'.

Despite the fact that ethics, leadership, and digitalization are widely discussed fields of study in academic research, scholarly debates, and the business world, the literature search results and review in this study have revealed that 'ethical challenges of leadership in the digital era' as a unified research concept is still in an evolutionary phase. It is difficult to find explicit statements on the emerging ethical challenges of leadership in the digital era, so the issue was found discussed in subtler forms instead, from the viewpoint of 'ethics of digitalization' in general and its apparent consequences in the organizational systems, including leadership work.

Big Data, Algorithmic Decision-Making and the Changing Role of Leadership

The literature reviewed in this study reveals that digitalization is a 'double-edged sword', particularly for leaders. For instance, as noted by Entschew and Suchanek (2017), Capurro (2017) and Royakkers et al. (2018) default digital designs or a demand for permanent availability, efficiency at the expense of personal privacy, unfair monetization of personal data, and the growing public concerns regarding the 'spying eyes' of various digital technologies such as IoTs, biometrics, VR and AR technologies have compounded the complications facing leaders in the search for balance between traditional ways of managing organizations and the pressing market need for the adoption of new technologies.

Poikola et al., (2020) and Sandvik (2014) state that the exponential rate of data collection in all aspects has resulted in a 'general digitalization of human lives'. Hence, Longbing (2017) proposes a theoretical concept for 'Big Data Science and Analytics' as a 'very necessary disciplinary science in the making' that will transform not only the core data oriented scientific and engineering fields but the fields of social science, business and management as well, thereby becoming a true enabler of a 'new platform economy', towards further digitalization of leadership work, enabled by AI and algorithmic decision-making.

On the other hand, Siebecker (2020) claims that despite the ethicists' major concerns regarding apparent problems with algorithmic reasoning, AI makes a 'compelling case for integrating moral considerations into board decision making'. However, 'AI systems are only as good as the data we put into them', so inputting 'low quality, biased and bad data' can be ter-

ribly damaging to organizations and societies, Siebecker warns. Hence, as noted by Belton (2019), apart from other requirements, digitalization of leadership, for instance adoption of AI powered advanced digital technologies such as big data analytics and machine learning, demands a sophisticated 'information governance system' for the creation, transmission, storage, analysis, use, valuation, security, and deletion of acquired data or information. Here, Belton reminds us that countries (such as China, the USA, and Germany) have adopted vividly distinct approaches to issues such as information governance, data security, e-commerce. Consequently, organizational leaders are facing various legal and moral challenges.

Davenport and Katyal (2018) and Park (2018) explain that it is the duty of leaders to ensure reliable digital infrastructure for data and privacy protection before the adoption of 'smart services'. Clavell (2018) shares this view and writes further that 'complications in data sharing among authorities', securing support and digital readiness among the personnel involved in the process, and developing a response mechanism for potential mismatches or unintended results from the use of new technology are among the other challenges for organizational leaders.

On the other hand, Brynjolfsson and Kahin (2000), McAfee and Brynjolfsson (2012) and Brynjolfsson and McElheran (2016) observed that along with the evolution of the new 'platform economy', traditional reliance on 'intuition' has been indeed replaced by data-driven decision-making (DDD). However, the critical question for leaders and managers in this 'new normal' is how to access and determine 'better data' for 'better decision-making'. Organizational leaders thus find it challenging to keep track of how AI-based digital technology has been transforming jobs and leadership roles and to formulate an evidence-based 'sense and respond' approach for the same (Brynjolfsson and Saunders 2010; Mitchel and Brynjolfsson, 2017). Additionally, as maintained by Dijck (2014), leaders and managers need to avoid and challenge the 'objective quantification' of human behaviour and sociality that has been made possible by so-called 'bigdata analytics'.

Havens (2014) notices the fundamental problem concerning bigdata and algorithmic decision-making is that individuals are not in charge of controlling their data. Havens warns that potential inputting of 'erroneous personal statistics' and exclusion of individuals from 'digital self-examination' is not only seriously undermining the true potential of AI and subsequent technologies built on personal data but also eventually failing it, as it could lead to the erosion of public or consumer trust – Hence, there is a risk that digitalization of leadership could become a failed or unfinished project. Fortunately, as noted by Havens there are rays of hope that a number of such initiatives are taking place worldwide towards 'individual control of data', 'beyond discussions of privacy or transactions'. For instance, the EU General Data Protection Regulation (GDPR, 2016) and the MyData Initiative (Poikola et al., 2020) are portrayed as initiatives in that direction.

Nonetheless, it remains a fact that people today are living under constant fear of breaches of cybersecurity and the potential theft of their identities, bank credentials, credit card data and other personal information (Kizza, 2013, pp. 9-11, Kumar and Rosenbach, 2019). The recent psychotherapy centre data breach in Finland (Yle, 2020) has once again awakened us with a brutal reminder of the emerging challenges and ethical tensions on the part of leadership caused by digital technologies in contemporary organizations. The World Economic Forum (2019) also highlights 'data fraud or theft' and 'cybersecurity' as the major challenges in terms of their impact in contemporary

organizations and leadership work. The document posits that while it is unrealistic to expect 'complete immunity' from such threats and attacks, the task of leadership is to keep the risks to an 'acceptable level'.

