

Digital Transformation of Leadership in the Post-Pandemic Era: A Literature Review on E-Leadership and E-Competencies

Autoria

Miriam Grobman - grobmanm@gmail.com

Mestrado e Doutorado em Administração / FGV/EBAPE - Fundação Getulio Vargas - Escola Brasileira de Administração Pública e de Empresas

Luiz Antonio Joia - luiz.joia@gmail.com

Mestrado e Doutorado em Administração / FGV/EBAPE - Fundação Getulio Vargas - Escola Brasileira de Administração Pública e de Empresas

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Resumo

Digital Transformation of Leadership in the Post-Pandemic Era: A Literature Review on E-Leadership and E-Competencies Abstract E-leadership – a.k.a. virtual leadership or remote leadership - is a relatively new construct that has been discussed across multiple disciplines. Although different theoretical frameworks have been presented thus far, little is known about what it actually takes for a professional to lead better in a virtual context. The COVID-19 pandemic accelerated the move towards teleworking, vastly expanding the prevalence of virtual teams and thereby creating ample opportunities to study e-leadership in organizational settings under these new circumstances. Based on that, we reviewed scientific articles produced on this subject in the last five years to better understand how leaders lead, or should lead, when they are not co-located with their followers. As a result, we intend to contribute to literature by (a) presenting a definition for e-leadership and unveiling the necessary e-competencies for such leaders, and (b) uncovering opportunities for further research on e-leadership competencies. Keywords: E-leadership, Virtual Leadership, Remote Leadership, Remote Work, Teleworking, E-competencies, Digital Leadership

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Abstract

E-leadership – a.k.a. virtual leadership or remote leadership - is a relatively new construct that has been discussed across multiple disciplines. Although different theoretical frameworks have been presented thus far, little is known about what it actually takes for a professional to lead better in a virtual context. The COVID-19 pandemic accelerated the move towards teleworking, vastly expanding the prevalence of virtual teams and thereby creating ample opportunities to study e-leadership in organizational settings under these new circumstances. Based on that, we reviewed scientific articles produced on this subject in the last five years to better understand how leaders lead, or should lead, when they are not co-located with their followers. As a result, we intend to contribute to literature by (a) presenting a definition for e-leadership and unveiling the necessary e-competencies for such leaders, and (b) uncovering opportunities for further research on e-leadership competencies.

Keywords: E-leadership, Virtual Leadership, Remote Leadership, Remote Work, Teleworking, E-competencies, Digital Leadership

1. Introduction

The term E-leadership¹ was coined during the dotcom era as “*a social influence process mediated by advanced information technology to produce a change in attitudes, feelings, thinking, behavior, and/or performance with individuals, groups, and/or organizations.*” (Avolio et al., 2000, p. 617) to address the rapidly changing context of leadership due to technological transformation of work practices. In the two decades since its conception, researchers across fields of Information Communication Technology (ICT), management, public administration, organizational behavior and social psychology, to name a few, have theorized about this construct (Avolio et al., 2000 and 2014; Cortellazzo et al., 2019; Lynn Pulley & Sessa, 2001; Purvanova & Kenda, 2018; Schmidt & Van Dellen, 2022; Van Wart et al., 2017, 2019), its antecedents (Liu et al., 2018; Van Wart et al., 2017; Purvanova et al., 2021), relationships with other constructs such as virtual teams (Cascio & Shurygailo, 2003; Hambley & Kline, 2007) or telecommuting (Contreras et al., 2020), moderator variables (Purvanova & Bono, 2009; Hoch & Kozlowski, 2014; Shockley & Allen, 2021; Wittmer & Hopkins, 2021), and mediator variables (Darics 2020; Dulebohn & Hoch, 2017; Liao, 2017). Yet, scholars continue to highlight that leadership research has not kept pace with the advancements in ICT and have called for more robust theoretical frameworks, as well as empirical research on this subject (Avolio et al., 2014; Bell et al., 2019; Liu et al., 2018, Van Wart et al., 2019; Cortazello et al., 2019; Torre & Sarti, 2020, to name just a few).

As the world starts to emerge from the COVID-19 pandemic, researchers and practitioners alike are rethinking many assumptions about traditional workplaces (Contreras et al., 2020; Kniffin

¹ Literature refers to e-leadership also as virtual leadership (Hambley et al., 2007) or remote leadership (Wittmer & Hopkins, 2021). We will use the term interchangeably throughout this review.

et al., 2021; McKinsey, 2021). One of the key areas where we still lack theoretical consolidation and empirical knowledge is leadership in the virtual space (Bell et al., 2019), both in terms of leading individuals and teams. What should leadership look like in this new more digital, distributed and inclusive workplace? What are the unique challenges that leaders and followers face when working remotely via ICT? How do leaders lead under these circumstances? How should they lead? These are just some of the questions still waiting to be answered (Bell et al., 2019; Kniffin et al., 2021; Purvanova, 2018; Van Wart, 2019).

Bell et al. (2019) identify several important factors that have accelerated the adoption of virtual work arrangements and will continue to affect the way leaders lead:

- **Globalization** - companies are increasingly expanding and hiring employees across multiple geographies. Virtual teams are becoming more and more ubiquitous in companies (Mak & Kozlowski, 2019).
- **Technological advancements** - communication technologies such as e-mail, mobile devices, telepresence (conferencing systems) with advanced video and audio capabilities like Zoom, messaging systems like Slack, coordination and collaboration tools such as Box and Twist, and others allow employees to have richer connections virtually, to share information quicker than before, to work autonomously and asynchronously, overcoming many of the original barriers that ICT presented in virtual work (Bell et al., 2019).
- **Greater focus on work-life interface and diversity and inclusion in organizations** - organizations are allowing employees to choose the arrangements that best suit their life choices, as well as when and where they want to work, so they can have greater flexibility in caring for their families or managing their physical disabilities (Bell et al., 2021; Kniffin et al., 2021).

- **Changes in organizational structure and shift in how work is conceptualized** - companies are becoming more flatter hierarchically, teams and employees are expected to act more independently, self-organize and use ICT to coordinate and collaborate. This is challenging traditional assumptions about how work should be done and how leaders and followers should interact are being challenged. This introduced a new paradigm: “*work is more often conceived as a set of behaviors people engage in, rather than a place where people go*” (Bell, 2019, p. 390).

Leadership is a multi-level construct involving “*leaders, leader–follower relationships, followers, groups, and processes – and occurring at all levels in the organization and its context.*” (Liu et al., 2018, p. 827). The literature on e-leadership, therefore, has focused on sundry dimensions of this construct: leaders and their traits and skills, leader-follower dyads, leadership of and within virtual teams, virtual communication skills, challenges associated with telework, individual traits, challenges and preferences of remote workers, design for telework, to name just a few (Bell et al., 2019).

In this review, we zoom in on one specific topic: e-competencies, namely the unique (or not) skills that leaders need to exhibit or develop in order to influence their followers and get results while working in virtual spaces. One of the challenges for identifying the appropriate competencies is that the definition of e-leadership is not uniform, which leads to an array of approaches and types of questions researchers try to answer.

That said, we seek to answer the following questions: What is the definition of E-leadership in a post-pandemic world? What are the specific e-competencies required of effective e-leaders, and are they different from traditional leadership ones?

In the following sections, we present the extant literature on that subject published over the last five years, looking for research gaps and opportunities for future investigations on the topic.

2. Method

The acceleration of teleworking arrangements reached a peak and led to many changes in paradigms during COVID-19 pandemic (Chamakiotis et al. 2021; Contreras et al., 2020). We therefore chose to focus on the last five years to identify the most recent finding in the literature on e-leadership. We drew on peer-reviewed research and did not restrict ourselves to a specific geography. Moreover, considering the novelty of this research area, we didn't want to limit our review to only the top journals and instead chose to include all the relevant publications in business administration areas.

Following a similar approach to Teichart (2019), we performed our preliminary search with keywords in Google Scholar, looking for papers in the most relevant journals in organizational behavior (Academy of Management and The Leadership Quarterly) and then expanded the search to electronic databases of academic papers (Scopus and Web of Science) (Table 2.1). The search process was restricted to the last five years, looking for scientific articles in English. We used search terms that address the concept of e-leadership (Table 2.2) to identify applicable articles and papers. This search strategy generated 220 hits. We restricted our review to organizational context, eliminating papers on education, health care and public administration due to the unique nature of job reality in these fields. We did include two papers that explored e-leadership in public administration and higher education ((Liu et al., 2018 and Van Wart et al., 2019) due to the important theoretical and empirical contribution they brought about to the e-leadership literature and frequency of citations. We excluded papers discussing research done in massively multiplayer

online games (MMOGs) because of lack of clarity on how their findings may translate to companies. This secondary screening yielded 59 papers.

