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An Action Design Research Study on Design Principles for Decision-Making Enhanced by Artificial Intelligence

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Abstract

This research explores the use of AI in organizations' decision-making by adopting an Action Design Research (ADR) method to reveal the means, potential, and best practices. Indeed, there has been a signification of AI in decision-making, and these features accompany the technology with the potential to improve the efficiency, accuracy, and predictability of decision-making. However, significant problems, including transparency, ethical questions, and users' resistance, prevent its smooth implementation. Focus groups, interviews, and document reviews form the basis of this research, which aims at properly examining these dynamics in detail. The findings are categorized into five themes: mixed concerns like implementing complexities and challenges, shared opportunities, knowledge of ethics for clinical interoperability, the concept of governance and regulation, and examining the best practices for integration processes. The findings highlight that ethical and organizational challenges persist while AI application means a democratized decision-making opportunity and virile analytical support. Consumers also stressed the need for transparency, engagement with customers, and regulations befitting the sector's requirements. The study ends with design principles to be followed by organizations that intend to implement AI solutions with positive outcomes and minimal harm.

Keywords

Artificial Intelligence, Decision-Making, Action Design Research, Ethics, Organizational Integration, Normative Guidelines

1. Introduction

1.1. Background of the Study

Management decision-making is critical in any organization, mainly where the environment is dynamic, unpredictable, and full of risks. Machine learning and, more generally, Artificial Intelligence (AI) have become game changers in this phenomenon, providing means to process large datasets and identify patterns that support decision-making (Collins et al., 2021). Brynjolfsson et al. (2021) observed that integrating AI in decision-making leads to gains in speed, precision, and flexibility for effective responses to complex and evolving markets.

Decision-making supported by AI is consistent with the overall idea of digitalization—an attempt to use technology to increase efficiency and generate value (Mikalef et al., 2020). However, AI has the capabilities mentioned above, and this concept is not without struggles. Transparency, ethical concerns, and the accessibility of human-centric AI in decision-making contexts remain some of the most significant barriers when implementing AI-enabled solutions (Shrestha et al., 2021).

This paper uses an Action Design Research (ADR) approach to build design principles for integrating AI into decision-making. Based on the premises outlined in section three, this research posits that ADR is most helpful in designing, deploying, and assessing solutions for real-world problems in cyclical processes. Concern with design principles guarantees that the study's results are practically oriented and can offer frameworks to organizations when they need to address the challenges of decision-making support with AI, as shown in **Figure 1**.

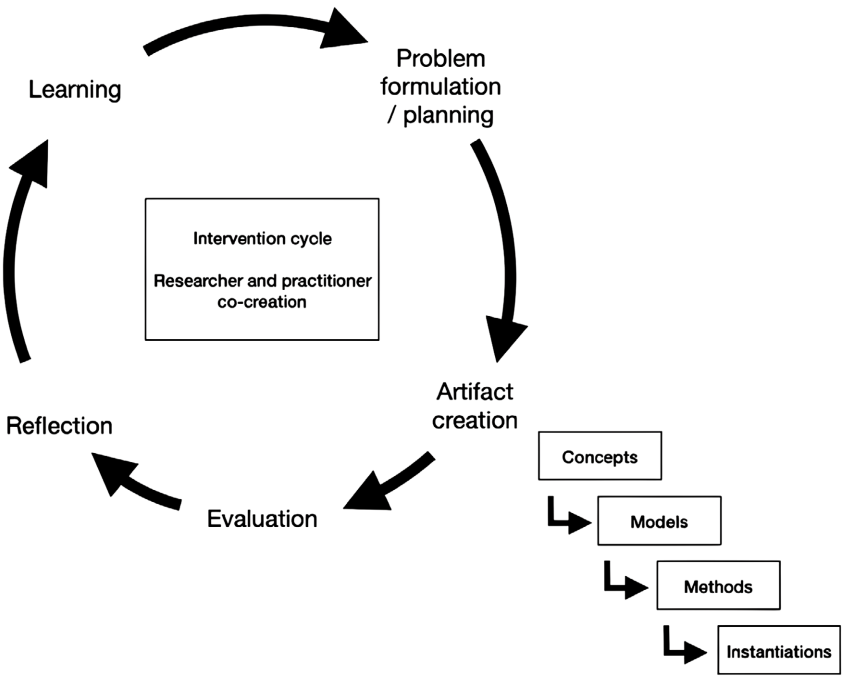

Figure 1. The intervention cycle: A collaborative framework for researcher and practitioner co-creation.

Current literature suggests that there is a need for a contingency approach when implementing AI in decision-making environments. For example, in their recent work referring to Siau and Wang (2020), the authors support the assertion that to deliver optimal value, AI systems should reflect organizational objectives, processes, and user choices. Likewise, Rai et al. (2021) also support that effective engagement involves stakeholders so that an AI system is produced and deployed ethically. The present work aims to extend the existing knowledge base on AI and decision-making by deriving organizational design principles for this technology.

This brings about the challenges of increased use of artificial intelligence in decision-making, which demands practical design principles that capture the interconnection of technology, user, and organizational systems. Therefore, by using an ADR approach, this study will provide a connection between theory and practice such that the principles developed are not only ideal but also feasible.

