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A Preliminary multidimensional AI readiness assessment model for SME's

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Abstract

Artificial intelligence (AI) is transforming the world by integrating the digital and physical worlds. Modern businesses utilize AI systems to optimize their operations, make strategic decisions and to enhance quality etc. On the other hand, Small and Medium-sized Enterprises (SMEs) constitute a sizeable portion of the global economy and are the main drivers of economic development. The highly saturated market of SMEs demands them to adopt innovative digital technologies to stay competitive. However, there are various challenges including ethics, transparency, privacy, biases, financial limitations, infrastructural incapacity, and others associated with the adoption of AI. Most SMEs are unable to measure AI readiness since it is a multi-faceted procedure that requires developing a multidimensional construct with variable elements. Therefore, this work proposes a Technology-Organization-Environment-Human (TOEH) framework that comprehensively captures the possible dimensions of AI readiness and their related elements. The model carries out this evaluation at the micro level by assessing the attributes of all dimensional elements for each of the four dimensions. In the pr-assessment phase, severity index for each attribute of the dimensional elements is formulated through expert review that serves as a metric to assess AI readiness. In the assessment phase, firm's capabilities are identified through a comprehensive questionnaire and each of the dimensional elements is assigned a readiness state (informal, struggling, approaching and desirable state). Based upon the state of these dimensional elements and the pre-determined severity ratings, a readiness rating is assigned to the four dimensions. The proposed model is also capable of suggesting a comprehensive action plan based on the organizational inadequacies. It is iterative that requires SMEs to reassess their readiness until it achieve the desired or required readiness state.

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1. Introduction

Modern businesses are using Artificial Intelligence (AI) based tools to enhance their operations and improve the quality of their offerings. AI is touted one of the main drivers of 4th and 5th industrial revolutions that intend to transform the industry by seamless integration of digital and physical worlds [1]. Various sectors like finance, education, manufacturing, healthcare, transportation and others are attempting to optimize their processes and reshape their business models using AI. However, businesses haven't still been able to leverage the full potential of artificial intelligence [2]. On the other hand, several researchers identified various challenges like ethics, transparency, privacy and biasness etc. associated with the adoption and management of artificial intelligence [2 - 6]. They further established that these issues are largely due to inappropriate organizational structure or lack of vital resources to support AI technologies. Similarly, most of the organizations are unable to measure the organizational readiness correctly, that is, if they are ready to adopt AI technologies or need to upgrade [7,8]. Further, researchers have hinted that AI readiness demands different capabilities as compared to adoption of other technologies [8,9]. It requires the organizations to upgrade dynamically with regards to their resource allocation, employee skills and decision-making procedures [10].

Small and Medium-sized Enterprises (SMEs) constitute a significant portion of the global economy and are the main drivers of economic development. Digitalization is a tool that allows SMEs to enhance their operations, optimize organizational processes and improve overall performance [2]. Several cutting-edge technologies for industrial support are being developed, and the competitive market demands the SMEs to adapt these innovative digital technologies [11]. Although there is great hype for AI technologies in SMEs, not much work has been carried out to explore and measure the readiness of organizations for AI adoption. Several studies [6-21] have explored various aspects related to this area: for example, [9, 17] examined artificial intelligence acceptance on the individual level whereas [10] and [12] explored AI adoption factors at governmental level. In addition, [13-15, 18-21] examined AI adoption factors in large enterprises, and [16] discussed AI adoption determinants for SME's. With this lack of understanding and less exploration of the area, there is a need for a comprehensive framework to assess and measure the readiness of SMEs for the adoption of AI technologies. Furthermore, [22] explained that assessment of organizations' readiness for AI adoption is a multi-faceted procedure that requires developing a multidimensional construct built upon multiple readiness dimensions with variable elements. Therefore, the proposed study intends to address the following two research questions.

- What are the possible dimensions and their related elements that can best capture the organizational Artificial Intelligence readiness?
- How to assess and measure the readiness of SMEs for the adoption of AI technologies?

2. Methods

This work uses the design-science-research methodology (DSRM) proposed by [23]. It is widely used for conducting and presenting DSR in information systems (IS). It is comprised of six steps including problem identification and motivation, objectives for solution, design and development, evaluation, and communication [23]. The purpose of the work is to develop an AI readiness assessment model to assist SMEs for successful adoption of AI systems. Therefore, the aims of the research based on the model proposed by [23] are described in Table 1 below.

Table 1: DSRM description for the proposed work

DSRM element	Description
Problem identification & Motivation	Understand if the design of a model to assess AI readiness for AI adoption is possible; How the model can help SMEs developing an "Action plan"?
Objectives for solution	To develop an AI readiness model that can help assess AI readiness to assist SMEs for successful adoption of AI system and guide SMEs in formulation of future action plan.
Design & development	All the AI readiness dimensions, their elements and attributes of these dimensional elements will be identified.