In the field of Human Resource Management (HRM), traditionally aligned HR processes and information systems along with a lack of high-quality data are cited as the primary factors impeding adoption of advanced HRA (Dahlbom et al., 2019). Dahlbom et al. therefore argue that HR should evolve from its traditional administrative role into a 'data-driven decision science of its own' – Thereby integrated into the 'critical decision-making body', i.e., the leadership team in an organization. Longbing (2017) also shares this view. However, these researchers highlight the utmost need to remain vigilant concerning the potential legal and ethical challenges that further digitalization of HR decision-making could entail.

Auvinen and Lämsä (2020) observe that the use of technology in HRM and organizational governance in general is not without problems. They see the major challenges as being a mechanistic viewpoint, machine-like treatment of human beings, and threats to privacy protection. Likewise, Leicht-Deobald et al. (2019) and Capurro (2017) find that AI systems do not have 'moral imagination power' and lack the ability for 'practical interpretation of the norms'. Hence, the writers maintain that algorithmic decision-making is legally and ethically problematic as of now. They recommend that organizational leaders and HR managers should be trained in critical data literacy, broad ethical awareness, and 'participatory design methodologies' for minimizing risks.

Computer and Information Ethics to AI Ethics and Emerging Challenges to Leadership
The review of literature in this study upholds that understanding the history of computer ethics provides us with a starting point in dealing with the digitalization of leadership and emerging ethical challenges. Following in the footsteps of Wiener's pioneering works on setting the foundations of the field of computer and information ethics (discussed above in 'Theoretical and Conceptual Backgrounds'), Maner (1980), Weizenbaum (1976), Bynum (2000), Parker et al. (1990), ACM (1992), Johnson (1985) and Moor (1985) have all contributed to the subsequent development of the field with their emphasis on the need for a comprehensive analysis of the nature and social impact of computer technology, and they also stress that formulation and justification of policies for the ethical use of the same is essential.

Maner (1996) opens a 'uniqueness debate' with the idea that computer ethics is a specific and autonomous academic discipline dealing with specific issues associated with computer technologies, thereby having no correlation to the history of classical ethics. Johnson (1985), on the other hand, maintains that ethical challenges and problems posed by computer technology are merely the moral dilemmas and disguised classical problems of ownership, power, responsibility, and privacy. Furthermore, Walsham (1996) and Johnson (1999) argue that rather than leading to the creation of a new universal ethical system, computer ethics will simply continue to develop as a specific branch of applied ethics within the existing system. Likewise, Donald Gotterbarn (1991 and 2001) believes that computer ethics is nothing more than developing codes and a standards of ethics for computing professionals and specialists. In the digital era, this includes organizational leaders and managers as well.

Figure 2 (p. 37) displays the conceptual development of ethics in the field of digitalization. For instance, Floridi (1999 and

2008) dismisses the idea that standard ethical theories (classical ethics theories, discussed above) are enough to deal with the problems of computer ethics. Hence, Floridi proposes a new field of study, termed 'information ethics', as the foundational and philosophical counterpart of computer ethics.

Writers like Avolio, Kahai and Dodge (2001), Avolio and Kahai (2003) and Brynjolfsson and Saunders (2010) have dedicated their work to e-leadership and the digitalization of leadership. For instance, they maintain that digitalization has challenged traditional power dynamics in organizations, ultimately bringing about intense pressure on leadership and management professionals. These writers recommend balancing the traditional leadership practices with the new e-leadership model, making ethical choices and wisely using technology not only 'to reach' but 'to touch' all employees and stakeholders.

Whereas, distinguishing the truly sustainable long-term opportunities from the short-term hype of the ongoing digital disruption is a major challenge faced by the leaders in contemporary organizations (Urbach and Röglinger, 2019). At this point, it is worthwhile to remember that 'a Hong Kong based venture capital firm, Deep Market Ventures, appointed an AI software entity, Vital, to its board of directors in 2014' (Siebecker 2020, p. 96). Likewise, the Finnish digital technology firm Tieto (2016) informed the public that it had appointed 'Artificial Intelligence' as a member of the leadership team of its new data-driven businesses unit. These are only a few representative examples. Similar other practices have been reported around the world in recent years. Hence, the consequent ethical and legal challenges regarding digitalization (of leadership) are ever-increasing (Wood-Harper et al., 2006; Kizza, 2013; Sandvik, 2014; Bunz, 2017; Mitroff, 2019).

The literature review suggests that apart from the anxiety regarding the need for major organizational restructuring and fear of unequal distribution of the potential benefits from the ongoing digital disruption, the apparent lack of industry standards and 'ethical codes' for the application of AI based digital technologies in organizational governance and operation has been noticed as an imminent challenge to leadership work and professions in the digital era (Sandvik, 2014; The IEEE, 2017; Havens, 2018; Royakkers et al., 2018; Belton, 2019; the EU, 2019 & 2020). Ala-Pietilä and Lundström et al. (2019, pp. 36-37) and Koski and Husso (2018, pp. 12-19) also share this view and write further that it is therefore important to formulate an appropriate 'state intervention mechanism' for 'smart regulation and healthy competition' supervision in this field, so that ethical challenges to leadership could be minimized.