In the final screening, after reviewing paper abstracts and full text, we excluded papers that didn't discuss e-leaders' competencies, namely those talking about leadership in general or virtual teams. We also excluded papers that didn't have full text available. The final screening led to eleven papers, to which we studied the reference lists and added five papers for final data extraction. The entire screening process and yielded results of the search strategy are illustrated in Table 2.3.

Table 2.1 Search process documentation	
Data source	Search process documentation
Google Scholar	<ul style="list-style-type: none"> ● Date of search: 20 March 2022 - 31 March 2022 ● Preliminary search by using defined keywords, limited to the last 5 years, from Academy of Management and Leadership Quarterly journals ● All screening and search results are saved and downloaded to a worksheet
Web of Science, Scopus	<ul style="list-style-type: none"> ● Preliminary search by using defined keywords (Table 2.2), limited to the last 5 years in journals in areas of business administration and psychology ● Retrieve and review abstracts in terms of inclusion criteria (secondary screening) ● Retrieve and review full text in terms of inclusion criteria (final screening) ● Final set of included studies added to the master worksheet
Reference Lists	<ul style="list-style-type: none"> ● Screening reference lists of already included papers ● Retrieve identified papers ● Final set of included studies added to the master worksheet
Table 2.2 Search Terms	
<ul style="list-style-type: none"> ● Google: ("e-leadership" or "virtual leadership" or "remote leadership") -education -healthcare -"public administration", looking specifically in Academy of Management* and The Leadership Quarterly journals (the most important journals for organizational behavior). ● Scopus/Web of Science: "E-leadership" / "Virtual leadership"/ "Remote leadership" + "e-competencies" - "Education" / "Healthcare" /"Public Administration" 	

Table 2.3 Inclusion criteria		
Screening Phase	Inclusion Criteria	Number of articles
Primary Screening	<ol style="list-style-type: none"> 1. English language 2. Article or review 3. Search keywords identified in the title, abstract or keywords 4. Restricted to the last 5 years (2018-2022) 5. Published in peer-reviewed journals 6. Exclude healthcare, public administration and education keywords 	220
Secondary screening	<ol style="list-style-type: none"> 1. Addressing leadership in company context (further excluding healthcare, education and public administration) 2. Published in journals related to management, organizational behavior, ICT (excluding journals related to specific business disciplines like operations management and marketing) 	59
Final screening	<ol style="list-style-type: none"> 1. Full-text article available 2. Exclude articles studying only virtual teams or leadership in general 	11
Screening reference lists	<ol style="list-style-type: none"> 1. Article, review or book chapter 2. Article is addressing e-leadership related concepts 3. Published within the last 10 years 	5
Final list		16

3. Results

3.1 E-leadership Definition

One of the challenges of studying e-leadership is the lack of a uniform definition for this concept (Bell et al., 2019; Contreras et al., 2020; Cortellazzo et al., 2019). Is e-leadership about leadership in another context, about the “e” - the technologies that leaders use, or perhaps about both?

One school of thought treats the “e-” as a technology toolbox extension to leadership - an e-leader is someone who uses or appropriates technologies to influence followers and/or encourages followers to use technologies on behalf of the organization’s interests. This line of research is most famously led by Avolio et al. (2014), who conceptualized e-leadership as: “*Social influence process embedded in both proximal and distal contexts mediated by AIT [“Advanced Information Technologies”] that can produce a change in attitudes, feelings, thinking, behavior and performance.*” (Avolio et al., 2014, p.107). They were looking to address the changes technology was bringing to the workplace and identify how the leadership system should be adapted to this new context. They set out to explore specifically how leaders appropriate technology, influence their followers to adopt technologies, and change their practices and approaches in response to specific technologies.

Van Wart et al. (2019) wanted to dive deeper into the impact of the digital revolution on public administration, specifically looking at the role of leaders in public agencies in adapting to and driving this change. Deeming Avolio’s definition too abstract and too broad (focusing on too many levels), they proposed a more pragmatic definition that focuses on leaders’ understanding of how to use technology *appropriately* based on the context and purpose: “*E-leadership is the effective use and blending of electronic and traditional methods of communication. It implies an awareness of current ICTs, selective adoption of new ICTs for oneself and the organization, and technical competence in using those ICTs selected* (Van Wart et al., 2019, p. 83).

Another more specific treatment of e-leadership focuses on adoption and use of technology on individual versus organizational levels, testing it empirically in several organizations (Liu et al., 2018). It posits that the concept of e-leadership should be broken into more managerial areas to ensure progress, focusing on phases of technology (adoption, quality of use) and on the purpose

(e-leadership as virtual communication vs. e-leadership as management of organizational structures) as described in Figure 1 below. Liu et al. (2018) delineate e-leadership as “*why and how leaders adopt technology at a personal level and at an organizational level; and why and how leaders use technology at a personal level and at an organizational level*” (p.827). They develop the E-leadership Communication Adoption Model for the Individual Perspective (ECAMi), which they test empirically to explore the trait- and skill-based antecedents of a leader’s adoption of technology.

Figure 1: Division of the field of e-leadership into four research domains

Definition of leadership	Adoption of technology	Use of adopted technology
Leadership focused on followers, constituents, etc. (individual): leadership as affecting others through communication	(1) Why and how do some leaders adopt virtual communications (ICTs) more readily for their personal use?	(2) Why and how do some leaders personally use virtual communications (ICTs) more effectively?
Leadership focused on organizational functioning (organizational): leadership as integrating technology for organizational communications, management and use of IT, decision making, and knowledge retrieval and mining	(3) Why and how do some leaders adopt new communication systems more readily for their organizations?	(4) Why and how do some leaders integrate (or use at the organizational level) new advanced technologies at the organizational level for knowledge creation, decision making, and productivity more effectively?

Source: Liu et al. (2018, p.828)

All the definitions contemplated thus far (Avolio et al., 2014; Liu et al., 2018; Van Wart et al., 2019) look at e-leadership as a leadership within a specific context of digital transformation and the response it requires from leaders and followers (i.e. technology adoption). Moreover, much of the research on e-leadership has been conducted with the mindset of identifying and mitigating the negative effects of technology on individuals and teams (e.g., Wakefield et al., 2008; Hoch & Kozlowski, 2014; Liao, 2014; Schramm, 2018). Yet, some studies are starting to explore the bright

side of virtual context for leaders and followers in terms of enhancing relationships as well as performance (Bell et al., 2019).

Considering that most modern workplaces are already highly digitalized (Cortellazzo et al., 2019), virtual teams are common in most large (and not so large) organizations, Millennials and Generation-Z digital natives compose a large part of the workplace and employees are highly skilled at using ICT in their personal lives (Balda & Mora, 2011; Gaidhani et al., 2019), looking at e-leadership as a simple response to digital transformation may be outdated.

Purvanova and Kenda (2018) took a more nuanced approach to define virtual leadership. Although they focused on leadership of virtual teams, the concepts are relevant to other levels and seem to duly tally with the trends presented by Bell (2019), mentioned in the beginning of this article. They claimed that *“The essence of virtual leadership is the same as that of traditional leadership - it is an influence process aimed at achieving results, but we also believe that virtual leadership differs from traditional leadership in how virtual leaders go about achieving results”* (Purvanova & Kenda, 2018, p. 753). Accordingly, the challenge of the leaders is to transform how they lead given the complex context which they need to navigate. Purvanova and Kenda (2018, p. 763) described this complex reality through seven paradoxes resulting from technology dependence, geographic dispersion, and human capital considerations (see Figure 1 for more details of their framework). Some examples of such paradoxes:

- Technology Dependence Paradox - touch tension: technology-mediated interactions are more impersonal, but less biased. This means that for example, even though there can be loss of communication meaning, minority team members can feel more included.