	A model will be developed that will be able to assess AI readiness across different dimensional elements to assist SMEs for successful adoption of AI system along with providing guidance in formulation of future action plan.
Evaluation	The proposed model will be applied to SMEs that are either undergoing AI adoption or intending to adopt AI systems. Academic and industry experts will evaluate the results of the model. A Likert scale ranging from 1 to 5 will be used to measure and define the success of the model.
Communication	Various publications will communicate the results of the model to the scientific community.

3. Literature review

3.1. AI readiness

Artificial Intelligence caters for a range of intelligent business applications concerning different business operations. To effectively integrate these technologies, it is essential to assess the existing digital capacity and capability of the organization [18]. The AI adoption journey for SME's can be more difficult and uncertain due to various technological, organizational and environmental challenges that SME's must face. Inadequate or outdated existing technology infrastructure, lack of technical expertise, limited budgets, lack of technology know how, rigid organizational culture, lack of government support and many such issues makes it difficult for SMEs to adapt and integrate AI technologies [8, 16, 24]. On the other hand, the development of these novel technologies is extremely fast and redesigning the entire business model to integrate these technologies may incur huge costs, full of uncertainties for the top management along with high level of associated risk [8]. Therefore, it is pertinent for SMEs to carry out a preliminary evaluation to assess if the organization is ready to initiate the process of AI adoption.

This pre-initiation phase of determining the existing infrastructure, resources and environment to check if the organization has the capabilities to embrace and reap benefits from the intended change is referred to as readiness [18]. There is a difference between the concepts of readiness and maturity. Whilst the readiness framework aims to assess the situation in pre-initiation phase and determines if the change process should be initiated or not [20]; maturity level of an organization refers to different states of developmental progress during or after implementation. These may include incomplete, ready or perfect states [21]. Readiness has been studied in digital phenomenon like big data and industry 4.0 in general [19, 20], however, there is a big gap in the literature on the assessment of readiness for AI adoption in SME's.

3.2. Related work

Research on AI about organizational studies is largely concerned with the adoption and implementation of AI systems, measuring satisfaction and assessing the organizational readiness for AI adoption [25]. [13, 22] assessed organizational AI readiness; [25, 26] studied and proposed AI adoption frameworks; [9, 17] assessed the users' satisfaction for AI technologies whereas [27, 28] studied AI implementation. Apart from that, these studies have been conducted under varying contexts and focus groups. For instance, [9, 17] examined artificial intelligence acceptance on the individual level understanding consumers' acceptance of automated technologies and assessing students' readiness for the artificial intelligence age respectively. [10, 12] explored the factors influencing readiness of adopting AI in governmental authorities, whereas [14-15] examined organizational AI adoption factors but observed the findings in context of large enterprises. [16] studied AI adoption determinants in context of SME's that examined various factors impacting AI adoption and identified the relative significance among the associated variables.

Furthermore, several authors [6, 7, 8, 29, 30] examined different dimensions of AI readiness, which refer to capability elements of an organization that are relevant to AI adoption: [8] conceptualized the AI readiness construct and identified eight dimensions of AI readiness including informational, environmental, infrastructural, participants, process, customers, data, and technological readiness; [29, 33] proposed model to determine influential factors or prerequisites affecting AI adoption based upon the Technology, Organization and Environment (TOE) framework; [7] suggested a readiness model with seven readiness dimensions and [7] proposed a model with ten readiness dimensions. On the other hand, [11, 31] identified various determining factors related to AI adoption among SME's. Researchers also explored different challenges relating AI like social, data, economic, organizational, ethical and

technological issues etc. along with the opportunities it offers in different perspectives like public sector, science and technology, business and humanities perspectives [32-35].

As explained above and shown in table 2, the focus of the previous studies varies based upon the firm type, business area and the research area. Although some of the studies reported the readiness dimensions, none of these studies presented any scheme or model to assess readiness of SMEs for AI adoption. Therefore, this work intends to develop a practical framework that can serve as both an assessment and guidance tool for SME's.

Table 2: Related work

Reference	Key findings	Firm type	Area
[6]	Artificial intelligence capabilities and readiness		General
[7, 8]	AI readiness dimensions	Large	General
[9]	Drivers of digital voice assistants' adoption	-	Services
[10]	Critical factors for successful implementation of AI	Mixed	General
[11]	Assessing AI readiness across Govt. organizations	Govt.	
[12]	Strategic guidelines for DT under industry 4.0	SME's	Manufacturing
[13]	AI readiness framework	-	General
[14]	Responsible AI (RAI) capabilities	Large	General
[15]	Framework for AI adoption	Mixed	General
[16]	Influential technological factors affecting AI adoption	SME's	Accounting
[17]	Measurement of readiness to learn about AI	Schools	-
[22]	Organizational AI readiness factors	-	General
[25]	Adoption of AI empowered AI robots	Large	Manufacturing
[26]	Impact of AI adoption on job engagement & employees	-	Employees
[27]	Employees' acceptance of AI model	-	-
[28]	AI support to management of the healthcare system	Health sector	-
[29]	Application of AI readiness Framework	-	General
[33]	Influential factors affecting AI adoption	SME's	Business performance
[34, 35]	Barriers and challenges to the Implementation of AI	-	General
[36]	AI trust framework and maturity model	-	General```
[37]	AI adoption model	Large	General
[38]	Determining factors related to AI adoption	SME's	General
[39]	Analyzing the readiness of firms with AI technologies.	Large	Production
[40]	Drivers of and barriers of AI adoption	Large	Project Management
[41]	Key dimensions of AI-driven digital transformation	SME's	General
[42]	Measuring organization's AI readiness	Large	General
[43]	Impact of TOE prerequisites for AI adoption	Large	Manufacturing
[44]	Recognized the benefits of AI adoption	SME's	General
[45]	Organizational factors and indicators for AI readiness assessments	Large	General
[46]	Factors influential in readiness for AI adoption	Govt. org	General
[47]	Understanding people's propensity to embrace and use AI technologies	Large	General
[48]	A readiness navigator tool with AI	-	Tool

