An Integrative Literature Review on Leadership and Organizational Readiness for AI

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Abstract: Digital transformation is a reality for nearly all organizations today. Artificial intelligence (AI) plays a critical role in this transformation. The advent of machine learning and AI forces leaders to re-evaluate what it takes to lead an AI-driven firm successfully. As the scope and applicability of AI aggrandize, traditional leadership needs to evolve and meet the challenges and harness the opportunities this elusive technology presents. This literature review examines required leadership capabilities and organizational imperatives (beyond technology) for AI readiness and adoption. Based on literature, a new framework is presented to build on current leadership insights and technology adoption theories. The framework connects required leadership capabilities (agility, vision, engagement, ethics, and digital know-how) and organizational domains (knowledge, competence, and culture) to create a tool for executive leaders to drive AI adoption throughout their firms.

Keywords: AI, AI readiness, AI adoption, artificial intelligence, integrative literature review, leadership

1. Introduction

The fourth industrial revolution (4IR) reveals itself as possibly the most impactful for individuals, enterprises, economies, and societies. It represents an era of advanced interconnected technologies that transform people's lives, work, and how they function in society (Schwab 2017). AI plays a significant role in shaping this era (Xu et al. 2018). Initially described as "the science and engineering of making intelligent machines" (McCarthy 1960), AI continues to evolve and redefine itself. This paper will use an operational definition of AI as 'machines that perform roles and execute tasks currently performed by humans' (Dwivedi et al. 2021).

There is significant academic and management interest in understanding AI (Borges et al. 2021; Brock & von Wangenheim 2019; Dwivedi et al. 2021; Kitsios & Kamarioutou 2021; Ransbotham et al. 2017) and how it is revolutionizing business today (Chiu et al. 2021). AI is proving to be one of the most interesting technological phenomena in history and yet possibly one of the most elusive (Berente et al. 2021; Haenlein & Kaplan 2019; Ransbotham et al. 2017). AI is being utilized in transforming businesses, industries, and economies at an unprecedented rate, thus making management more complex (Berente et al. 2021; Dwivedi et al. 2021; Loureiro 2021). The most distinctive feature of AI, which sets it apart from other technology, is its ability to process vast amounts of data and provide real-time guidance on critical management decisions (Cubric 2020; Duan et al. 2019; Dwivedi et al. 2021; Schneider & Leyer 2018).

As organizational landscapes shift in this digitally cognitive world, leaders need to be ready. Leaders must determine how prepared their organization is to embrace AI (Frick et al. 2021). This paper looks at contemporary academic literature to understand how leaders and organizations are preparing themselves for AI adoption by addressing the research questions:

- RQ1: What leadership capabilities are required to lead in AI-driven firms?
- RQ2: How do leaders invest (beyond technology) to guide organizations towards AI readiness and adoption?

2. Background

2.1 Artificial Intelligence in the beginning

AI has experienced many waves of scientific investigation and public speculation (Dwivedi et al. 2021). The true genesis of AI in society is often debated, with ideology ranging from ancient times in mythology (Buchanan 2006; Elliott, 2019) to more current representations in intelligent machines (Loureiro et al. 2021). Despite early philosophical and logical ideation, the term AI was formally coined in the 1950s at a seminal conference at Dartmouth University (McCarthy et al. 1955). For several decades, interest in AI mainly remained confined to academic investigation (Daugherty & Wilson 2018; Haenlein & Kaplan 2019). The early 2000s represented a period of great advancement in information technology, specifically in data collection, storage capabilities, and analytics (Marr 2015). Conversations on what "big data" means, and is capable of, started permeating the

business world (Borges et al. 2021; Duan et al. 2019; Haenlein & Kaplan 2019). As a result, many social applications (apps) and websites transformed into commercial platforms, and companies started capitalizing on the data they had been collecting on users for years (Van Dijck 2013) paving the way for artificial intelligence.