1.2. Problem Statement

AI has become a tool for the decision-making process in organizations due to its ability to handle quantitative data and make and deliver results predictions (Saha et al., 2023). However, the absence of architectural patterns to guide the integration of AI in decision-making practices results in unsatisfactory results such as user resistance, ethical issues, and system inefficiency (Siau & Wang, 2020). Current literature and models must be more sufficient or cater to the AI integration specific to organizations.

This lack of practical advice can narrow AI's potential as a tool in decision-making. This paper calls for research on design principles to positively address organizational objectives, user requirements, and ethical issues to promote the efficient utilization of AI. To fill this gap, this study takes an ADR perspective to design and assess design principles for improving decision-making using AI.

1.3. Rationale of the Study

This research is, therefore, informed by the rising incidence of artificial intelligence integration in decision-making processes in organizations and the key emerging issues of reliability and success of these systems. As AI has been integrated into a decision-making process, it also has undesired effects, including a reduced level of user trust or potential ethical issues (Ahmad et al., 2023).

The ADR methodology provides a great chance to deal with these issues since it does. This paper intends to address this shortfall by offering practical and implementable design principles for enhancing collaborative capabilities while maintaining organizational structure and ethos. From the perspective of academic contribution and practical significance, the study is significant in expanding the knowledge of scholars studying AI-assisted decision-making processes and providing guidance for practitioners and policymakers.

1.4. Aim of the Study

This research aimed to design, implement, and assess prescriptive principles for

designing AI decision-making.

1.5. Research Objectives

RO1: To investigate the significant issues and prospects of applying AI in organizational decision-making.

RO2: To explore the normative guidelines and benchmarks for using intelligent technologies and their regulation in decision processes.

1.6. Research Questions

RQ1: What are the significant issues and prospects of applying AI in organizational decision-making?

RQ2: What are the normative guidelines and benchmarks for using intelligent technologies and their regulation in decision processes?

1.7. Significance of the Study

This research offers various essential contributions to both theoretical and applied disciplines. Appreciating such imagined actionable design principles also links a theory-research grounded approach to practical applications of AI in decision-making. The result will be helpful for organizations, providing them with different structured frameworks for implementing AI and possible problems, including ethical, user acceptance, and efficient operational concerns, into consideration.

This work enriches the existing Stream of ADR and the use of AI to support decision-making while providing a novel methodological angle for the researchers themselves. Policymakers can also use this information to create ethical standards for AI use in organizations. Finally, this research aims to help organizations effectively manage AI opportunities and threats and realize innovativeness and competition in the era of digital transformation.

1.8. Structure of the Study

This study, based on a qualitative research methodology, is organized into five chapters: Introduction: This chapter gives the reader an understanding of the research area, background to the study problem statement and rationale, aims and objectives of the study, research questions, and justification for the study. This makes us appreciate the background and necessity of investigating decision-making via artificial intelligence utilizing qualitative research. Research Methodology: This chapter focuses on the approach used in the study by identifying it as qualitative research in the determination of the iterative ADR framework. It outlines the research proposals, research methodology, data collection techniques (case studies), sampling procedures, issues of ethics, and data analysis methods. Findings and Analysis: The results obtained from qualitative data analysis are outlined in this chapter using the identified themes. It also discusses what these results imply for formulating design guidelines more broadly about decision-making that AI augments. Conclusion and Recommendations: Chapter five summarizes the key findings, concludes

the research with the limitations identified, recommendations for practice and future research, and final remarks concerning the relevance of the findings for organizational qualitative research.

2. Materials and Methods

2.1. Research Approach

This research employs qualitative methods to estimate and understand design principles for decision support systems deployed in AI, as shown in **Figure 2**. Quain's qualitative approach is particularly relevant for describing and explaining the eternal and rich processes that form the basis of human interactions and organizational environment. It enables the development of analysis of participants' lived experiences and realistic scenarios of dealing with practical, real-life AI systems in decision-making processes. This research is underpinned by Action Design Research (ADR), which connects theory to practice. Thus, ADR focuses on the interactional work between academics and professionals to develop contextualized resources for practice that are useful and feasible (Pathirannehelage et al., 2024).

Figure 2. Qualitative research approaches.

In linking specific design principles to the resultant themes, this study thus complements quantitative studies that prioritize value-driven, generic, but actionable guidelines or recommendations. The approach enables the definition of risks and benefits of employing AI in decision-making while enabling subsequent improvement of the guidelines based on feedback (Stix, 2021). Furthermore, the chosen research paradigm is qualitative. It corresponds with the work's purpose of contributing findings that are both academically sound and grounded in practice while filling a theoretical and practical gap in the literature on the role of AI in decision-making. In Creswell and Poth's (2018) words, qualitative research is highly appropriate for investigating multifaceted phenomena, and this study is a perfect fit.