Though there is a big gap in the AI readiness assessment research area, previous studies provide substantial knowledge about adoption, satisfaction, and implementation of AI. To develop a model for readiness assessment, it is pertinent to identify relevant influencing factors. A comprehensive literature review was carried out for this purpose.

To achieve better results, effective querying and correct use of keywords is extremely important. For instance, different synonyms like “elements”, “factors”, “aspects etc. reflecting the action were used. Because of the gap in this AI readiness assessment area, therefore, other keywords like AI adoption, AI satisfaction, and AI implementation were also used to gain maximum insights to obtain relevant knowledge. 157 papers were shortlisted based upon their titles, however, this number reduced to 41 after reading the abstract of the studies. Based upon the knowledge from these studies, Table 3 below was formulated. The second column represents these influencing factors along with the descriptive attributes for each factor in the third column. These factors were categorized based upon the Technology–organization–environment (TOE) framework. TOE is an extensive multi-perception framework that can help examine the technology adoption within organizations by identifying and analysing the influencing factors based on three primary dimensions [49]. These include technological, organizational, and environmental dimensions [50]. Its wide acceptability and applicability is due to its flexible nature that allows selection of contextual factors according to the research context [51]. On the other hand, AI is a form of modern technologies that aims to mimic human intelligence and increase operational efficiency that is somewhat swapping the roles and controls between human and technology [52]. It is considered that human-technology relationship would determine the future of AI technologies in organizations as it has potential to reshape the entire structure, culture and organization of a workplace [53-56]. This inspired the need to consider “human” as a distinguished and primary aspect while exploring the AI readiness of organizations.

Therefore, this work proposed to extend the TOE framework to Technology-Organization-Environment and Human (TOEH) framework that examines human related factors for AI readiness along with others. It is not that the TOE framework does not explore human factors, but only considers human as an organizational element. Whereas the growing need for stronger human-technology association requires human related factors to be considered as a primary dimension.

Table 3: TOEH framework description

Dimension	Dimensional elements	Attributes
Technological Readiness	IT infrastructure	Level of technology being used by the company; Computing, storage capacity and other IT resources; ERP and other software capabilities [7, 57-60]
	Data Access	Availability, Volume and Quality of available data [7, 57-59, 64]
	Security	Firm's capabilities regarding Cyber security [7, 57-60, 64]
	Tech. information management	Ability to Figure out the need for AI adoption; Ability to identify digital solutions & choosing right one [7,57,58]
Organizational Readiness	Leadership support	Leadership's willingness and focus to adopt AI; Clarity in AI vision and strategy [67-72, 74]
	Operational integration	Integrating operations, supply chain and ERP etc. [8, 67-73]
	Financial Analysis	Organizational budget to invest in AI technologies; Return on investment [67-71,73-76]
	Organizational culture	Organizational ability and strategy for change management [67-73]
	Organizational structure	Communication capabilities and mechanism among different data touchpoints [67-73]
Environmental Readiness	Competitors	Competitor's digital capabilities; Competitor's business model and offerings [7,81-83]
	Ethics and Regulations	Data processing and storage regulations; Legal repercussions in varying zones; Laws and procedures regarding selling online [7, 81-83]
	Government Support	Funding and operational backing from the government [7,78-80, 84]
	Market	AI acceptance among customers; Customer needs; Buying behavior and other market dynamics [7, 78-80]
	Supplier	Supplier's infrastructural compatibility; Supplier's acceptance and coordination [7,78]
	Collaborators	Collaborator's infrastructural compatibility; Collaborator's acceptance and coordination [7,68,78]
	Digital skills	In-house ability to manage and leverage AI; Ability to implement change [36,85, 86]

Human Readiness	Employees	Staff's skills and knowledge about AI; Willingness to learn; Employee's innovativeness [20, 36,85, 86]

4. Multi-dimensional AI readiness assessment model

AI readiness is a complex phenomenon based upon multidimensional construct which is difficult to understand and realize [22]. The proposed model is founded upon the dimensional elements influencing technology adoption. It comprises of two components: pre-assessment readiness guide, and readiness calculation & guidance framework.