The IEEE (2017, pp. 61-65 and 182-190), The EU (2019), Havens (2018) and Davenport and Katyal (2018) propose that an ethical framework for AI-based digital systems, which is already a desperate need of our times, can be built upon the same foundations as 'classical ethics' as well as 'computer and information ethics' (discussed above) by embedding fundamental human rights, values and wellbeing metrics in their design and operation. An EU white paper on AI (2020) urges member states to assume leadership roles and formulate new national legislations on AI technology in order to ensure citizens' trust and confidence. However, 'laws are not always up to the speed with technological developments' (EU, 2019), so AI-based digital technologies should adhere to ethical norms in the first place.

Moreover, countries like Japan are already headed for society 5.0 (Gladden, 2019). Gladden projects that autonomous robots and AI systems will become active participants or even full members in such a society. Still, their recognition as moral subjects or political entities will remain an unrealistic scenario.
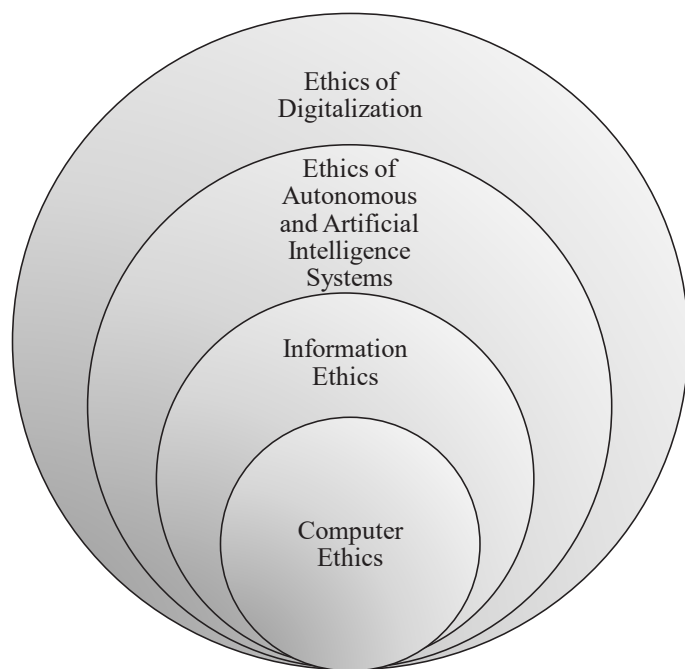
Figure 2. Conceptual development of ethics in the field of digitalization.

However, along with natural biological human beings, human beings altered or enhanced with futuristic technologies (to various degrees) will make up the predominant members in society 5.0. This will further diversify human society, increase the risk of inequality, and also further complicate the ethical and legal challenges concerning the use of AI technologies, Gladden maintains.

Ethical organization systems design and the emerging challenges to leadership in the digital era
The review of literature in this study reveals that complications in ethical organization systems design in itself stands as a major ethical challenge to leadership in the digital era. As noted by Burrell and Morgan (1979, pp. 152-156), organizations are 'living systems' open to their environments wherein the social system is considered a positive, but a technological system is seen as an element that leads to complications. Also worthy of note here are Robey and Boudreau's (1999) discussion on the 'logic of opposition' against the 'logic of determination', and Clegg et al.'s (2001) recommendation for taking an approach of 'practical relevance' instead of 'rhetorical significance' to studying the consequences of information technology in organizational systems and the apparent challenges to leadership.

However, Gharajedaghi (2011, pp. 16 & 29-30) explains that unlike the system thinking of the first and second generations, the system thinking of the digital age has to deal with the challenges of interdependency, self-organization and choices all at once. Hence, the leaders of the digital era are required to possess and demonstrate abilities to adapt and reinvent themselves accordingly. As well, Auvinen and Lämsä (2020) have observed that self-organizing capabilities of organizations are largely shaped by the operating environment.

Today, a crisis of meaning and eroding moral authority is largely persistent in contemporary organizations around the world (Brown and Tervino 2006; Brown and Mitchell 2010; Bolman and Deal 2017). Hence, Riivari and Lämsä call for not only a positive attitude, but also 'leadership by example and ethical role modelling' (2019, p. 233) as essential for promoting ethical virtues of innovativeness in digital-era organizations).

Epley and Kumar (2019) argue that ethics is indeed not only a 'belief problem' but also a 'design problem' in contemporary organizations, where leaders can play decisive roles with simple yet effective actions. According to Epley and Kumar, ethical organization systems design can be as simple as embedding ethical principles into an organization's strategies and policies, setting up a top priority for ethical leadership practice, establishing an incentive-based culture for ethical behaviour and encouraging ethical norms in everyday operations. Auvinen et al. (2019) examine the correlation of digitalization and 'strategy narration' by leaders, noting that there is an increasing demand for 'organizational transparency' and 'responsible communication' by leaders in all sectors.