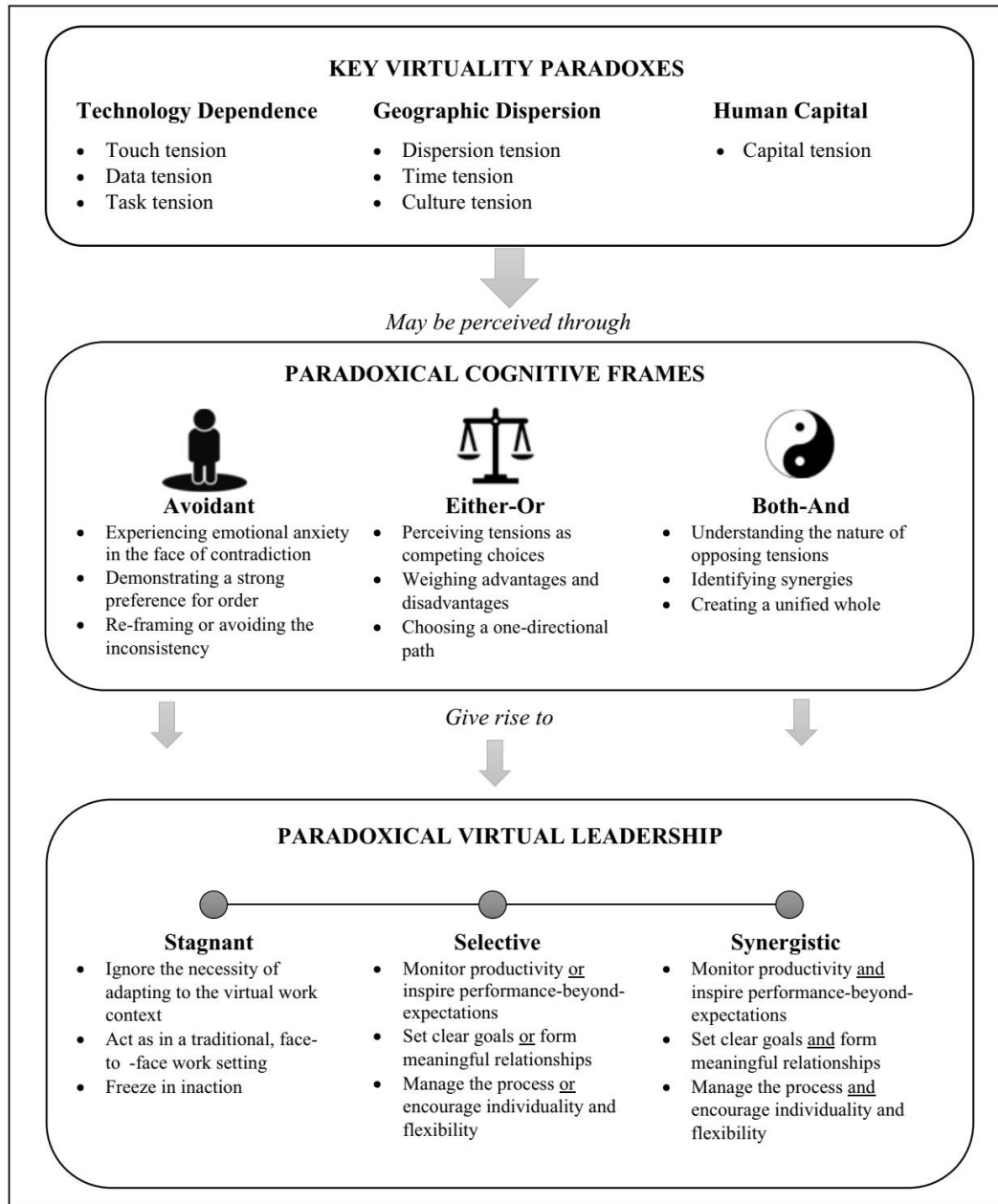
- Geographic Dispersion Paradox - dispersion tension: geographic dispersion generates feelings of isolation, but provides increased flexibility, for example to work autonomously and gives a sense of control to employees.
- Human Capital Paradox - capital tension (low social capital v. high knowledge capital): virtual team members are highly task-oriented experts who don't prioritize social capital, but who endow their team with great knowledge capital, through their external networks

They concluded that *“virtual leadership’s core function is to find synergies between the paradoxical tensions that virtuality generates”* (Purvanova and Kenda, 2018, p.776). They also challenged the mainstream assumptions about effectiveness of transformational, inspirational, relational, and empowering leadership approaches, saying they must be balanced out by pragmatic managerial skills: *“leaders must be simultaneously relational and task-oriented, transformational and transactional, leaders and managers”* (Purvanova and Kenda, 2018, p.764).

In short, there is no clear definition of what e-leadership or virtual leadership is, but it's clear that for modern leaders to be effective, they need to use ICT, understand the impact of ICT on their reality and their followers, and know how to adapt their approaches to keep up with the pace of innovation. This requires a mix of soft and hard skills, as well as an understanding of the organizational context and followers' realities in order to choose what skill or skills to apply.

In the following sections, we discuss two important contexts for e-leaders.

Figure 2: Paradoxical Virtual Leadership System



Source: Purvanova & Kenda (2018, p. 765).

3.2 E-leadership for a New Context: Remote Work and Telecommuting

The evolution of communication technologies has made telecommuting or remote work a viable work arrangement (Allen et al., 2015; Bell et al., 2019; Cascio & Montealegre, 2016). The numbers of telecommuters have been growing steadily from only about 10% of employees working from home full-time in 2009 to over 24% of the United States workforce using telecommuting at least some of the time in 2016 (Golden, 2019). Until recently, telecommuting remained a niche work arrangement, often viewed as a benefit for certain employees requiring more flexibility (Allen et al., 2015). Prior research on this topic mostly focused on benefits and disadvantages of this work arrangement to companies and individuals, comparing telecommuters to non-telecommuters (Golden 2019), rather than exploring virtuality as a new organizational context. It also suffered from some level of endogeneity (Glass & Noonan, 2016; Asgari & Jin, 2017) as the subjects of research were often self-selecting individuals in specific industries (for example: call centers or software development) and life circumstances (looking to mitigate work-life conflict due to family responsibilities).

The COVID-19 pandemic has made this arrangement mainstream, largely changing the way so many companies around the world operate. For example, Gartner (2020) survey of 229 human resource departments showed that 50% of companies had more than 80% of their employees working from home at the beginning of the pandemic. More recently, Gartner (2021) reiterated findings saying that “by the end of 2021, 51% of all knowledge workers worldwide are expected to be working remotely, up from 27% of knowledge workers in 2019.” McKinsey (2021) analyzed the future of remote work for across more than 2,000 tasks used in 800 occupations in eight focus countries and found that “25 percent of the workforces in advanced economies could work from home between three and five days a week,” (McKinsey, 2021), which means four to

five times more remote work in comparison to pre-pandemic era and may lead to geographic shifts of companies and individuals. During the pandemic, as millions of employees around the world were forced to socially isolate and work from their homes full-time, researchers alerted to the various challenges these old and new job circumstances created for them (Chamakiotis et al. 2021; Contreras et al., 2020; Kniffin et al., 2021). Contreras et al. (2020) highlighted some of the challenges: social isolation from work teams leading to lower performance and declining motivation, work-to-family conflict (taking over the previously often discussed, family-to-work conflict), anxiety over career prospects due to reduced visibility, intensified work, lack of trust of managers in employees who aren't co-located and ethical concerns about exploitation of company data as well as invasion of employees' privacy. Kniffin et al. (2021) also added additional health and well-being concerns the pandemic generated with increased job demands and reduced resources, as well as anxiety about one's own health during this crisis.

Contreras et al. (2020) also highlighted several opportunities for teleworking and identified past empirical work pointing to favorable outcomes such as job performance, satisfaction, work-family balance, lower stress levels, reduced turnover intentions, quality of life, employee's happiness and work satisfaction. They added that those outcomes are conditional on employees finding "managerial, peer and technological support." To companies, teleworking offers cost-savings, sustainable practices, and access to a broader pool of talent and expertise. To employees, it offers more flexibility, autonomy, thereby contributing to higher motivation and outcomes.

One tangential yet very important consideration that is briefly discussed in several of the recent papers on the subject is the need to pay attention to individual differences, in terms of personality, culture, generation, family situation, prior experience with remote work (Bell et al., 2019; Kniffin, 2021,). Bell et al. (2019, p. 391) noted that "*virtual leaders must be able to lead*

employees with varying levels of skill and motivation for working virtually.” Some individuals may thrive working from home, easily establishing boundaries and enjoy working autonomously. Others may struggle to organize their time, avoid distractions and stay motivated without having regular face-to-face contact with their managers or teammates due to personality differences. Specifically, impact of social distancing and work-from-home vary for those who are higher (v. lower) on extraversion and conscientiousness. Moreover, boundaries with work may look different for *segmentors*, who do better when there is a clear boundary between work and personal life and *integrators*, who “*tend to flourish when toggling between different activities across these boundaries.*” (Kniffin et al., 2021, p. 71).