2.2 Artificial intelligence today

Today, AI is all around us (Daugherty & Wilson 2018) in life and business (Dwivedi et al. 2021). AI is transforming how organizations create and capture value (Borges et al. 2021; Güngör 2020; Kitsios & Kamariotou 2021; Wilson & Daugherty 2021).

The scope, scale and pace at which AI is impacting business environments creates uncertainty and a lack of clarity on what leadership skills and competencies are required to manage AI-driven organizations (Chiu et al. 2021). Leading organizations in an AI-driven environment will require new perspectives on executive leadership knowledge and competencies (Chamorro-Premuzic et al. 2018; Dixit & Maurya 2021; Watson et al. 2021). Fundamental leadership skills need to shift (Chamorro-Premuzic et al. 2018; Fountaine et al. 2019) for organizations to succeed in the future. Although some academic research has been done to capture how leadership is evolving in the context of AI, there remains a gap in understanding how leaders need to prepare and respond (Brock & von Wangenheim 2019; Chatterjee et al. 2021; Frick et al. 2021; Loureiro et al. 2021; Watson et al. 2021). This paper addresses the gap by reviewing and discussing current prominent ideas on required leadership qualities and applicable technology adoption models. A new framework that connects relevant findings to leadership and organizational readiness to adopt AI is proposed.

3. Research methodology

3.1 Integrated literature review

A critical research tool in advancing knowledge and understanding – integrative literature reviews examine scholarly investigation and build on existing theory to generate new knowledge in a particular area of interest (Toraco 2016; Webster & Watson 2002). This paper examines published academic studies and relevant practitioner insights which have explored leadership and organizational readiness in the context of AI. The literature examined here focuses specifically on AI in business environments.

3.2 Literature search strategy

The strategy employed in this review included searching Google Scholar, Google, and Scopus databases for academic literature based on studies of leadership and AI readiness in business. Terminology utilized in the search included variations of keywords such as AI, artificial intelligence, digital transformation, leadership, machine learning, technology readiness, and technology adoption. Search filters included books, peer-reviewed journal articles, academic conference proceedings, and relevant business management publications published in the last five years in English. The search focused on the business and management application of AI and excluded data and decision scientific material.

4. Literature review

Extant literature suggests a long history of academic investigation into successful leadership and technology adoption (Alsheibani et al. 2018; Oliveira & Martins 2011); however, there appears to be little research connecting both concepts to understand what it takes to lead in an AI-enabled business environment. The nature of AI is quite different from previously examined information systems (IS) and information technologies (IT) innovations (Chatterjee et al. 2021; Chiu et al. 2021; Kaplan & Heinlein 2019). The potential of AI is evolving faster, morphing in applicability and presenting unprecedented opportunities and risks to business.

Due to the rapidly evolving nature of AI (applied in a business context), very little theoretical research exists on the required leadership capabilities for effectively guiding an AI-driven firm (Watson et al. 2021). Although some models are emerging to address leadership in a greater digital transformation context, there is little research which addresses the nuances of artificial intelligence. Models such as Neubauer, Tarling, and Wade's (2017) model on agile leadership, have been reviewed and should be considered applicable to AI. Watson et al. (2021) have developed a model on leadership capabilities for the AI era based on academic research. Dixit and Maurya (2021) present observations on a range of traits AI leaders need. Through examining such literature,

the most prominent leadership themes that have emerged include vision, agility, engagement, ethics, and digital know-how.