However, as maintained by Filabi and Haidt (2017) and Floridi et al. (2018), a results-driven ethical framework or system design in the digital era involves consistency and alignment of personal, organizational, and regulatory readiness and commitment. Additionally, Singer (2002, pp. 1-13) and Groarke (1998) maintain that phenomena such as globalization, climate change, terrorism, cybersecurity, and organizational restructuring are no longer exclusively the concern of public policy and international diplomacy: they also determine business culture and leadership ethics, or at least to a large extent thinking about ethics in organizations. Chernyak-Hai and Rabenu (2018) explored the need for readjustments in social exchange theory (SET) used to understand labour relationships, in order to better align it with the technological, political, globalization, and economic changes of the recent decades, so that the challenges to leadership associated with the same could be minimized.

Dolgin (2012) coined the term 'new economy of the information society', a phenomenon for which a definitive name and leadership model has not yet materialized. Froese (2017) proposes an updated vision to the new organizational equilibrium for the 21st century, towards developing a 'systematic approach' consisting of the planning and implementation of 'strategies and processes' to achieve and maintain a balanced equilibrium in organizations. Similarly, Fiorini et al. (2020) discuss the global leadership challenge in the 21st century with an integrated and strategic perspective in science, engineering and technology (SET) towards a radical redesign of organizational systems and the role of leadership.

Moreover, Caruso (2017) argues that among other challenges, the potential emergence of 'knowledge workers' as the 'new elites' is an imminent social challenge that digitalization and the fourth industrial revolution entails – While the technology industry's failure or unwillingness to predict 'prescribed consequences' to jobs and organizational design stands as yet another major challenge to leadership work. Capurro (2017) observes it more like a 'digital class divide'. Chernyak-Hai and Rabenu (2018) share this view and write further that the new role of leadership in this new reality is about balancing organizational politics and power relationships, along with ensuring 'distributive justice' in order to avoid 'reproduction of employee inequality' and 'counter-productive behaviour' in organizations.

Recommendations for Future Research

As discussed above, organizations and their leaders often perceive and portray digitalization as a critical response needed to drive innovation and efficiency towards increasing levels of business agility, along with meeting the rising customer expectations for individualized experiences. Digitalization of leadership work often appears at the top of this process. However, technological developments naturally require considerable ad-

aptation, including making ethical choices on the part of leadership in organizations, while also remaining efficient in the 'old world order' (e.g., Avolio et al. 2001, pp. 615 & 623). Therefore, the challenges facing leaders in making ethical choices while working together with advanced, often autonomous digital systems should be studied empirically as a separate research topic in itself.

The ethical challenges of leadership associated with the proposed new field of bigdata science (e.g., Longbing, 2017) and the 'ethical data economy' (e.g., Poikola et al., 2020; Ala-Pietilä and Lundström et al., 2019), which are often considered in the literature reviewed within this study, demand further empirical investigation. In relation to the same, it is vital to conduct more research regarding the ethical challenges of leadership in formulating an evidence-based 'sense and respond' approach (Brynjolfsson and Saunders 2010; Mitchel and Brynjolfsson, 2017) that that the writers claim can be built on the strategic value offered in the form of bigdata.

The EU General Data Protection Regulation (GDPR, 2016) and the 'MyData Initiative' (Poikola et al., 2020) are portrayed as a 'coherent data protection framework' and a true companion to organizational leadership towards promoting an ethical data economy based on an open business environment, economic certainty, and transparency for the involved stakeholders, including leaders and managers in all kinds of organizations. This topic in conjunction with Nissenbaum's (2010) argument that privacy and data security as the 'subjects of contextual determination' can be a whole new topic of research, in terms of their applied effectiveness and leadership experiences for the same.

Increasing public concerns regarding control and filtering of freedom of expression along with issues like unfair power balance in the use of digital technologies are noticed in this study as challenges to leaders in the digital era, while assurance of cybersecurity and embedding privacy and digital trust into the DNA of organizations (e. g., Stone, 2019; WEF, 2019) have been proposed as potential solutions. Thus, it is important to conduct further studies to find out the required qualities, effectiveness, and challenges of leadership in addressing these issues.

The majority of the literature reviewed in this study highlights the apparent lack of industry standards and universally accepted 'ethical codes' for AI-based digital technologies as the major ethical challenge of leadership in the digital era. Moreover, additional ethical dimensions associated with the artificial superintelligence (ASI) now in the making and the AI provisions designed for critical sectors, such as health care, transportation, law enforcement and legal systems as well as 'physical harm' or warfare are emphasised in much of the literature. Likewise, emotional intelligence, affective computing, and the mixed reality provisions being embedded in AI development are also noted as further challenges to leaders. Hence, more scholarly engagement exclusively surrounding this topic, an ethics of AI, is highly recommended, along with challenges to leadership in contemporary organizations.

Moreover, this study highlights only a general scenario regarding the ethical challenges of leadership in the digital era. Thus, it would be beneficial to conduct further study in a country-and-field-specific context within this topic. For instance, how leadership work has transformed due to AI-based digital technologies in Finland and what ethical challenges leaders are facing, such as in education, health and wellness, or banking and finance. Likewise, the major challenges for an ethical organization system design in the digital era could be studied more thoroughly and empirically in future studies.