In summary, the prevalence of telecommuting creates a technology-mediated environment for the leader to navigate (Avolio et al., 2014, Van Wart et al., 2019). Teams are dispersed (Panteli et al, 2018), information is fragmented, people may feel more disconnected from their companies and colleagues (Beauregard et al., 2019, Kniffin, 2021). Leaders who are faced with remote settings need to understand the above challenges and opportunities. Organizations also need to help employees and managers to tackle them (Torre & Sarti, 2020). One interesting opportunity in this context is that leadership may be needed more than ever to help employees navigate higher levels of uncertainty and act as the bridge between employees and organizations and organizations and their customers. Schmidt and Van Dellen (2022) discussed that “sense of a place is socially constructed by those who interact with it” and virtual spaces are no different. They provide an opportunity for leaders to engage in sensemaking and help their followers “*understand and frame events related to the group.*” (p. 187). Virtual spaces also allow leaders to establish powerful connections with their followers through engaging technologies such as social media, as we see popular influencers or politicians do. While Schmidt and Van Dellen (2022) discussed virtuality

as a boundary for leaders to shape and operate in, Contreras et al. (2020) viewed this from another angle, explaining that teleworking leads to a boundaryless work through technology. It is a challenge offered to leaders and followers to develop practices and competencies to diminish some of those barriers.

3.3 E-leadership and Virtual Teams

Virtual teams are often discussed adjacently to e-leadership as they have become common for organizing work streams with employees across geographical distances (Cascio & Shurygailo, 2003; Hoch & Dulebohn, 2017; Hoch & Kozlowski, 2014; Townsend et al., 1998). Researchers in this domain often focus on two key dimensions: *technology dependence* - how much do team members rely on technology-mediated communication versus face-to-face interactions and *geographic dispersion* - in terms of physical distance (spacial and time zone differences), and configuration of team member dispersion (geographic subgroups and isolated members) (Bell et al., 2019). Studies in this field often look to understand how these two dimensions pose challenges to effective team functioning and performance (Eisenberg et al., 2019; Hoch & Kozlowski 2014; Mak & Kozlowski, 2019).

Although virtual teams have been around for some time now (Dulebohn & Hoch, 2017), the COVID-19 pandemic brought about a massive expansion of this practice as companies shifted whole teams online (Contreras et al., 2020; Kniffin et al., 2021). This forced individuals who may have not had the experience working in this configuration into a new reality of full-time collaboration via ICT. While virtual teams may already suffer from challenges of communication due to the lack of richness of face-to-face interactions, Kniffin et al. (2021) highlighted that the expansion of virtual teams created direct and indirect conflicts that employees needed to navigate. When we pair lack of experience with working on virtual teams with the pandemic exacerbating

employees' stress levels, conflicts on virtual teams are bound to escalate more quickly (Kniffin et al., 2021).

This context has two broad implications for leadership. One is about the role of the formal leader to help virtual team members to work better together, to overcome conflict and align their objectives with those of the organization, as well as create norms for collaboration via ICT (Contreras et al., 2020). Another newer area of research focuses on informal, shared leadership structures that emerge on virtual teams who need to self-organize to establish said norms, navigate conflict, build trust and working relationships (Bell et al., 2019; Hoch & Dulebohn, 2017). One extreme case of virtual team emergence is starting to be discussed in literature is the gig economy, which involves freelance workers who perform tasks for organizations or customers under virtual and also non-exclusive work arrangements. Schmidt and Van Dellen (2022) highlighted companies such as Uber, Amazon Mechanical Turk and TaskRabbit, whose workers do not have formal leaders, and instead are led by algorithms, and often create self-organized communities where leadership needs are shared among the gig workers participating.

In this review, we mostly stay away from the role of leaders on virtual teams due to the specificity of the way research is conducted in this space and instead focus on the leadership level. Nevertheless, it is an important context to keep in mind when studying e-leadership.

3.4 E-Competencies

From the discussion about the various definitions of e-leadership and the contexts that e-leaders are inserted in and need to navigate, emerge numerous competencies that leaders need to exhibit in order to influence their followers and achieve organizational results. Very few of these skills are tested in empirical studies, especially inside companies (Bell et al., 2021).

We summarized the studies we could identify in the last five years in Table 1.

Table 1: Summary of empirical studies on e-competencies of e-leaders 2018-2022

Authors	Year	Title	Context / method	Competencies discussed
Belitski M., Liversage B.	2019	E-leadership in small and medium-sized enterprises in the developing world	Mixed-methods approach: 11 face-to-face interviews with fast-growing SMEs in Johannesburg, South Africa, and data-mining to identify how e-leadership be a tool to facilitate product commercialization	E-leaders integrate business and information technology to deliver the best experience to external stakeholders, especially to clients. They are hands-on with digital technologies to improve sales and get feedback from clients, exchange information with customers and to monitor, motivate and recruit employees
Darics E.	2020	E-Leadership or "How to Be Boss in Instant Messaging?" The Role of Nonverbal Communication	Micro-level immersive analysis using Grounded Practical Theory and inductive methodology of interactional linguistics to analyze nuances of instant messaging work conversations of leaders and followers inside a consulting company based in the UK	Ability to convey subtle nonverbal cues to enable virtual collaboration through resolving miscommunication, adopting a positive interactional style and facilitating supportive work environment
Ernst B.A., et al.	2021	Virtual charismatic leadership and signaling theory: A prospective meta-analysis in five countries	Lab experiments testing virtual and face-to-face scenarios in five countries where actress gives charismatic and non-charismatic speech and asks participants to work on a task, decorating flashcards and then do optional extra work for 15 minutes.	Verbal and nonverbal charismatic leadership tactics (CLTs) such as using metaphors, storytelling, setting high expectations, body gestures, do not appear to make a significant difference in employees performance virtually (across multiple cultures) but they can create positive evaluation of the leader by followers
Liu C., et al.	2018	E-leadership: an empirical study of organizational leaders' virtual communication adoption	Survey and CFA on SEM adapted from Van Wart et al. (2017) identifying traits and antecedents of leaders individual adoption of ICTs such as video conferencing, document sharing programs and social media. Tested with undergrad and graduate students, validated by public servants in California and also in Korea via a telephone survey.	Some traits and skills (STS) are more important in context of e-leadership in terms of adoption of ICTs: energy, need for achievement, willingness to assume responsibility, flexibility, analytical skills, continuing learning, and technical skills. Most of the variance in adoption attributed to energy, responsibility and analytical skills
Torre T., Sarti D.	2020	The "Way" Toward E-leadership: Some Evidence From the Field	Case study using interviews and a questionnaire in 15 Italian companies in different industries and digital stages	Competence depends on stage of company in adoption of e-leadership. In most advanced stage, leaders manage both electronic and traditional methods of communication in an effective and adaptive way: - Manage implications of distance on work relations - Understand the opportunities and potential of technologies and act to stimulate others to accept and adopt them - Ease of use of technology and follow suggestions of IT experts to introduce new tools and engage in discussions of their usage - Ensure engagement and commitment of team members, building a positive climate and trust - Manage distance by clearly defining goals as means of compensating for lack of control
Van Wart M., et al.	2019	Operationalizing the definition of e-leadership: identifying the elements of e-leadership	Case study of university instructors in the United States using digital technologies (e-mail, online teaching platform and file sharing platform to identify challenges and required competencies.	Defining 6 core e-skills for leaders: e-communication, e-social skills, e-team building skills, e-change management, e-technological skills, and e-trustworthiness
Wittmer, JLS; Hopkins, MM	2021	Leading Remotely in a Time of Crisis: Relationships with Emotional Intelligence	Survey sent to executive coaching participants (222) in variety of industries in the United States, regression analysis of emotional intelligence elements and relationship with concerns of leading remotely -Challenges in leading remotely -Challenges in leading in times of crisis -Skills required for remote leadership -Skills for crisis leadership	Leaders must invest a significant amount of increased time and effort on the people side of leading instead of the operational aspects. Required Top 5 skills according to executives: - Communication (oral, written, persuasive) - Emotional Intelligence - Compassion / empathy - Ability to facilitate discussions - Team Building skills - Flexibility

Source: elaborated by the authors

We only found seven studies, two of which are done in academic education context (Liu, 2018 and Van Wart 2019), which we chose to include because the models discussed provide insights that are relevant to any organizations.