4.1. Pre-assessment readiness guide

The proposed four primary dimensions based on TOEH (i.e., technological, organizational, environmental, human) can help report all related dimensional elements and their attributes that comprehensively describe each element. The pre-assessment readiness guide will be built upon that knowledge. Experts will be asked to further determine the gravity and significance of these attributes. This way each attribute will be assigned a severity index, which can help formulating a readiness guide for the model to assess the AI readiness of the organization. The model will consider this severity index as a metric that will determine the readiness state accordingly (e.g., attributes with higher weightage will be given a higher weightage).

4.2. Readiness calculation & guidance framework

In this phase a questionnaire with a set of questions relating each readiness dimension will be administered to the company. This set of questions will be shared with the relevant people of the organization to record their response according to the state of their organization. For instance, the set of questions relating to technological dimension will be sent to the technology experts of the firm and the management for accurate responses. However, researchers will conduct interviews to record descriptive responses from the relevant people and then will fill the questionnaire in accordance with the responses. This will allow the researcher to correctly assign the quantitative rating on a Likert scale by careful understanding and interpreting the descriptive response. For instance, a question relating "data access" (a dimensional element of technology dimension) could be phrased as: "On a scale of 5, how would you rate the smoothness and reliability of data flow across operational layers". The respondents from the IT department may confirm the smooth and reliable data flow but also mention a certain layer of the organization that is still operating manually, so the data flow may be interrupted at a certain point. Such responses are difficult for the respondents to convey correctly through a numerical rating. Therefore, interviews would be beneficial for the researcher to understand the exact situation. These responses will help in rating the elements of the four dimensions. Further, mapping these results against the expert ratings in the pre-assessment readiness guide will assign a readiness state to each dimensional element. For instance, there are four attributes of a dimensional element. Out of these four attributes, experts rated 2 attributes as critical and the other 2 moderate. Therefore, the weight of the 2 critical attributes will be higher than the others and will eventually determine the either of the four readiness states that are informal, struggling, approaching and desirable state to the concerned dimensional element. Informal state depicts that the organization is reactive and at the lowest state to support AI systems. The concerned element requires greater attention and well-defined strategy to move up the levels. Struggling state represents that the organization has initiated the improvement to address the concerned risks and issues; however, it still requires a lot of work to be done. Approaching state depicts that although risks are still high, but organization is on the right track and requires further efforts to support successful AI adoption. Desirable state represents a strong foundation for AI systems. Based upon the state of these dimensional elements and the pre-determined ratings, a readiness rating will be assigned to the four dimensions too. Also, a comprehensive action plan based upon the organizational inadequacies will be suggested. This will help the organization to incrementally equip itself with the required attributes to successfully adopt AI systems.

The proposed model is iterative as it requires reassessing the readiness until the organization achieves the top readiness state (desirable state). Since it proposes to assess the readiness of each dimensional element, it may be able to identify any scarceness or insufficiency in terms of being ready to benefit from AI. Further, it shall also help the

organization to continuously monitor their technological, organizational, environmental and human sphere, and may identify any related issues.