Moreover, future studies in this field could also focus on the impact of rapid digitalization in organizational, professional, and family life that has been driven by the sudden appearance of the Covid-19 global pandemic and has highlighted the underlying ethical problems, unfair organizational designs, broken systems, and failure of leadership both within the governmental structures and business world (Fiorini et al., 2020).

Discussion and Conclusions

Drawing upon the method of multi-vocal literature review (MLR), this study explored the emerging ethical challenges of leadership in the digital era. As presented above, adoption of AI-based digital systems in organizational governance and operation is largely contributing to rapid digitalization of leadership work. At the same time, the general digitalization of human life and the security of personal data have become the primary concern for leaders and the pivotal point of discussion in both the academic community and business world today – While leaders are often struggling to determine 'quality and strategic usefulness' (Brynjolfsson and Saunders, 2010) as well as legal and moral clarity in the use of specific data sets.

Figure 3 (p. 39) summarizes the major ethical challenges of leadership in the digital era. The challenges can be realized in terms of socio-economic, political, and environmental challenges, and they fall within the main three conceptual areas of discussion as presented in the findings of this study. How digital technologies can be used to improve the processes and outcomes of businesses without compromising ethical and moral duties of leadership and management is a major question today. A swift introduction of new regulatory policies and an ethical framework for emerging digital technologies as the new companion to leadership is an imminent need of the time. Moreover, digital-age leaders and managers are required to be able to clarify the relationship between professional ethics and applied ethics for AI and autonomous digital systems, while also critically examining the essence of classical ethics in terms of their applicability for the same. The popular term coined by Moor in 1985, 'policy vacuums', concerning the governance of computer systems (digital technologies) still refers to an unsolved problem. Hence, those vacuums are the real ethical challenge to organizational leaders in the digital era.

Moreover, as revealed by Robey and Boudreau (1999, p. 170) there is still no consistency among academics and practitioners regarding the true consequences or impact of the application of digital technologies to leadership work and organizational systems. Manner's (1996) uniqueness debate, which was reinforced by Gorniak (1996), concerning computer ethics is being further developed today, as AI ethics or ethics of digitalization in general are slowly taking centre stage in the universal ethics debate around the globe (Bynum, 2015). Ethical challenges of leadership are very much dependent on the settlement of this debate and the development of universally accepted codes of ethics.

Important consideration of the human dimension of digitalization and compliance with fundamental concepts of ethics is not only contributing to ethical organization systems design and leadership excellence, but it is also strengthening the case for further development of advanced digital technologies in itself. However, the ongoing digital disruptions, emergence and domination of multinational business corporations and supranational governing agencies that severely challenge the traditional roles and power exercises performed only by nation-states are largely intertwined, and have become a major challenging factor in ethical leadership practice globally. Hence,
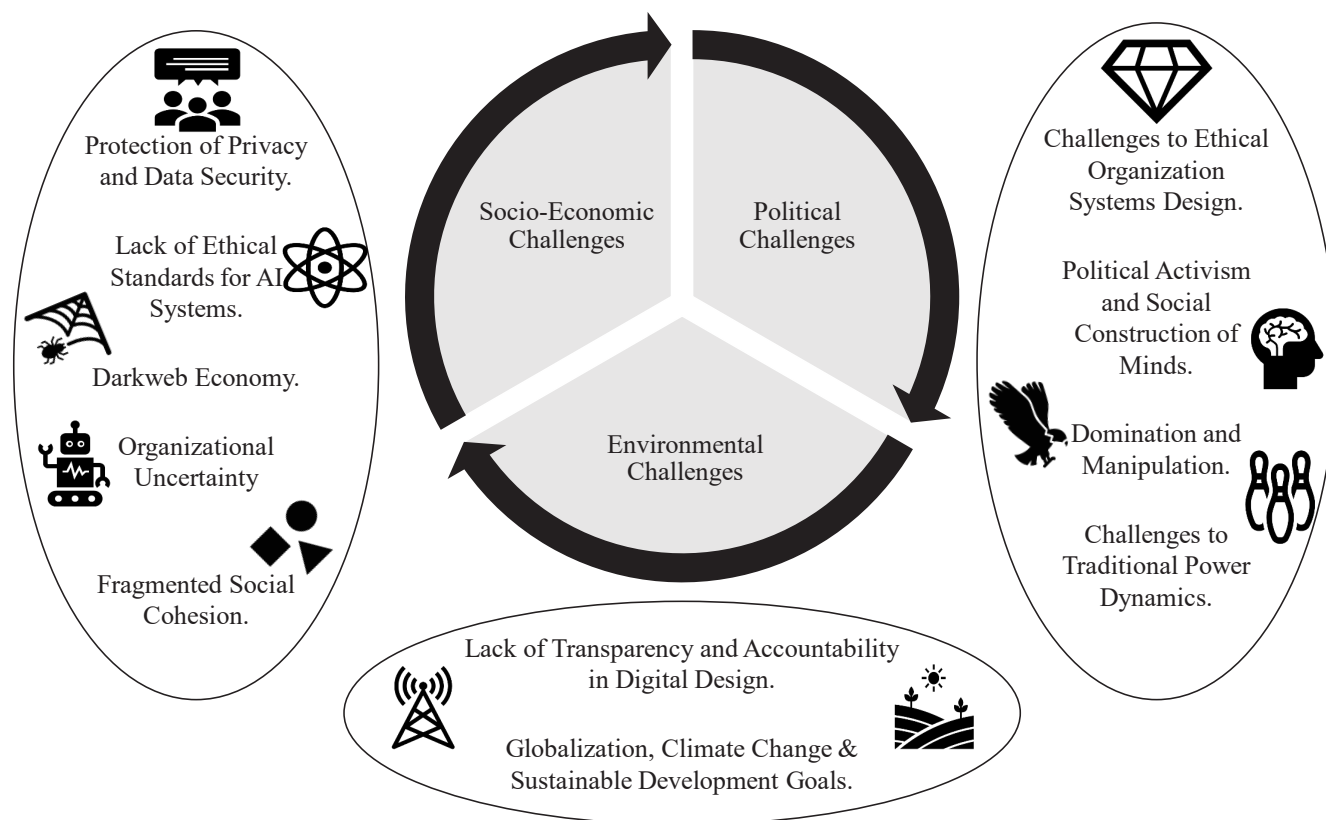
Figure 3. Emerging ethical challenges of leadership in the digital era.