Studies applied a variety of research methods, including surveys, interviews, linguistic analysis and linear regression. The studies selectively addressed chosen definition or sub definition of e-leadership, thereby testing different constructs and outcomes. For example, while Belitski and Liversage (2019) used e-leadership as a tool for integrating technology with specific business objectives related to marketing and sales, Liu et al. (2018) chose to focus on antecedents of leaders' adoption and usage of communication technology, whereas Darics (2020) dove even deeper to look at how leaders can create meaning when communicating through nonverbal ICT. Some of the studies' observations are highly subjective, for example, Wittmer (2021) identified

the relationship between leaders' emotional intelligence self-evaluation to their perception of challenges of leading remotely while others tested causal relationships through a lab experiment of applying charismatic leadership tactics to employee performance (Ernst et al., 2021). Only one study explored the evolution of e-leadership as it interacted with the organizational context: Torre and Sarti (2020) identified e-leadership typologies that emerge as companies increasingly incorporate digital technologies and start offering organizational support to leaders.

Only two studies created a comprehensive model of e-competencies and put it through an empirical test.

Liu et al (2018) looked at the relationships between leadership traits and skills and technology adoption by leaders. They found a leader's energy, responsibility and analytical skills are most relevant to understanding a leader's individual-level ICT adoption behavior. Surprisingly, technical skills have lower relevance.

Van Wart et al. (2019) presented the most comprehensive model that blends traditional and new skills for e-leaders. They conceptualized e-leadership as comprising six e-competencies: e-communication, e-social, e-team building, e-change management, e-technological, and e-trustworthiness, under which they organized 15 issues (see Figure 3). There are several challenges with this framework, which the authors acknowledge explaining it is still in the concept development stage. First, it is developed based on a case study in a very specific context - a large public university - whose reality may not be generalizable to other universities or organizations. Second, the list is quite comprehensive but mixes workplace challenges (ex: miscommunication) with leader's skills, as well as includes various items which are not necessarily specific for e-leaders such as: management of communication flows, holding team members accountable, or engaging in change management. Indeed, it is an excellent starting point but the list needs to be

refined and streamlined in future studies as well as tested in company settings and against organizational outcomes.

4. Discussion

Comparing and contrasting the depth and breadth of theoretical constructs, skills and challenges posed by e-leadership, remote work and virtual teams in the last few years to the scarcity of empirical work conducted, we see a vast gap and opportunity to consolidate theories and test them in organizational settings. The multitude of definitions and skills discussed across different environments and contexts (Bell et al., 2019, Contreras et al., 2020; Cortellazzo et al., 2019; Van Wart, 2019; Liu et al., 2019; Torre & Sarti, 2020) makes it difficult to draw any conclusion about what skills are most relevant, as already presented in Table 1.

For example, Van Wart et al. (2019) looked at e-leadership quite broadly and listed fifteen skills grouped under six “e-competencies”: e-communication, e-social skills, e-team building skills, e-change management, e-technological skills, and e-trustworthiness (Figure 3), which they identify in an e-learning university context. Torre and Sarti (2020) studying fifteen Italian companies also identified a mix of traditional and new skills such as getting commitment from employees and building trust and positive climate understanding and adapting usage of ICTs. Two studies looked at applying skill in a narrower scope: one tested the effect of seven skills and traits on individual-level ICT adoption with students and public servants (Liu et al., 2018) while another identified how successful leaders use digital technologies and social media to improve sales strategies and to recruit and engage employees (Belitski and Liversage, 2019) in eleven South African small and medium size enterprises.

Figure 3: E-leadership Six E-competencies

E-skills	Description of good e-skills
e-communications skills	<p><i>Communication clarity:</i> Communication in electronic settings is very clear, well organized, and allows for feedback to avoid errors and untested assumptions.</p> <p><i>Lack of miscommunication:</i> Communication in electronic settings is especially careful not to convey unintended messages that leave the receiver feeling insulted or angry because of tone or misunderstandings.</p> <p><i>Management of communication flow:</i> Ensures that the ease of communications does not invite excessive communications impeding the ability of employees/leaders to get their work done. Filters data when it may be so extensive or complex as to overwhelm employees.</p>
e-social skills	<p><i>Good leader support:</i> Ensures that all employees in ICT-mediated environments are provided with customized communication from time to time. Uses richer media such as face-to-face meetings, telephone, and virtual conferencing when appropriate. Ensures that teams use robust interaction methods that are inclusive.</p>
e-team building skill	<p><i>Team motivation:</i> Ensures that team building occurs in virtual teams. That is, makes sure that new teams have initial introductory activities, have a genuine sense of their purpose, and occasional encouragement. Makes sure that new virtual members are properly introduced and integrated.</p> <p><i>Team accountability:</i> Ensures that individuals in virtual teams are held accountable for participating and contributing.</p> <p><i>Team and team member recognition:</i> Makes sure that members of virtual teams get as much opportunity for recognition, rewards, development, and advancement as face-to-face team members.</p>
e-change management skill	<p><i>Change management:</i> Provides change management techniques by pre-planning transitions, monitoring implementation, and refining technology practice with experience.</p>
e-technological skills	<p><i>Currency with relevant ICTs:</i> Stays abreast of new ICTS and new enhancements of ICTs. Investigates and compares ICTs to ensure that those in use are optimally effective given a cost–benefit analysis including financial and transaction costs.</p> <p><i>Blending traditional and virtual methods:</i> Use of adopted ICTs is practiced in a sensible mix with other ICTs and traditional communication methods.</p> <p><i>Basic technological savvy:</i> Has sufficient skills and inclination to deal with various types of technology breakdowns in both personal and enterprise settings, either directly or with the aid of technology specialists in a timely manner. Is able to support subordinates and others when there are technology breakdowns or underperformance issues.</p>

(continued)

E-skills	Description of good e-skills
e-trustworthiness	<p><i>Technological security:</i> Provides assurance of safe storage of information for privacy. Is vigilant against hacking and systems breaches.</p> <p><i>Trustworthiness in a virtual environment:</i> Creates a sense of trust in the leader with regard to honesty, consistency, follow-through, fairness, and general integrity.</p> <p><i>Work–life balance:</i> Does not allow virtual technologies to intrude into employees' lives excessively. Ensures demands for client responsiveness do not overwhelm employees.</p> <p><i>Diversity management:</i> Ensures that support of diversity is as well monitored in virtual settings as it is in face-to-face settings.</p>

Source: Van Wart et al. (2019, p. 92-93)

One study looked at a very specific communication skill: using subtle nonverbal cues in instant message communication at a UK-based global consulting firm (Darics, 2020). Two studies did not distinguish between virtual and non-virtual skills, discussing the validity of charismatic leadership tactics to motivate followers in a virtual environment through a series of lab experiments (Ernst et al., 2021) or looking at leadership skills most relevant in remote context according to leaders' self-reports during an executive coaching program (Wittmer & Hopkins, 2021).

From the existing studies (empirical and theoretical) in recent years, it is challenging to distill e-competencies into a manageable set of actionable and trainable skills, separate them from a leader's innate traits, such as adaptability or capacity to learn (Liu et al., 2018), as well as identify which ones are unique to the virtual context. Indeed, skills discussed range from abstract concepts like “empathy” or “flexibility” (Wittmer & Hopkins, 2021) and “responsibility” or “technical skills” (Liu et al., 2018) to more specific items such as “stay abreast of new ICTs” (Van Wart et al., 2019). Moreover, given the specific context of each study, it is difficult to generalize findings to an overall framework for all leaders.

Identifying the importance or relevance of each skill is another challenge. The list ranges from e-communication and e-technological skills, which are often discussed in literature as critical for virtual context (Bell et al., 2019; Darics, 2020; Torre & Sarti, 2020; Van Wart et al., 2019), to e-team building skills, which appear less frequently (Van Wart et al., 2019; Wittmer & Hopkins, 2021). Moreover, while some are well-established leadership skills, such as communicating and engaging followers, others seem like a very specific IT manager skill, as for example, *“Technological security: Provides assurance of safe storage of information for privacy. Is vigilant against hacking and systems breaches.”* (Van Wart et al., 2019, p. 93).

In addition, there is very little discussion of specific organizational outcomes beyond technology adoption (Liu et al., 2018) and even more so, objective behavioral outcomes, which are not self-reported (Ernst et al., 2021). In many of the papers we reviewed, it is not clear which skills are new and different from the traditional leadership skills (Torre & Sarti, 2020; Van Wart et al., 2019).