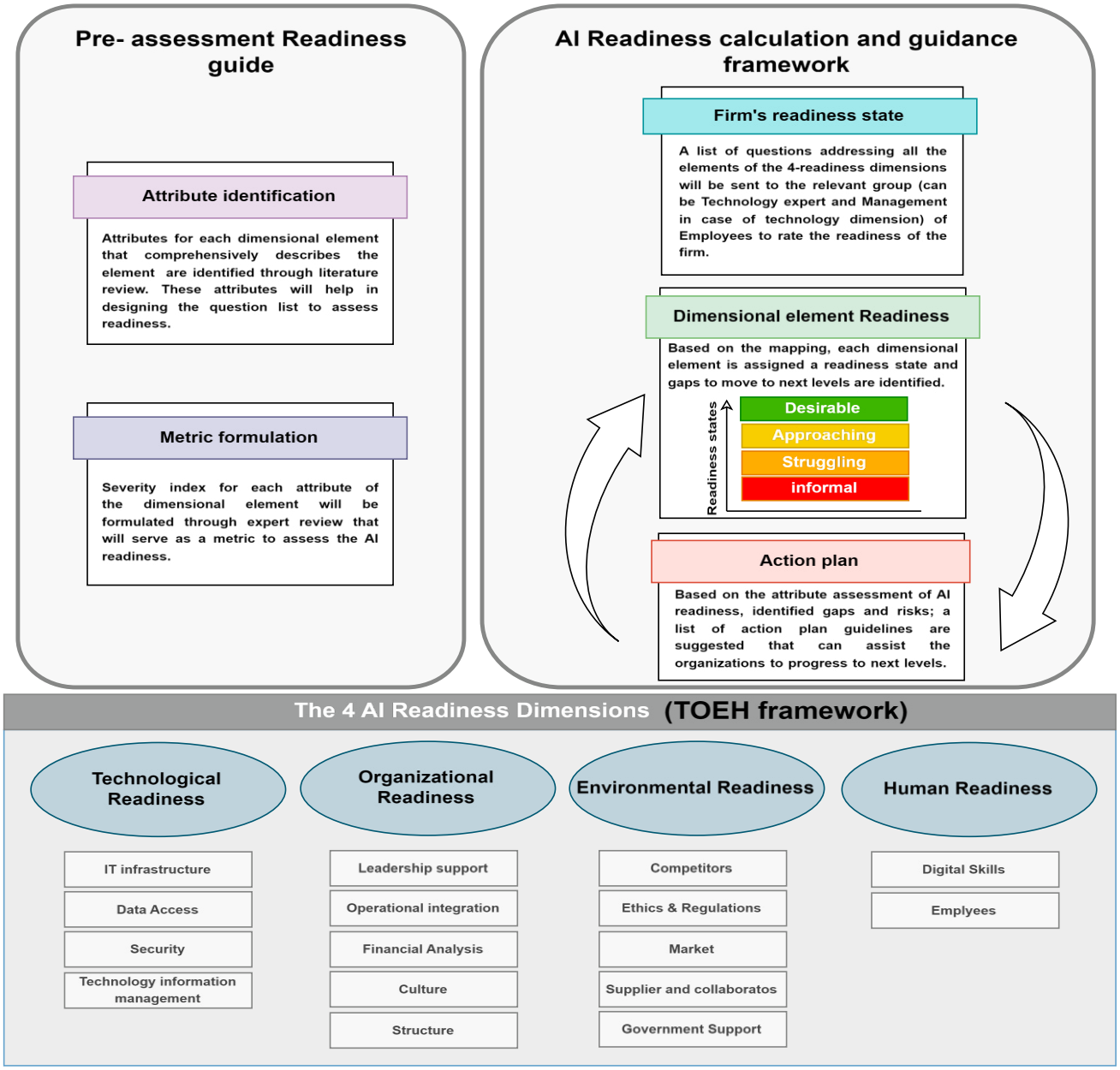

Figure 1: TOEH framework-based AI Readiness assessment model of SME's (TOEH-AIRAM)

5. Conclusion and Future work

This work proposed a TOEH framework highlighting four dimensions to determine the AI readiness. It further explained dimensional elements and their attributes to provide a comprehensive description of these dimensions. Moreover, an AI readiness assessment model for SME's based upon the TOEH framework was proposed and described. Since it is a preliminary model, therefore, it lacks elaboration of key aspects of the assessment. Further, it

is presented based upon theoretical knowledge, its implementation in industry settings may expose its limitations with regards to its application in varying contexts. Therefore, the next step would be the complete elaboration and description of the (TOEH-AIRAM) model. The next research phase will present a detailed description of the pre-assessment readiness guide that includes pre-determined rating for each dimensional element. Further, it would include a detailed discussion on the set of questions to assess the AI readiness across the TOEH dimensions. After the complete elaboration of the model, validation of the model in the industry settings will be carried out. It could also be tuned and applied to large enterprises to make it applicable to both large enterprises and SMEs. Further, the conceptual model can be implemented into a tool that can help in automated assessment of AI readiness of SMEs.

References

[1]. Skilton M. The Impact of Artificial Intelligence on Business [Internet]. 2019 [cited 2024 March 21]. Available from: https://warwick.ac.uk/fac/soc/impact/policybriefings/impact_of_ai_on_business_policybrief_final.pdf

[2]. Davenport T, Guha A, Grewal D, Bressgott T. How artificial intelligence will change the future of marketing. Journal of the Academy of Marketing Science. 2020 Jan; 48:24-42.

[3]. Mariani MM, Machado I, Magrelli V, Dwivedi YK. Artificial intelligence in innovation research: A systematic review, conceptual framework, and future research directions. Technovation. 2023 Apr 1; 122:102623.

[4]. Wirtz J, Zeithaml V. Cost-effective service excellence. Journal of the Academy of Marketing Science. 2018 Jan; 46:59-80.

[5]. Kumar V, Rajan B, Venkatesan R, Lecinski J. Understanding the role of artificial intelligence in personalized engagement marketing. California Management Review. 2019 Aug;61(4):135-55.

[6]. Porcher S. Measuring Artificial intelligence capabilities and readiness. InAcademy of Management Proceedings 2020 (Vol. 1, p. 13168). Briarcliff Manor, NY 10510: Academy of Management.

[7]. Nortje MA, Grobbelaar SS. A framework for the implementation of artificial intelligence in business enterprises: a readiness model. In2020 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC) 2020 Jun 15 (pp. 1-10). IEEE.

[8]. Tehrani AN, Ray S, Roy SK, Gruner RL, Appio FP. Decoding AI readiness: An in-depth analysis of key dimensions in multinational corporations. Technovation. 2024 Mar 1; 131:102948.

[9]. Fernandes T, Oliveira E. Understanding consumers' acceptance of automated technologies in service encounters: Drivers of digital voice assistants' adoption. Journal of Business Research. 2021 Jan 1; 122:180-91.

[10]. Najdawi A. Assessing AI readiness across organizations: The case of UAE. In2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT) 2020 Jul 1 (pp. 1-5). IEEE.