Significant research has been conducted to understand technology adoption however, one model does not fit all as it relates to the unique nature of AI (Kaplan & Haenlein 2019) due to its fluidity (Berente et al. 2021) and rapidly evolving nature. Established technology adoption models that have influenced a proposed framework (Figure B) include the diffusion of innovation (DOI), technology organization environment (TOE), and technology acceptance model (TAM). One of the most prominent theories on technology adoption (Alsheibani et al. 2018; Brock & von Wangenheim 2019; Jöhnk et al. 2021; Loureiro et al. 2021) is Roger's 1962 *Diffusion of Innovation* theory (Rogers, 2003). This model has been reviewed, adapted, and applied in many scientific and management studies, often applied in technology adoption analysis, and applicable at an individual and firm-level (Oliveira & TMartins 2011). Tornatzky and Fleisher developed the technology-organization-environment (TOE) framework in 1990 to identify factors that influence technology adoption at a firm level (Tornatzky & Fleisher 1990). The *organizational context* was examined most closely in this literature review and incorporated into the proposed framework in *knowledge*, *competency and culture* as appropriate to AI. The technology acceptance model (TAM), developed by Fred Davis in 1989, is a widely used model (Lee 2003) which evaluates people's intention to use (or adopt) technology based on the system's perceived ease of use (PEOU) and perceived usefulness (PU), (Davis 1989; Davis et al. 1989). While this model was developed to determine intention on an individual level, studies have indicated it can also apply at an organizational level (Chatterjee et al. 2021; Yu & Tao 2009). Incorporating this model into the proposed framework, in the domain of culture, should be relevant in determining employee perceptions towards firms' readiness to adopt AI.

4.1   Leadership capabilities

The role of the organizational leader is evolving (Chamorro-Premuzic et al. 2018).   Today the role requires rebalancing specific established characteristics and possibly developing new ones to effectively lead an AI-driven firm (Chamorro-Premuzic et al. 2018; Marr 2020; Ransbotham et al. 2017). Research indicates that visible, committed executive leadership involvement in digital transformation (such as AI) is key to successful technology adoption (Brock & von Wangenheim 2019; Jöhnk et al. 2021; Schiuma et al. 2021). Chatterjee et al.'s (2021) study confirmed that if strong leadership was apparent in AI projects, the adoption of AI would be accelerated. However, being visibly present and involved in AI projects is not enough. Today's leaders need specific capabilities to instil confidence in their organizations and guide them through AI transformation (Berente et al. 2021). Academics and practitioners have started postulating and proposing ideal characteristics and competencies for leaders in the AI age.   As some ideas are similar, they have been captured and consolidated into the five most frequently examined capabilities. The most supported ideas include agility, vision, engagement, ethics, and digital know-how.

Agility

Agile leadership is emerging as a promising approach in digital transformation (Neubauer et al. 2017; Watson et al. 2021). Agile leaders thrive in complex and rapidly changing business environments (Joiner & Josephs 2006); thus, it is appropriate to suggest it is a relevant approach in leading AI-driven organizations. As AI continues to grow and permeate organizations, leaders must make decisions and act quickly. Agile leadership is critical for making rapid decisions (Neubauer et al. 2017; Watson et al. 2021). Watson et al.'s research (2021) suggests the need for expediency in today's competitive environment.   Leaders who anticipate the challenges of change (such as AI) will most effectively manage their employees (Frick et al. 2021).   De Cremer (2020) agrees that it is essential that leaders be agile and able to respond quickly in AI environments; however, also suggests leaders must be creative and proactive in managing change.

Visionary

Digital leaders need to maintain established mission and values but steer the organization towards a shared vision of digitality (Cortellazzo et al. 2019). Leaders must incorporate AI into their vision and communicate its value to get the entire organization on board (Chamorro-Premuzic et al. 2018; Fountaine et al. 2019; Sanders & Wood 2020; Schiuma et al. 2021).   Dixit and Maurya's research (2021) confirms AI-driven leaders should be visionary and emphasize the importance of creating and communicating the vision well before implementing any processes which include AI. Chamorro-Premuzic et al. (2018) contend that communicating vision is more

important than ever due to the lack of clarity AI brings to roles and responsibilities. Fountaine, McCarthy, and Saleh (2019) agree on the importance of effective communication to reduce employee fear (of job loss/replacement). "Leaders have to provide a vision that rallies everyone around a common goal …why AI is important to the business and how (employees) fit" (Fountaine et al. 2019). This sentiment is consistent with Jöhnk et al.'s (2021) findings which conclude that communication on the value of AI to the organization is critical to successful AI adoption.