On a methodological level, because it is difficult to observe the skills in real workplaces, researchers had to use an array of strategies and techniques. Lab experiments help identify causal relationships but suffer from external validity issues by oversimplifying the highly complex e-leadership context. For example, one study (Ernst et al., 2021) found that charismatic leadership did not impact task performance in random tasks performed by mostly students (identified as workers) but did impact perception of a leader in a virtual context. However, in a real company context, where longer term relationships are established through multiple interactions, results may be different. On another hand, field studies can provide important insights but are difficult to generalize because they often look at situations that are very specific for a country/ industry context (Belitski and Liversage 2019; Torre & Sarti, 2020) or type of profession or interaction (Van Wart

et al., 2019 looking at e-learning at a university). Contreras et al. (2020) also discussed various methodological issues in this space, highlighting small and not representative samples and weak theoretical foundations and calling for more experimental and quasi-experimental studies as well as more longitudinal and mixed methods studies. Bell et al. (2019) complimented this view, although discounting lab experiments and calling for field studies that look at the effect of time and history on virtual leadership such as those done by Hill et al. (2014).

Finally, except for one study that looked at interaction of remote and crisis leadership skills (Wittmer & Hopkins, 2021), literature mostly ignores the interaction between different sets of skills or how they may evolve over time and experience.

Instead of limiting ourselves to one definition of e-leadership, we synthesized both theoretical and empirical insights from the literature to create one set of skills that might meet different objectives of e-leadership in terms of driving digital transformation, navigating the digital workplace, and leading employees and teams who increasingly inhabit virtual spaces. We propose that research on e-leadership competencies can be clustered into three groups: technical skills, communication/organizational skills, and people skills. In Figure 4, we organize the most cited skills from the literature to be discussed below.

Technical skills - regardless of the chosen definition of e-leadership, it is clear that in order to thrive in the modern workplace, leaders need to understand how to use a range of ICT to ensure that they are able to engage at the workplace and at least connect to the realities of their followers (Bell et al., 2019; Liu et al., 2018; Van Wart et al., 2019). However, acquiring these skills requires not just studying new technologies but also identifying the impact these have on followers. To meet the specific objective of technology adoption (Liu et al., 2018), it is the leader's responsibility to role model usage of the various ICT in order to create common work practices among followers.

As Torre and Sarti (2020) proposed, organizations need to provide training and resources and incentivize leaders to engage in this constant exploration and adaptations of ICT or hire individuals who are more skilled with ICT and blending those into leadership practices. Moreover, because work environments continue to present a hybrid reality of both virtual and face-to-face opportunities for leaders, followers and teams to engage, skilled e-leaders need to be able to blend traditional strategies with new technologies (Van Wart et al., 2019). Future research could explore how this hybrid approach affects employee outcomes and whether the use of technologies changes the results of leadership theories that previously were tested in a face-to-face context (Ernst et al., 2021).

Communication and Organizational skills: virtual and global teams create a layer of complexity that leaders can help manage in order to improve their effectiveness. As communication is conducted via ICT, new norms are required to enable collaboration and smooth communication flows (Bell et al. 2019; Cortellazzo et al., 2019). Such norms may include things like speaking order, cadence of meetings, and step-by-step flow of document sharing. Considering time zone differences that global virtuality affords, leaders need to pay attention to ensure that team members from different geographies can join at a reasonable time and participate equally as well as organize asynchronous work (Contreras et al., 2020).

With the lack of regular face-to-face check in and physical distance from a central hub, goals, roles and responsibilities should also be defined or at least facilitated by leaders to ensure that teams are aligned. Most importantly, leaders may often need to expand extra effort to create a common language and shared mental models to help individuals who are not co-located to work together (Bell et al., 2019; Liao, 2017; Schmidt & Van Dellen, 2022).

People skills, or soft skills - perhaps the biggest challenge and opportunity of virtuality is the need to connect with and engage individuals who are increasingly isolated from their organizations, looking for more flexibility and interaction with their leaders and companies, as well as facing ever-increasing conflict between work and life circumstances (Kniffin et al., 2021; Wittmer & Hopkins, 2021). Leaders need to figure out how to connect with their followers despite the growing social and physical distances between individuals and organizations. In parallel, new technological tools (such as social media) create opportunities for leaders to engage their followers in more creative ways and on a larger scale (Cortellazzo, 2019; Schmidt and Van Dellen, 2022; Torre & Sarti, 2020).

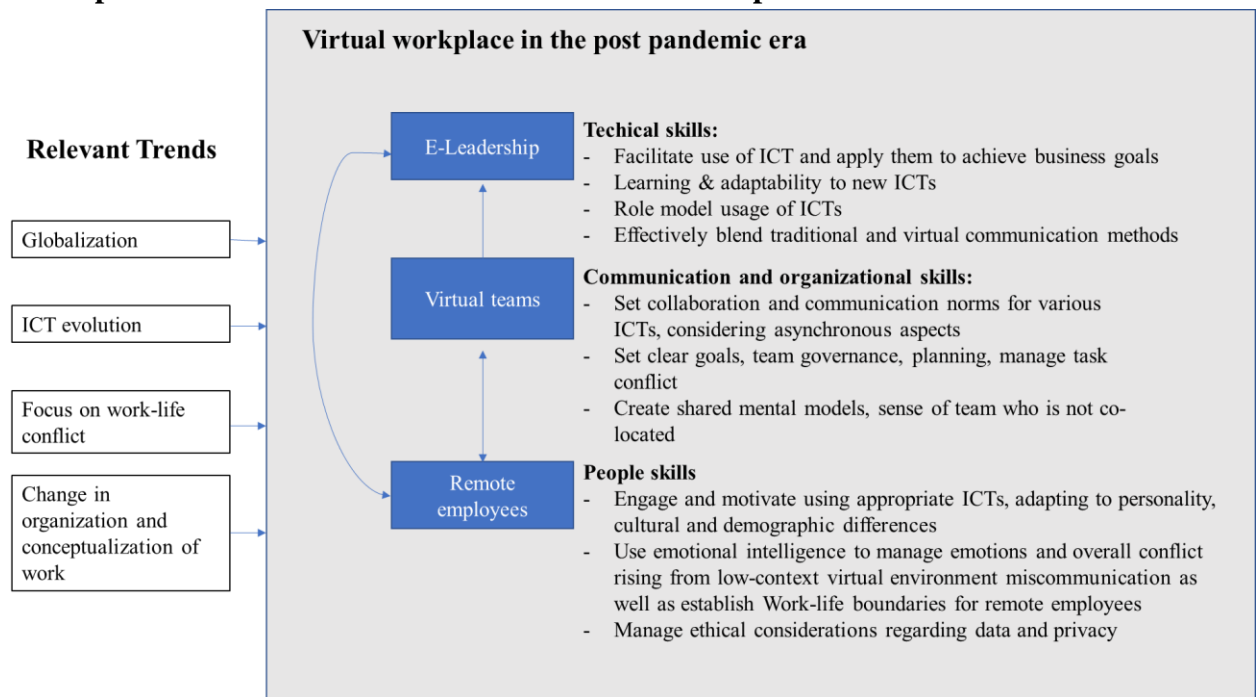
Moreover, people skills are also important as individuals and companies start emerging from a global crisis brought about by the pandemic and finding new ways of living and working. Engaging employees via ICT requires empathy from leaders (Hoch & Kozlowski, 2014; Wittmer & Hopkins, 2021) to understand what channels and tools are most appropriate for their followers' needs and varied skill sets and preferences (Bell et al., 2019; Van Wart et al., 2019). For example, a leader may need to connect regularly via videoconferencing with some employees in order to motivate them, while with others a quick email with general instructions may suffice.

In virtual context, interactions can be less frequent and contain more subtle cues about how followers are thinking and feeling. It is therefore the role of leaders to engage at a deeper level with their followers in order to understand what is happening in their day-to-day lives at work and beyond (Contreras et al., 2020; Panteli et al., 2019). This requires ever developed emotional intelligence skills to be able to investigate and react to employee's emotional needs and deal with conflict and miscommunication effectively (Van Wart et al., 2019; Wittmer & Hopkins, 2021).

In addition, leaders can play an important role in helping employees navigate work-life conflict by establishing proper boundaries in the work practices (Bell et al., 2019; Cascio & Shurygailo, 2003; Chamakiotis et al., 2021; Contreras et al., 2020; Kniffin et al., 2021; Wittmer & Hopkins, 2021).

Finally, to address two emerging themes, e-leaders are increasingly expected to exercise maturity and judgment to handle ethical considerations around how to keep company data safe when it is not stored in the physical space of the office, leaving it more exposed to abuse by employees and third parties, as well as how to navigate employee privacy with working from home arrangements (Cortellazzo et al., 2019; Van Wart et al., 2019).