[11]. Ghobakhloo M, Iranmanesh M. Digital transformation success under Industry 4.0: A strategic guideline for manufacturing SMEs. Journal of Manufacturing Technology Management. 2021 Apr 29;32(8):1533-56.

[12]. Stenberg L, Nilsson S. Factors influencing readiness of adopting AI: A qualitative study of how the TOE framework applies to AI adoption in governmental authorities.

[13]. Holmström J. From AI to digital transformation: The AI readiness framework. Business Horizons. 2022 May 1;65(3):329-39.

[14]. Akbarighatar P, Pappas I, Vassilakopoulou P. A sociotechnical perspective for responsible AI maturity models: Findings from a mixed-method literature review. International Journal of Information Management Data Insights. 2023 Nov 1;3(2):100193.

[15]. Alsheibani S. Re-thinking the Competitive Landscape of Artificial Intelligence: Exploring the Organization Adoption Factors (Doctoral dissertation, Monash University).

[16]. Rawashdeh A, Bakhit M, Abaalkhail L. Determinants of artificial intelligence adoption in SMEs: The mediating role of accounting automation. International Journal of Data and Network Science. 2023;7(1):25-34.

[17]. Dai Y, Chai CS, Lin PY, Jong MS, Guo Y, Qin J. Promoting students' well-being by developing their readiness for the artificial intelligence age. Sustainability. 2020 Aug 14;12(16):6597.

[18]. Klievink B, Romijn BJ, Cunningham S, de Bruijn H. Big data in the public sector: Uncertainties and readiness. Information systems frontiers. 2017 Apr;19(2):267-83.

[19]. Schumacher A, Erol S, Sihn W. A maturity model for assessing Industry 4.0 readiness and maturity of enterprises. Procedia Cirp. 2016 Jan 1.

[20]. Armenakis AA, Harris SG, Mossholder KW. Creating readiness for organizational change. Human relations. 1993 Jun;46(6):681-703.

[21]. Demir S, Gunduz MA, Kayikci Y, Paksoy T. Readiness and maturity of smart and sustainable supply chains: a model proposal. Engineering Management Journal. 2023 Apr 3;35(2):181-206.

[22]. Jöhnk J, Weißert M, Wyrtki K. Ready or not, AI comes—an interview study of organizational AI readiness factors. Business & Information Systems Engineering. 2021 Feb;63(1):5-20.

[23]. Peffers K, Tuunanen T, Rothenberger MA, Chatterjee S. A design science research methodology for information systems research. Journal of management information systems. 2007 Dec 1;24(3):45-77.

[24]. Lada S, Chekima B, Karim MR, Fabeil NF, Ayub MS, Amirul SM, Ansar R, Bouteraa M, Fook LM, Zaki HO. Determining factors related to artificial intelligence (AI) adoption among Malaysia's small and medium-sized businesses. Journal of Open Innovation: Technology, Market, and Complexity. 2023 Dec 1;9(4):100144.

[25]. Pillai R, Sivathanu B, Mariani M, Rana NP, Yang B, Dwivedi YK. Adoption of AI-empowered industrial robots in auto component manufacturing companies. Production Planning & Control. 2022 Dec 10;33(16):1517-33.

[26]. Braganza A, Chen W, Canhoto A, Sap S. Productive employment and decent work: The impact of AI adoption on psychological contracts, job engagement and employee trust. Journal of business research. 2021 Jul 1; 131:485-94.

[27]. Chatterjee S, Tamilmani K, Rana NP, Dwivedi YK. Employees' acceptance of AI integrated CRM system: development of conceptual model. InRe-imagining Diffusion and Adoption of Information Technology and Systems: A Continuing Conversation: IFIP WG 8.6 International Conference on Transfer and Diffusion of IT, TDIT 2020, Tiruchirappalli, India, December 18–19, 2020, Proceedings, Part II 2020.

[28]. Dicuonzo G, Donofrio F, Fusco A, Shini M. Healthcare system: Moving forward with artificial intelligence. Technovation. 2023 Feb 1.

[29]. Badghish S, Soomro YA. Artificial Intelligence Adoption by SMEs to Achieve Sustainable Business Performance: Application of Technology–Organization–Environment Framework. Sustainability. 2024 Feb 24;16(5):1864.

[30]. Moore A. When AI becomes an everyday technology. Harvard Business Review. 2019 Nov;7.

[31]. Kaplan RS, Norton DP. Measuring the strategic readiness of intangible assets. Harvard business review. 2004 Feb 1;82(2):52-63.

[32]. Blut M, Wang C. Technology readiness: a meta-analysis of conceptualizations of the construct and its impact on technology usage. Journal of the Academy of Marketing Science. 2020 Jul; 48:649-69.

[33]. Chong J, Olesen K. A technology-organization-environment perspective on eco-effectiveness: A meta-analysis. Australasian journal of information systems. 2017;21.

[34]. Bérubé M, Giannelia T, Vial G. Barriers to the Implementation of AI in Organizations: Findings from a Delphi Study.

[35]. Dwivedi YK, Hughes L, Ismagilova E, Aarts G, Coombs C, Crick T, Duan Y, Dwivedi R, Edwards J, Eirug A, Galanos V. Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management. 2021 Apr 1; 57:101994.