there is a sense of urgency to formulate 'new ethics' and a leadership model consistent with the age of globalization and technological disruption in order to create a more ethical, efficient and just system of organizations.

Even though ethical neutrality is an unattainable ideal (Wood-Harper and Wood, 1996), there is a growing need for education and training in ethical implications for leaders, human resource managers, and systems engineers. Furthermore, there is an imperative to ensure a readiness for continuous learning and proactive consciousness among leaders towards tackling the ever-increasing ethical challenge posed by new technologies. At the same time, there is so much to agree with in Clavell (2018), that studying ethical, social, organisational, and technological challenges should not be understood as a way to limit the potential of technology, but to ensure that it can reach its full potential. It is not necessarily a debate for and against the use of technology, but how to implement it without causing tensions among the stakeholders or creating turmoil in organizations.

While this study is timely and includes the most recent contributions, it comes with limitations which should be considered and overcome in future studies. First, since the study was designed to offer a general overview of prior research and highlight the ethical challenges of leadership in the digital era, the author has not provided detailed propositions to the conceptual categories outlined in the study. This needs to be addressed by future studies. The second limitation concerns the data set. The author primarily drew data from a local university database and direct recommendations from academic experts within this field. Hence, it is possible that some relevant literature stored elsewhere might have been overlooked. Thus, future studies could be conducted with comparative data sets from two or more databases.

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Conflict of interest:

The author declares that there is no conflict of interest.

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Appendix 1: Specification Table of the Reviewed Literature.

S. N.	Literature	Source	Title	Areas of Discussion*	Category*
1	ACM (1992)	The Association for Computing Machinery.	ACM Code of Ethics and Professional Conduct.	2	Grey
2	Ala-Pietilä and Lundström et.al. (2019)	Government of Finland, MoEAE	Leading the way into the age of artificial intelligence - Final report of Finland's Artificial Intelligence Programme 2019.	2	Grey
3	Auvinen and Lämsä (2020)	EJBO – Business & Organization Ethics Network	Henkilöstöjohtamisen Trendit Digitalisoituvassa Toimintaympäristöss	1 and 3	Research
4	Auvinen et. al. (2019)	Leadership - SAGE Publications.	Evolution of strategy narration and leadership in the digital era	3	Research
5	Avolio, Kahai and Dodge (2001)	Leadership Quarterly.	E-Leadership Implication for Theory, Research and Practice.	2	Research
6	Avolio and Kahai (2003)	Organizational Dynamics – Elsevier Science Inc.	Adding the 'E' to E-leadership: How it may impact your leadership.	2	Research
7	Belton et.al. (2019)	Issues in Science and Technology	Who Will Set the Rules for Smart Factories?	1 and 2	Research
8	Bolman and Deal (2017)	Jossey-Bass.	Reframing Organizations: Artistry, Choice, and Leadership (6th Edition).	3	White
9	Brynjolfsson and Kahin (2000, Eds.)	The MIT Press.	Understanding the Digital Economy: Data, Tools and Research.	1	White
10	Brynjolfsson and McElheran (2016)	American Economic Review: Papers & Proceedings 2016.	Digitalization and Innovation: The Rapid Adoption of Data-Driven Decision-Making.	1	Research
11	Brynjolfsson and Saunders (2010)	The MIT Press.	Wired for Innovation: How information technology is reshaping the economy.	1 and 2	White
12	Brown and Trevino (2006)	The Leadership Quarterly Elsevier Inc.	Ethical Leadership: A review and future directions.	3	Research
13	Brown and Mitchell (2010)	Business Ethics Quarterly.	Ethical and Unethical Leadership: Exploring New Avenues for Future Research.	3	Research
14	Bunz (2017)	Amsterdam University Press.	The need for dialogue with Technology - In Schafer and van Es (Eds): The Datafied Society: Studying culture through data.	2	Research
15	Burrell and Morgan (1979)	Ashgate Publishing	Sociological Paradigms and Organizational Analysis.	3	White
16	Bynum (2000)	American Philosophical Association.	A Very Short History of Computer Ethics. In: Newsletter on Philosophy and Computing.	2	Research
17	Bynum (2015)	Stanford University	Computer and Information Ethics	2	Grey
18	Capurro (2017)	AI & Society	Digitization as an ethical challenge.	2	Research
19	Caruso (2017)	Springer-Verlag London Ltd.	Digital innovation and the fourth industrial revolution: epochal social changes.	3	Research
20	Ceruzzi (2012)	The MIT Press.	Computing: a concise history.	2	White
21	Chernyak-Hai and Rabenu (2018)	Industrial and Organizational Psychology.	The New Era Workplace Relationships: Is Social Exchange Theory Still Relevant?	3	Research
22	Clegg, Clark and Ebarra (2001)	Journal of Human Relations, SAGE Publications.	Millennium management, changing paradigms and organizational studies.	3	Research
23	Clavell (2018)	Springer Journal of Ethics and Information Technology.	Exploring the ethical, organisational and technological challenges of crime mapping: a critical approach to urban safety technologies.	1	Research
24	Davenport and Katyal (2018)	MITSloan Management Review.	Every Leader's Guide to the Ethics of AI.	1 and 2	Grey
25	Dolgin (2012)	SpringerLink.com	Manifesto of the New Economy: Institutions and Business Models of the Digital Society.	3	White
26	Dahlbom, Siikanen and Sajasalo (2019)	Baltic Journal of Management - Emerald Publishing Limited.	Big data and HR analytics in the digital era.	1	Research