Engagement

As company dynamics change, how leaders engage with their employees is critical to achieving desired outcomes such as AI adoption (Chamorro-Premuzic et al. 2018; Frick et al. 2021; Schiuma et al. 2021). Engagement, empathy, emotional intelligence are capabilities that appear recurringly in the research on leadership and AI; the proposed framework consolidates these ideas under *engagement*. AI can create strong employee emotions. Leaders need to demonstrate empathy and manage their employees' concerns about artificial intelligence (De Cremer 2019; Marr 2020). Neubauer et al. (2017) present the idea of 'engaged' in their model regarding a leader's ability to listen, interact, and communicate with stakeholders. Similarly, Watson et al. (2021) discuss the value of 'networking' in the context of engaging stakeholders; defining networking as a set of skills requiring strong internal and external relationships. They suggest communication, social networking, and interpersonal relationship skills (Watson et al. 2021) are critical in AI adoption. Huang et al. (2019) discuss a necessary shift for leaders to transition from 'thinking' to 'feeling' skills. Their research suggests that as machines take over more analytical (thinking) tasks, leadership must invest in more empathetic and emotional management capabilities.

Ethics

The importance of ethics and AI is becoming a critical concern for academics and practitioners (Daugherty & Wilson 2018; Duan et al. 2019; Dwivedi et al. 2021; Gillespie et al. 2021; Kiron & Candelon 2021; Loureiro et al. 2021; Watson et al. 2021). As the momentum of AI continues to accelerate (Duan et al. 2019; Dwivedi et al. 2021), the more critical ethics and governance of AI become. Trust and transparency are critical ethical considerations when developing systems involving AI. Gillespie et al.'s recent study (2021), *Trust in Artificial Intelligence,* examined societal views on AI trust and governance. The study confirmed there is generally low civil trust in AI, and without trust (an indicator of influence), there is less likelihood of adoption (Gillespie et al. 2021). There is concern, the more complex AI systems and applications become, the more difficult it will be for humans to understand decision pathways and consequences (Loureiro 2021). Transparent development and communication are critical in AI environments.

Digital know-how

Unlike most digital-native companies, where many leaders have significant technology experience and expertise, leaders in traditional organizations often do not (Graves 2021). Although many firms will have technology development skills, data specialists, and systems experts, it is imperative that leadership grasp the fundamentals of available and implemented technology. Today, basic digital know-how is required to navigate the complexity of data-driven digital business effectively (Graves 2021; Watson et al. 2021). Data drives AI. As the volume of available data grows, so does companies' ability to understand industries, markets, customers, and environments. Leaders need a data-driven focus to harness the power of AI and gain a competitive advantage (Neubauer et al. 2017; Watson et al. 2021). Digital know-how and a data-driven focus will help leaders make fast, informed decisions.

5. Organizational domains

New technology adoption rarely occurs without significant investment; however, the better executive leaders align their organization and prepare their workforce, the greater the odds are for a successful transition (Babic et al. 2020; Jöhnk et al. 2021). Understanding an organization's readiness can determine how likely it will adopt and optimize AI (Alsheibani et al. 2018; Jöhnk et al. 2021). Alsheibani, Cheung, and Messom (2018) define AI readiness as "preparedness of organizations to implement change involving applications and technology related to AI."
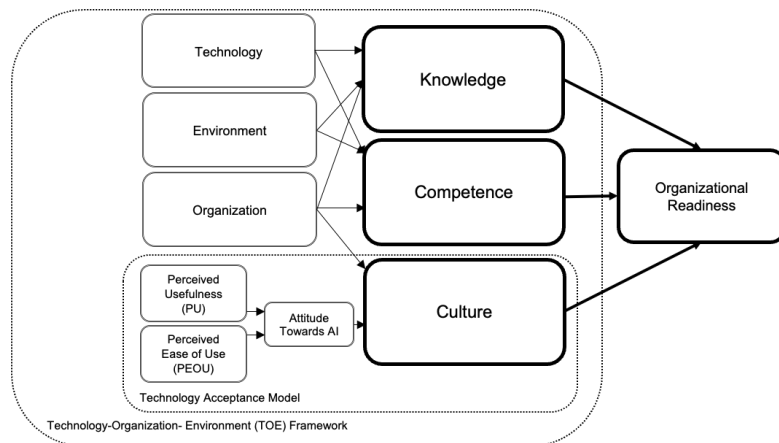
Figure 1: How the TOE and TAM theoretical frameworks applied lead to organizational readiness for AI