[36]. Mylrea M, Robinson N. Artificial Intelligence (AI) trust framework and maturity model: applying an entropy lens to improve security, privacy, and ethical AI. Entropy. 2023 Oct 9;25(10):1429.

[37]. Uren V, Edwards JS. Technology readiness and the organizational journey towards AI adoption: An empirical study. International Journal of Information Management. 2023 Feb 1; 68:102588.

[38]. Vuong QH, Ho MT, Vuong TT, La VP, Ho MT, Nghiem KC, Tran BX, Giang HH, Giang TV, Latkin C, Nguyen HK. Artificial intelligence vs. natural stupidity: Evaluating AI readiness for the vietnamese medical information system. Journal of clinical medicine. 2019 Feb 1;8(2):168.

[39]. Horvat D, Heimberger H. AI Readiness: An Integrated Socio-technical Framework. InInternational Conference on Production Research 2022 Nov 23 (pp. 548-557). Cham: Springer Nature Switzerland.

[40]. Shang G, Low SP, Lim XY. Prospects, drivers of and barriers to artificial intelligence adoption in project management. Built Environment Project and Asset Management. 2023 Jun 20;13(5):629-45.

[41]. Taherizadeh A, Beaudry C. An emergent grounded theory of AI-driven digital transformation: Canadian SMEs' perspectives. Industry and Innovation. 2023 Oct 21;30(9):1244-73.

[42]. Holmström J. From AI to digital transformation: The AI readiness framework. Business Horizons. 2022 May 1;65(3):329-39.

[43]. Kinkel S, Baumgartner M, Cherubini E. Prerequisites for the adoption of AI technologies in manufacturing–Evidence from a worldwide sample of manufacturing companies. Technovation. 2022 Feb 1; 110:102375.

[44]. Kumar A, Kalse A. Usage and adoption of artificial intelligence in SMEs. 2021.

[45]. Jöhnk J, Ollig P, Oesterle S, Riedel LN. The Complexity of Digital Transformation-Conceptualizing Multiple Concurrent Initiatives. InWirtschaftsinformatik (Zentrale Tracks) 2020 (pp. 1051-1066).

[46]. Stenberg L, Nilsson S. Factors influencing readiness of adopting AI: A qualitative study of how the TOE framework applies to AI adoption in governmental authorities.

[47]. Blut M, Wang C. Technology readiness: a meta-analysis of conceptualizations of the construct and its impact on technology usage. Journal of the Academy of Marketing Science. 2020 Jul; 48:649-69.

[48]. Eljasik-Swoboda T, Rathgeber C, Hasenauer R. Assessing Technology Readiness for Artificial Intelligence and Machine Learning based Innovations. InDATA 2019 Jul (pp. 281-288).

[49]. Qiu Z. Technology and organization: Multidisciplinary research patterns and sociological concerns. Sociological Study. 2017; 4:167-92.

[50]. Fernando Y, Rozuar NH, Mergeresa F. The blockchain-enabled technology and carbon performance: Insights from early adopters. Technology in Society. 2021 Feb 1; 64:101507.

[51]. Li J, Cao Y. Digital transformation driving model of manufacturing enterprises based on configuration perspective. RD Manag. 2022.

[52]. Huang MH, Rust RT. Artificial intelligence in service. Journal of service research. 2018 May;21(2):155-72.

[53]. Mahroof K. A human-centric perspective exploring the readiness towards smart warehousing: The case of a large retail distribution warehouse. International Journal of Information Management. 2019 Apr 1; 45:176-90.

[54]. Murray A, Rhymer J, Sirmon. Humans & technology: Form of conjoined agency in organizations. Academy of Management Review. 2021 Jul.

[55]. Kellogg KC, Valentine MA, Christin A. Algorithms at work: The new contested terrain of control. Academy of management annals. 2020 Jan;14(1):366-410.

[56]. Pfeffer J. The Role of General Manager in New Economy: Can We Save People from Tech Dysfunctions? Springer Int. Publishing; 2020.

[57]. Bhattacherjee A, Hikmet N. Reconceptualizing organizational support and its effect on information technology usage: Evidence from the health care sector. Journal of Computer Information Systems. 2008 Jun 1;48(4):69-76.

[58]. Soomro MA, Hizam-Hanafiah M, Abdullah NL. Digital readiness models: A systematic literature review. Compusoft. 2020 Mar 30;9(3).

[59]. Gorla N, Chiravuri A, Chinta R. Business-to-business e-commerce adoption: An empirical investigation of business factors. Information Systems Frontiers. 2017 Jun; 19:645-67.

[60]. Oztemel E, Polat TK. Technology readiness model for enterprises. InIntelligent Production Machines and Systems 2006 Jan 1 (pp. 362-367). Elsevier Science Ltd.

[61]. Huang MH, Rust RT. A strategic framework for artificial intelligence in marketing. Journal of the Academy of Marketing Science. 2021 Jan.