27	Entschew and Suchanek (2017)	ZFWU Journal of Economic and Business Ethics.	Digital Communication: A New Challenge for Moral Discernment.	3	Research
28	Epley and Kumar (2019)	Harvard Business Review.	How to Design an Ethical Organization	3	Grey
29	Filabi and Haidt (2017)	World Economic Forum.	Ethical systems design: what smart leaders are using to improve their organizations (and the world).	3	Grey
30	Floridi (1999)	Ethics and Information Technology.	Information Ethics: On the Theoretical Foundations of Computer Ethics.	2	Research
31	Floridi (2008)	John Wiley & Sons Inc.	Foundations of Information Ethics (In Himma and Tavani, Eds. - The Handbook of Information and Computer Ethics).	2	White
32	Fiorini et.al. (2020)	Cadmus Journal.	Global Transformative Leadership in the 21st Century: A Science, Engineering, Technology Integrated and Strategic Perspective.	3	Research
33	Floridi, Cowls and Beltrametti (2018)	Minds and Machines.	AI4People - An Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations.	3	Research
34	Froese (2017)	Springer-Verlag Berlin Heidelberg.	Organizations in balance: revitalizing the concept of organizational equilibrium.	3	Research
35	Gharajedaghi (2011)	Elsevier (Morgan Kaufmann) Inc.	Systems Thinking: Managing chaos and complexity – A platform for designing business architecture.	3	White
36	Gladden (2019)	MDPI Journal of Social Sciences.	Who Will Be the Members of Society 5.0? Towards an Anthropology of Technologically Posthumanized Future Societies.	2	Research
37	Gorniak-Kocikowska (1996)	Global Information Ethics – Opragen Publications	"The Computer Revolution and the Problem of Global Ethics," in T. Bynum and S. Rogerson (eds.).	2	White
38	Gotterbarn (1991)	The Phi Beta Kappa Journal.	Computer Ethics: Responsibility Regained.	2	Research
39	Gotterbarn (2001)	Science and Engineering Ethics.	Informatics and Professional Responsibility.	2	Research
40	Groarke (1998)	Wilfrid Laurier University Press.	The Ethics of the New Economy: Restructuring and Beyond	3	White
41	Havens (2014)	Mashable.com	Artificial Intelligence Is Doomed if We Don't Control Our Data.	1	Grey
42	Havens (2015)	Mashable.com	The importance of human innovation in A.I. ethics.	1	Grey
43	Havens (2018)	AI Matters – IEEE.	Creating Human Standards for Ethical Autonomous Intelligence Systems	2	Research
44	Johnson (1985, 1994, 2001)	Prentice-Hall.	Computer Ethics.	2	White
45	Johnson (1999)	A keynote address at ETHICOMP99, Rome, Italy, October 1999.	Computer Ethics in the 21st Century.	2	Grey
43	Kizza (2013)	Springer-Verlag.	Ethical and Social Issues in the Information Age - Texts in Computer Science.	1 and 2	White
46	Koski and Husso (2018)	Government of Finland, Ministry of Economic Affairs and Employment.	Work in the age of artificial intelligence: Four perspectives on the economy, employment, skills and ethics.	2	Grey
47	Kumar and Rosenbach (2019)	International Monetary Fund (IMF).	The Truth About The Dark Web.	3	Grey
48	Leicht-Deobald et. al. (2019)	Springer - Journal of Business Ethics.	The Challenges of Algorithm-Based HR Decision-Making for Personal Integrity.	1	Research
49	Longbing (2017)	ACM Computing Surveys.	Data Science: A Comprehensive Overview	2	Research
50	Maner (1980)	Helvetia Press.	Starter Kit on Teaching Computer Ethics.	2	White
51	Maner (1996)	Science and Engineering Ethics.	Unique ethical problems in information technology.	2	Research
52	McAfee and Brynjolfsson (2012)	Harvard Business Review.	Big Data: The Management Revolution	1 and 2	Grey
53	Miroslav (2015)	Trauner Verlag Universitat.	The history of computer ethics and its future challenges.	2	Research
54	Mitchell and Brynjolfsson (2017)	Springer Nature (Macmillan Publishing).	Track how technology is transforming work	1 and 2	Research
55	Mitroff (2019)	Palgrave Macmillan.	Technology Run Amok	2	White