Figure 4: Proposed Model for Future Research of E-leadership Skills



(Elaborated by Authors)

5. Conclusion

Our literature review uncovered many interesting opportunities for research on e-leadership and its associated competencies. First, as previously mentioned, there is ample opportunity for identifying relevant challenges and competencies of e-leaders by conducting research in field settings (Avolio et al., 2014; Bell et al., 2019; Liu et al., 2019). Moreover, it is unreasonable to expect leaders to master 15 different competencies (as proposed by Van Wart, 2019). Therefore, future research should explore what competencies are the most important ones - as Liu et al., 2018 did concerning which traits/skills are most important for ICT adoption - and consolidate them into a more cohesive or context-based theoretical framework.

Second, future research could address and empirically test the relationship between e-leadership and its competencies to organizational outcomes beyond technology adoption (Cortellazzo et al., 2019) such as performance, collaboration, creativity, prosocial motivation, and employee well-being.

Third, given the massive change that workplaces and individuals went through during the COVID-19 pandemic (Contreras et al., 2020), a question still holds, namely whether we need to create new leadership theories, maintain past ones, or revise them. Specifically in the organizational behavior literature, future studies could further revisit traditional leadership theories - such as transformational and charismatic, authentic, leader and member exchange, shared and strategic (Hernandez et al., 2011) – to see if they in fact hold true in the post-pandemic virtual spaces.

Fourth, while there is quite a lot of discussion about the impact of context of technology on leaders and followers, there is scarcity of research in terms of how e-leadership effectiveness in virtual spaces is bounded by individual differences in terms of technological readiness and

motivation, culture, personality, and demographic characteristics such as age and gender (Bell et al., 2019; Cortelazzo et al., 2019; Kniffin et al., 2021). Thus, future studies could address these differences.

Finally, while so many researchers idealize the competencies of an e-leader, we know very little about how e-leaders *actually* lead (Darics, 2020). What competencies and gaps do they have and how do those affect their followers? Prior reviews hint the dark side of e-leadership such as using ICT to enable unethical or abusive leadership behavior (Avolio et al., 2014), diminish motivation through control and monitoring (Cortellazo et al., 2019), or create distance from employees that may lead to miscommunication or demotivation (Kulshreshtha & Sharma, 2021). These issues could also be further explored in future studies both in the lab and inside companies.

In this literature review, we set out to understand how the definition of e-leadership and its competencies evolved in the last five years, especially given the shift in paradigms of teleworking or remote work and the propagation of virtual workplaces and virtual teams due to the COVID-19 pandemic. We uncovered a range of theoretical frameworks and several related constructs but found little empirical evidence both in lab and organizational settings to support a robust e-leadership and e-competencies framework. We also saw a range of contexts and methods through which e-leadership was studied, which left us encouraged about the relevance of this topic for future research agenda across the various business administration fields. We attempted to propose a research agenda through a draft model that organizes e-competencies and the relationship between leaders, followers and teams in the virtual space and discussed major gaps in the literature to address in future studies.

However, our review is not without limitations. While we tried to be comprehensive by identifying peer-reviewed studies from multiple sources: google scholar, Scopus and Web of

Science, we may have missed important contributions due to restricting our search to the specific terms e-leadership, virtual leadership, and remote leadership, which may not have covered the full range of studies of leadership behaviors and skills in the virtual space. Moreover, due to the abundance of literature reviews (in comparison to peer-reviewed research) that mentioned numerous e-leader skills, we had to select the most prominent competencies to discuss in the current review and may have missed to mention important ones. In addition, because most of the studies we found were from ICT literature, the competencies we uncovered may be more relevant for enabling digital transformation and not fully represent the range of challenges leaders face and the skills required to lead in virtual work environments. Finally, due to our boundary condition, we excluded articles that focused on virtual teams as loci of leadership as well as articles from fields of education, public administration, and healthcare. Thus, future studies should incorporate insights across industries and understand how they compare and contrast.

Finally, as the literature does not clearly distinguish between leadership of individuals, leader-follower-dyads in the virtual space, and leadership of virtual teams, future research could also explore whether each of these leadership forms should be treated as a separate construct with its unique skills or should the understanding of leadership in the virtual space be unified across constructs.

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References

- Asgari, H., & Jin, X. (2017). Impacts of telecommuting on nonmandatory activity participation: Role of endogeneity. *Transportation Research Record: Journal of the Transportation Research Board*, 2666(1), 47–57. <https://doi.org/10.3141/2666-06>
- Avolio, B. J., Kahai, S. S., & Dodge, G. E. (2000). E-leadership: Implications for theory, research, and practice. *The Leadership Quarterly*, 11(4), 615–668. [https://doi.org/10.1016/S1048-9843\(00\)00062-X](https://doi.org/10.1016/S1048-9843(00)00062-X)
- Avolio, B. J., Sosik, J. J., Kahai, S. S., & Baker, B. (2014). E-leadership: Re-examining transformations in leadership source and transmission. *The Leadership Quarterly*, 25(1), 105–131. <https://doi.org/10.1016/j.leaqua.2013.11.003>
- Balda, J. B., & Mora, F. (2011). Adapting leadership theory and practice for the networked, millennial generation. *Journal of Leadership Studies*, 5(3), 13–24. <https://doi.org.sbproxy.fgv.br/10.1002/jls.20229>
- Belitski, M., & Liversage, B. (2019). E-leadership in small and medium-sized enterprises in the developing world. *Technology Innovation Management Review*, 9(1), 64–74. <https://doi.org/10.22215/timreview/1212>
- Bell, B. S. & Kozlowski, S. J. (2002). A typology of virtual teams: Implications for effective leadership. *Group & Organization Management*, 27, 14–49. <https://doi.org/10.1177/1059601102027001003>
- Bell, B. S., McAlpine, K. L., & Hill, N. S. (2019). Leading from a Distance: Advancements in Virtual Leadership Research. In R. N. Landers (Ed.), *The Cambridge Handbook of Technology and Employee Behavior* (1st ed., pp. 387–418). Cambridge University Press. <https://doi.org/10.1017/9781108649636.016>
- Beauregard, T. Alexandra and Basile, K.A. and Canónico, E. (2019) Telework: outcomes and facilitators for employees. In: Landers, R.N. (ed.) *The Cambridge Handbook of Technology and Employee Behavior*. Cambridge, UK: Cambridge University Press, pp. 511-543. ISBN 9781108649636.
- Cascio, W. F., & Montealegre, R. (2016). How technology is changing work and organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, 3(1), 349–375. <https://doi.org/10.1146/annurev-orgpsych-041015-062352>

- Cascio, W. F., & Shurygailo, S. (2003). E-leadership and virtual teams. *Organizational Dynamics*, 31(4), 362–376. [https://doi.org/10.1016/S0090-2616\(02\)00130-4](https://doi.org/10.1016/S0090-2616(02)00130-4)
- Chamakiotis, P., Panteli, N., & Davison, R. M. (2021). Reimagining e-leadership for reconfigured virtual teams due to Covid-19. *International journal of information management*, 60, 102381. <https://doi.org/10.1016/j.ijinfomgt.2021.102381>
- Contreras, F., Baykal, E., & Abid, G. (2020). E-Leadership and Teleworking in Times of COVID-19 and Beyond: What We Know and Where Do We Go. *Frontiers in Psychology*, 11, 590271. <https://doi.org/10.3389/fpsyg.2020.590271>
- Cortellazzo, L., Bruni, E., & Zampieri, R. (2019). The role of leadership in a digitalized world: A review. *Frontiers in Psychology*, 10, 1938. <https://doi.org/10.3389/fpsyg.2019.01938>
- Darics, E. (2020). E-leadership or “how to be boss in instant messaging?” The role of nonverbal communication. *International Journal of Business Communication*, 57(1), 3–29. <https://doi.org/10.1177/2329488416685068>
- DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. *Organization Science*, 5(2), 121–147. <https://doi.org/10.1287/orsc.5.2.121>
- Dulebohn, J. H., & Hoch, J. E. (2017). Virtual teams in organizations. *Human Resource Management Review*, 27(4), 569–574. <https://doi.org/10.1016/j.hrmr.2016.12.004>
- Eisenberg, J., Post, C., & DiTomaso, N. (2019). Team Dispersion and Performance: The Role of Team Communication and Transformational Leadership. *Small Group Research*, 50(3), 348–380. <https://doi.org/10.1177/1046496419827376>
- Ernst, B. A., Banks, G. C., Loignon, A. C., Frear, K. A., Williams, C. E., Arciniega, L. M., Gupta, R. K., Kodydek, G., & Subramanian, D. (2021). Virtual charismatic leadership and signaling theory: A prospective meta-analysis in five countries. *The Leadership Quarterly*, 101541. <https://doi.org/10.1016/j.leaqua.2021.101541>
- Gaidhani, S., Arora, L., & Sharma, B. K. (2019). Understanding the attitude of generation Z towards workplace. *International Journal of Management, Technology and Engineering*, 9(1), 2804-2812.
- Glass, J. L., & Noonan, M. C. (2016). Telecommuting and Earnings Trajectories Among American Women and Men 1989-2008. *Social forces; a scientific medium of social study and interpretation*, 95(1), 217–250. <https://doi.org/10.1093/sf/sow034>