Knowledge, competence, and culture are emerging themes in determining organizational readiness to adopt AI. Figure 1 depicts how the TOE and TAM theoretical frameworks applied lead to organizational readiness for AI. The proposed conceptual model (Figure B) indicates that leadership investment and guidance in these three organizational domains can drive organzations to AI readiness.

Knowledge

The more collective knowledge an organization has on AI, the more ready employees will embrace the technology (Jöhnk et al. 2021). All employees should have a fundamental understanding of AI and basic awareness of its value to the organization (Jöhnk et al. 2021). A lack of knowledge of AI is often viewed as a barrier or significant challenge in AI implementation (Brock & von Wangenheim 2019). The more employees understand AI and its purpose within an organization, the more they will view it as a tool (Sanders & Wood 2020; Jöhnk et al. 2021) and not a threat (Frick et al. 2021).

Chiu, Zhu, and Corbett (2021) recently examined cognitive behaviours and affective attitude factors associated with employees in pre-adoptive AI organizations. The study found a positive correlation between employees' perceived operational and cognitive capabilities associated with affective and cognitive attitudes towards AI (Chiu et al. 2021). The more employees understand and believe AI will benefit them, the more positive they feel about AI and accept it (Chiu et al. 2021). Another study examined employee likeliness to adopt AI and strategic decision delegation through the lens of situational awareness (Schneider & Leyer 2018). Findings suggest that people in low situational awareness scenarios are highly like to delegate decisions to AI (Schneider & Leyer 2018).

Competence

Organizational competence is critical to AI adoption (Chatterjee et al. 2021). Chatterjee et al.'s research (2021) confirms that organizational competence positively influences the perceived usefulness of AI and leads to AI adoption intention (Chatterjee et al. 2021). Brock and von Wangenheim (2019) examined organizational competence and digital skills required in AI implementation and their findings indicate there is a need for strategic, technology, data, and security capabilities. They suggest firms which invest in these skills, will be more likely to successfully adopt AI (Brock & von Wangenheim 2019). Iansiti and Lakhani (2020) assert that firms will need to hire new talent and create opportunities to retain them. These ideas are consistent with Watson et al.'s (2021) findings; however, they also suggest that significant reskilling may be required for traditional organizations to adopt and optimize AI. AI will continue to evolve and change organizational structures and roles; employees need to be prepared to adapt to corresponding changes (Daugherty & Wilson 2018; Kaplan & Haenlein 2019). Continuous learning will be required to stay abreast of the technology, organizational changes, and role expectations (Kaplan & Haenlein 2019). Interestingly, Ransbotham et al. (2020) suggest firms achieve AI returns when they invest in organizational learning including human and machine resources.

Culture

Technology is not enough; culture needs to be invested in to ensure AI initiatives are embraced by the organization (Fountaine et al. 2019). Research suggests organizations should invest as much in AI adoption activities as in the technology itself (Fountaine et al. 2019). AI-driven firms require a culture of innovation and collaboration to quickly harness the power of technology and capitalize on it (Jöhnk et al. 2021; Ransbotham et al. 2021). Jöhnk et al.'s research (2021) identifies culture as one of the most significant elements of overall organizational readiness for AI adoption and breaks it down into three key factors: innovativeness, collaborative work, and change management. The researchers contend that creating an innovative culture encourages employees to change the status quo by utilizing AI (Jöhnk et al. 2021). From a competitive landscape perspective, research suggests organizations that create a culture of innovation (to support AI) may gain a competitive advantage over firms who simply employ AI for process improvements (Kiron & Candelon 2021; Ransbotham et al. 2021). Cultures which encourage experimentation are important in AI environments (Daugherty & Wilson 2018).