56	Moor (1985)	Blackwell (October 1985 issue of Meta-philosophy).	What Is Computer Ethics? In Bynum (Ed.): Computers and Ethics.	2	Research
57	Nissenbaum (2010)	Stanford University Press	Privacy in Context. Technology, Policy and the integrity of social life.	1 & 2	White
58	Park (2018)	Springer Journal of AI and Society.	The Fourth Industrial Revolution and implications for innovative cluster policies.	1 and 2	Research
59	Parker et. al., (1990, Editors)	QED Information Sciences.	Ethical conflicts in information and computer science, technology and business.	2	White
60	Petrin (2019)	University College London (UCL).	Corporate Management in the Age of AI.	1	Research
61	Poikola, Kuikkaniemi and Honko (2020)	Open Knowledge Finland.	MyData – A Nordic Model for human-cantered personal data management and processing.	1	Grey
62	Riivari and Lämsä (2019)	Journal of Business Ethics.	Organizational Ethical Virtues of Innovativeness.	3	Research
63	Robey and Boudreau (1999)	Information Systems Research.	Accounting for the contradictory Organizational Consequences of Information Technology: Theoretical Directions and Methodological Implications	3	Research
64	Royakkers et. al. (2018)	Ethics of Information and Technology	Societal and ethical issues of digitization.	2	Research
65	Russel (2016)	John Wiley and Sons Inc.	Building an innovative learning organization: A framework to build a smarter workforce, adapt to change and drive growth.	3	White
66	Sandvik (2014)	International Review of the Red Cross.	Humanitarian technology: a critical research agenda.	1 and 2	Research
67	Siebecker (2020)	The Journal of Corporation Law.	Making Corporations More Humane Through Artificial Intelligence.	1 and 2	Research
68	Singer (2002)	Yale University Press.	One World: The Ethics of Globalization.	3	White
69	Stone (2019)	Springer Nature.	Digitally Deaf: Why Organizations Struggle with Digital Transformation.	1	White
70	The European Union (2016)	Official Journal of the European Union.	Directive 95/46/EC (The EU General Data Protection Regulation - GDPR)	1	Grey
71	The European Union (2019)	The European Commission.	Ethics Guideline for Trustworthy AI.	2	Grey
72	The European Union (2020)	The European Commission.	The EU White Paper on Artificial Intelligence - A European approach to excellence and trust	2	Grey
73	The IEEE (2017)	The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems (A/IS).	Ethically Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems (1st Ed., Version 2)	2	Grey
74	Tieto (2016)	TietoEVRY Oyj	Tieto the first Nordic company to appoint Artificial Intelligence to the leadership team of the new data-driven businesses unit.	2	Grey
75	Urbach and Röglinger (2019, Editors)	Springer International Publishing AG.	Digitalization Cases: How Organizations Rethink Their Business for the Digital Age.	1 and 2	White
76	Walsham (1996)	Information Systems Journal.	Ethical theory, codes of ethics and IS practice.	2	Research
77	Weizenbaum (1976)	W. H. Freeman.	Computer power and human reason: from judgement to calculation.	2	White
78	Wiener (1948)	Technology Press.	Cybernetics: or Control and Communication in the Animal and the Machine	2	White
79	Wiener, N. (1950 and 1954)	Houghton Mifflin & Doubleday Anchor.	The Human Use of Human Beings: Cybernetics and Society.	2	White
80	Wiener (1964)	The MIT Press.	God & Golem, Inc. - A Comment on Certain Points where Cybernetics Impinges on Religion.	2	White
81	Wood-Harper, Corder and Wood (1996)	Communications of the ACM.	How We Profess: The Ethical Systems Analyst.	2	Research
82	World Economic Forum (2019)	World Economic Forum	The Cybersecurity Guide for Leaders in Today's Digital World	1	Grey
83	Yle, 2020	www.yle.fi online news	President Niinistö: "This affects all of us".	1	Grey

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