- Garcia Carreño, I. D. V. (2020). e-Leadership: A Bibliometric Analysis. *International Journal of Advanced Corporate Learning (IJAC)*, 13(1), 19. <https://doi.org/10.3991/ijac.v13i1.12341>
- Gartner. (2020). *Gartner HR survey reveals 41% of employees likely to work remotely at least some of the time post coronavirus pandemic*. Gartner. Retrieved from <https://www.gartner.com/en/newsroom/press-releases/2020-04-14-gartner-hr-survey-reveals-41--of-employees-likely-to->
- Gartner. (2021, June 22). *Gartner forecasts 51% of global knowledge workers will be remote by the end of 2021*. Gartner. <https://www.gartner.com/en/newsroom/press-releases/2021-06-22-gartner-forecasts-51-percent-of-global-knowledge-workers-will-be-remote-by-2021>
- Golden, T. D., & Gajendran, R. S. (2019). Unpacking the role of a telecommuter's job in their performance: Examining job complexity, problem solving, interdependence, and social support. *Journal of Business and Psychology*, 34(1), 55–69. <https://doi.org/10.1007/s10869-018-9530-4>
- Hambley, L. A., O'Neill, T. A., & Kline, T. J. (2007). Virtual team leadership: The effects of leadership style and communication medium on team interaction styles and outcomes. *Organizational Behavior and Human Decision Processes*, 103(1), 1-20. <https://doi.org/10.1016/j.obhdp.2006.09.004>
- Hernandez, M., Eberly, M. B., Avolio, B. J., & Johnson, M. D. (2011). The loci and mechanisms of leadership: Exploring a more comprehensive view of leadership theory. *The Leadership Quarterly*, 22(6), 1165–1185. <https://doi.org/10.1016/j.leaqua.2011.09.009>
- Hill, N., Kang, J., & Seo, M. (2014). The interactive effect of leader–member exchange and electronic communication on employee psychological empowerment and work outcomes. *Leadership Quarterly*, 25(4), 772-783. <https://doi.org/10.1016/j.leaqua.2014.04.006>
- Hoch, J. E. & Kozlowski, S. W. J. (2014). Leading virtual teams: Hierarchical leadership, structural supports, and shared team leadership. *Journal of Applied Psychology*, 99, 390–403. <https://doi.org/10.1037/a0030264>
- Hoch, J. E., & Dulebohn, J. H. (2017). Team personality composition, emergent leadership and shared leadership in virtual teams: A theoretical framework. *Human Resource Management Review*, 27(4), 678–693. <https://doi.org/10.1016/j.hrmr.2016.12.012>
- Kniffin, K. M., Narayanan, J., Anseel, F., Antonakis, J., Ashford, S. P., Bakker, A. B., Bamberger, P., Bapuji, H., Bhave, D. P., Choi, V. K., Creary, S. J., Demerouti, E., Flynn, F. J., Gelfand,

- M. J., Greer, L. L., Johns, G., Kesebir, S., Klein, P. G., Lee, S. Y., ... Vugt, M. van. (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American Psychologist*, 76(1), 63–77. <https://doi.org/10.1037/amp0000716>
- Kulshreshtha, K., & Sharma, G. (2021). Understanding e-leadership: Please mind the gap. *Technological Forecasting and Social Change*, 168, 120750. <https://doi.org/10.1016/j.techfore.2021.120750>
- Liao, C. (2017). Leadership in virtual teams: A multilevel perspective. *Human Resource Management Review*, 27(4), 648–659. <https://doi.org/10.1016/j.hrmr.2016.12.010>.
- Liu, C., Ready, D., Roman, A., Van Wart, M., Wang, X., McCarthy, A., & Kim, S. (2018). E-leadership: An empirical study of organizational leaders' virtual communication adoption. *Leadership & Organization Development Journal*, 39(7), 826–843. <https://doi.org/10.1108/LODJ-10-2017-0297>
- Lynn Pulley, M., & Sessa, V. I. (2001). E-leadership: Tackling complex challenges. *Industrial and Commercial Training*, 33(6), 225–230. <https://doi.org/10.1108/00197850110405379>
- Mak, S., & Kozlowski, S. W. J. (2019). Virtual teams: Conceptualization, integrative review, and research recommendations. In R. Landers (Ed.), *The Cambridge handbook of technology and employee behavior* (pp.441– 479). Cambridge, United Kingdom: Cambridge University Press. <http://dx.doi.org/10.1017/9781108649636.018>
- McKinsey. (2021). *The future of work after COVID-19*. McKinsey. Retrieved from <https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19>
- Panteli, N., Yalabik, Z. Y., & Rapti, A. (2019). Fostering Work Engagement in Geographically-Dispersed and Asynchronous Virtual Teams. *Information Technology & People*, 32(1), 2-17. <https://doi.org/10.1108/ITP-04-2017-0133>
- Purvanova, R. K., & Bono, J. E. (2009). Transformational leadership in context: Face-to-face and virtual teams. *The Leadership Quarterly*, 20(3), 343–357. <https://doi.org/10.1016/j.leaqua.2009.03.004>
- Purvanova, R. K., & Kenda, R. (2018). Paradoxical virtual leadership: Reconsidering virtuality through a paradox lens. *Group & Organization Management*, 43(5), 752-786. <https://doi.org/10.1177/1059601118794102>

- Purvanova, R. K., Charlier, S. D., Reeves, C. J., & Greco, L. M. (2021). Who emerges into virtual team leadership roles? The role of achievement and ascription antecedents for leadership emergence across the virtuality spectrum. *Journal of Business and Psychology*, 36(4), 713–733. <https://doi.org/10.1007/s10869-020-09698-0>
- Schmidt, G. B., & Van Dellen, S. A. (2022). Leadership of place in virtual environments. *Leadership*, 18(1), 186–202. <https://doi.org/10.1177/17427150211045153>
- Schramm, M. (2018). The Virtual Coffee Break: Virtual Leadership – How to Create Trust and Relations Over Long Distances. In D. Kolbaek (Eds.), *Online Collaboration and Communication in Contemporary Organizations* (pp. 256-275). IGI Global. <https://doi.org/10.4018/978-1-5225-4094-6.ch014>
- Shockley, K. M., Allen, T. D., Dodd, H., & Waiwood, A. M. (2021). Remote worker communication during COVID-19: The role of quantity, quality, and supervisor expectation-setting. *Journal of Applied Psychology*, 106(10), 1466–1482. <https://doi.org/10.1037/apl0000970>
- Torre, T., & Sarti, D. (2020). The “Way” Toward E-leadership: Some Evidence From the Field. *Frontiers in Psychology*, 11, 554253. <https://doi.org/10.3389/fpsyg.2020.554253>
- Townsend, A. M., DeMarie, S. M., & Hendrickson, A. R. (1998). Virtual teams: Technology and the workplace of the future. *Academy of Management Perspectives*, 12(3), 17–29. <https://doi.org/10.5465/ame.1998.1109047>
- Van Wart, M., Roman, A., Wang, X., & Liu, C. (2017). Integrating ICT adoption issues into (E-) leadership theory. *Telematics and Informatics*, 34(5), 527–537. <https://doi.org/10.1016/j.tele.2016.11.003>
- Van Wart, M., Roman, A., Wang, X., & Liu, C. (2019). Operationalizing the definition of e-leadership: Identifying the elements of e-leadership. *International Review of Administrative Sciences*, 85(1), 80–97. <https://doi.org/10.1177/0020852316681446>
- Wakefield, R. L., Leidner, D. E., & Garrison, G. (2008). research note—A model of conflict, leadership, and performance in virtual teams. *Information Systems Research*, 19(4), 434–455. <https://doi.org/10.1287/isre.1070.0149>
- Wittmer, J. L. S., & Hopkins, M. M. (2021). Leading remotely in a time of crisis: Relationships with emotional intelligence. *Journal of Leadership & Organizational Studies*, 154805182110535. <https://doi.org/10.1177/15480518211053531>