Collaboration across the organization is crucial for successfully implementing and optimizing AI (Fountain et al. 2019; Jöhnk et al. 2021; Kiron & Candelon 2021; Sanders & Wood 2020). Data must flow through an organization to harness the potential of AI. "Silos … are the enemy of AI-powered growth" (Iansiti & Lakhani 2020). AI un-silos organizations (Kiron & Candelon 2021). Cross-functional teams can build systems that enable AI to find relevant information and solve problems (Sanders & Wood 2020). Interestingly a recent report affirms organizational culture affects AI adoption and AI adoption affects organizational culture implying AI creates a circular effect on culture (Ransbotham et al. 2021).

5.1 Proposed conceptual framework
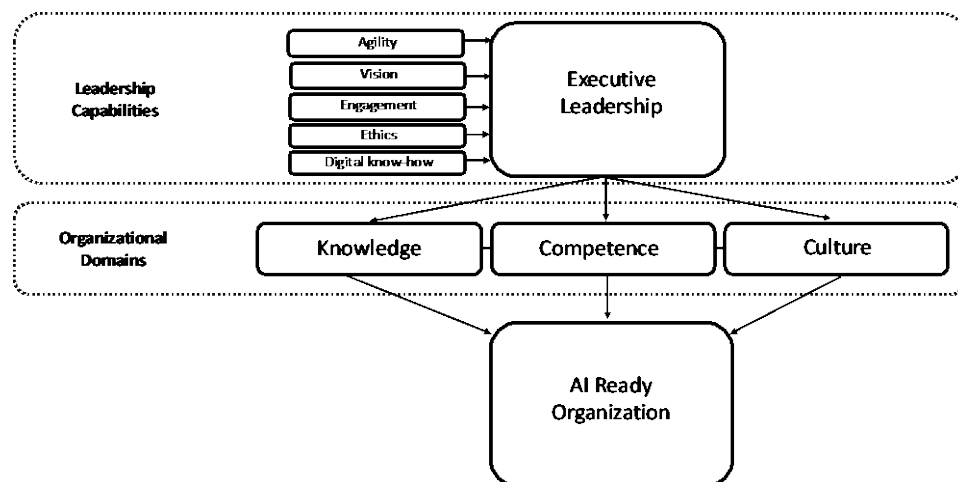
Figure 2: New framework

This literature review leads to a proposed new framework (Figure 2), incorporating elements from current thinking on leadership and relevant technology adoption frameworks. The proposed framework strives to advance thinking on how leaders need to evaluate the nuances of AI invest in themselves and the organization (beyond technology) to ensure AI readiness and adoption.

The DOI theory, at the firm level, emphasizes individual characteristics (leader), internal and external characteristics of the organization. This framework focuses on the concept of *organizational context* from the TOE model and breaks it down into 'knowledge', 'competence' and 'culture' domains as areas for consideration and investment. The model applies the TAM principles of *Perceived Usefulness and Perceived Ease of Use* as variables of 'culture' which may predict AI readiness.

6. Findings and further research

This literature review demonstrates that understanding evolving leadership and organizational requirements (beyond technology) in AI-driven organizations is emerging as an important topic. Unlike previous technology adoption, AI is unique due to the rate of change and breadth of application possibilities. This literature review identified current thinking on required leadership skills to navigate the complexities of AI in business today. In conjunction with leadership competencies, this paper discusses organizational domains, which may drive AI

readiness for adoption. The proposed model addresses the gap of how leaders need to prepare and respond to the complexities AI brings to management and business today.

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