[62]. Lee J, Davari H, Singh J, Pandhare V. Industrial Artificial Intelligence for industry 4.0-based manufacturing systems. Manufacturing letters. 2018 Oct 1.

[63]. Shabani-Naeeni F, Ghasemy Yaghin R. Incorporating data quality into a multi-product procurement planning under risk. Journal of Business & Industrial Marketing. 2021 Jul 27;36(7):1176-90.

[64]. Tisdale SM. Cybersecurity: Challenges from a Systems, Complexity, Knowledge Management and Business Intelligence Perspective. Issues in Information Systems. 2015 Oct 1;16(3).

[65]. Kaplan RS, Norton DP. Measuring the strategic readiness of intangible assets. Harvard business review. 2004 Feb 1;82(2):52-63.

[66]. García-Machado JJ, Martínez-Ávila M. Environmental performance and green culture: The mediating effect of green innovation. An application to the automotive industry. Sustainability. 2019 Sep 6;11(18):4874.

[67]. Jun W, Ali W, Bhutto MY, Hussain H, Khan NA. Examining the determinants of green innovation adoption in SMEs: A PLS-SEM approach. European Journal of Innovation Management. 2021 Jan 5;24(1):67-87.

[68]. Aboelmaged M, Hashem G. Absorptive capacity and green innovation adoption in SMEs: The mediating effects of sustainable organisational capabilities. Journal of cleaner production. 2019 May 20; 220:853-63.

[69]. Naujokaitiene J, Tereseviciene M, Zydziunaite V. Organizational support for employee engagement in technology-enhanced learning. Sage Open. 2015 Oct 6;5(4):2158244015607585.

[70]. El-Kassar AN, Singh SK. Green innovation and organizational performance: The influence of big data and the moderating role of management commitment and HR practices. Technological forecasting and social change. 2019 Jul 1; 144:483-98.

[71]. Clohessy T, Acton T. Investigating the influence of organizational factors on blockchain adoption: An innovation theory perspective. Industrial Management & Data Systems. 2019 Sep 18;119(7):1457-91.

[72]. Dasgupta S, Gupta B. Espoused organizational culture values as antecedents of internet technology adoption in an emerging economy. Information & Management. 2019 Sep 1;56(6):103142.

[73]. Srisathan WA, Ketkaew C, Naruetharadhol P. The intervention of organizational sustainability in the effect of organizational culture on open innovation performance: A case of thai and chinese SMEs. Cogent business & management. 2020 Jan 1;7(1):1717408.

[74]. Star SL, Bowker GC. How to infrastructure. Handbook of new media: Social shaping and social consequences of ICTs. 2006 Jan 17:230-45.

[75]. Chen Y, Wang Y, Nevo S, Benitez J, Kou G. Improving strategic flexibility with information technologies: insights for firm performance in an emerging economy. Journal of Information Technology. 2017 Mar; 32:10-25.

[76]. Zhang Y, Sun J, Yang Z, Wang Y. Critical success factors of green innovation: Technology, organization and environment readiness. Journal of cleaner production. 2020 Aug 10; 264:121701.

[77]. González-Benito J, González-Benito Ó. A review of determinant factors of environmental proactivity. Business Strategy and the Environment. 2006 Mar;15(2):87-102.

[78]. Liao YC, Tsai KH. Innovation intensity, creativity enhancement, and eco-innovation strategy: The roles of customer demand and environmental regulation. Business Strategy and the Environment. 2019 Feb;28(2):316-26.

[79]. Dhull S, Narwal M. Drivers and barriers in green supply chain management adaptation: A state-of-art review. Uncertain Supply Chain Management. 2016;4(1):61-76.

[80]. Fast V, Schnurr D, Wohlfarth M. Regulation of data-driven market power in the digital economy: Business value creation and competitive advantages from big data. Journal of Information Technology. 2023 Jun;38(2):202-29.

[81]. Kokshagina O, Reinecke PC, Karanasios S. To regulate or not to regulate: unravelling institutional tussles around the regulation of algorithmic control of digital platforms. Journal of Information Technology. 2023 Jun;38(2):160-79.

[82]. Minkkinen M, Zimmer MP, Mäntymäki M. Co-shaping an ecosystem for responsible AI: Five types of expectation work in response to a technological frame. Information Systems Frontiers. 2023 Feb;25(1):103-21.

[83]. Mitropoulos P, Tatum CB. Forces driving adoption of information technologies. Journal of construction engineering and management. 2000 Oct.

[84]. Venkatesh V. Adoption and use of AI tools: a research agenda grounded in UTAUT. Annals of Operations Research. 2022 Jan;308(1):641-52.

[85]. Lee J, Suh T, Roy D, Baucus M. Emerging technology and business model innovation: the case of artificial intelligence. Journal of Open Innovation: Technology, Market, and Complexity. 2019 Sep 1;5(3):44.

[86]. Flavián C, Pérez-Rueda A, Belanche D, Casaló LV. Intention to use analytical artificial intelligence (AI) in services–the effect of technology readiness and awareness. Journal of Service Management. 2022 Feb 28;33(2):293-320.