2.2. Research Design

This study uses a case study approach that is well suited for the methodological proposal of the ADR framework. An example approach of case studies is well suited for examining phenomena in their context when specific phenomena related to the integration of AI in decision-making processes are best understood, as shown in Figure 3. This design helps the researcher to concentrate on the single organization adopting the AI technique; this will make the study wholly embedded into a real-life environment and, therefore, achieve high levels of internal validity. Yin (2018) has suggested that case studies are most effective for exploring "how" and "why" questions, which correspond with the research questions of the present study, namely, the processes and issues that arise in AI-augmented decision-making.

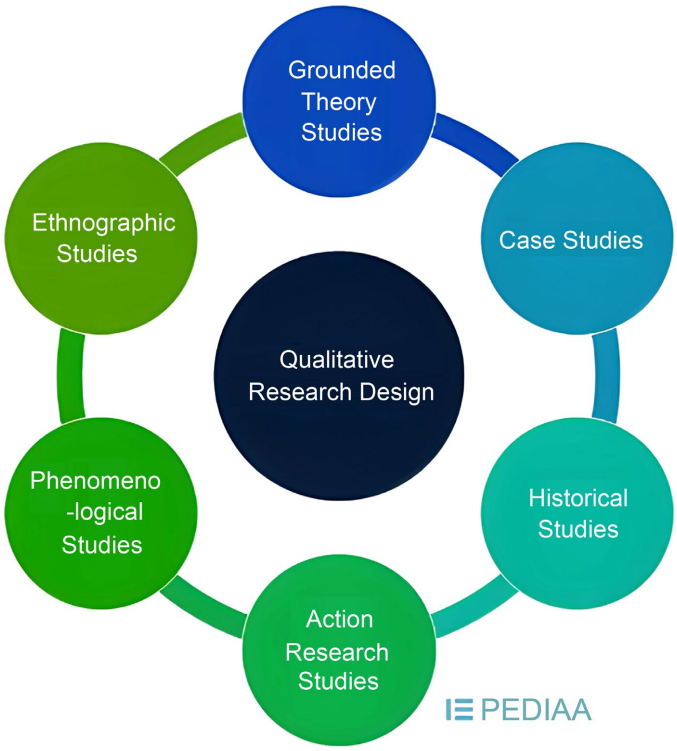

Figure 3. Qualitative research design approaches.

The ADR framework adds to the case study design by incorporating cyclic design, implementation, and model evaluation. Such cycles can help the researcher refine the design principles according to qualitative evidence and feedback, mainly because they contain real-world actions that fit within a theoretical framework (Cedergren & Hassel, 2022). Thus, integrating ADR and case studies enables the construction of a rich and theoretically sound methodological framework to investigate the continuous production of technology and organizational practices. Although contributing findings are directly applicable only in a single case, the research provides a rich understanding of particular issues and prospects. It generates

results that can be applied in similar circumstances in other contexts (Sela, 2017).

2.3. Research Philosophy

Based on the research philosophy, the study adopts the interpretivist research philosophy, which is aligned with the qualitative approach and the ADR framework. Interpretivism believes that reality is a creation of society and can only be understood through social stakeholders' perceptions (Dudovskiy, 2019). Erasure or exclusion, therefore, is particularly problematic when trying to understand how decision-makers and other stakeholders engage with AI-based systems since this approach focuses on their experiences. Saunders et al. (2019) opine that, through interpretivism, the researcher can discover how individuals define their actions and decisions regarding using AI systems.

It also assumes that researchers and participants collaborate in knowledge production specific to the context. In the context of this study, this means consulting with the many stakeholders to define issues, improve design features, and assess impact (Ozdemir et al., 2023). This approach is characteristic of the ADR method, aimed at creating theoretical and pragmatic results (Sein et al., 2024). Through interpretivist philosophy, the study guarantees that the findings are grounded on the organizational reality and the various perceptions and requirements of the actors participating in decision-making mechanisms enhanced by AI.

2.4. Inclusion and Exclusion Criteria

This study intended to ensure the results were up-to-date and valid; in light of this, participant characteristics were defined in terms of inclusion and exclusion criteria. Screening criteria covered participants who made decisions, used AI, or had some experience implementing it. This allowed the participant to offer valuable information regarding the best practices, risks, and factors to consider in decision-making. Moreover, participants had to be willing to undergo several rounds of interviews and a co-engaging process, which is inherent to the ADR strategy.

General exclusions were based on the participants' need for decision-making and exposure to AI systems. This was done to keep study participants engaged with first-hand experience so that the results that will be found are credible and applicable. In addition, participants who could not or would not attend the collaborative ADR process were omitted since they would need to provide feedback on the process throughout the iterative development of principles. These criteria were selected deliberately to fit the quantitative framework of the study as the research aimed to employ qualitative analysis that focused on depth rather than breadth. Following these criteria prevented the research from deviating from the target population, and the results were valid and reliable (Creswell & Poth, 2018).

2.5. Data Collection

All data for this study was obtained using a single case study of an organization

that uses AI in its decision-making. As Yin (2018) pointed out, the case study as an approach is most suitable for gathering qualitative data because it offers insight into actual phenomena within their natural environment. Multiple qualitative data collection methods were used to allow for the optimality of the results in capturing the research questions under investigation. A few open-ended interviews followed the questionnaires, structured with decision-makers, AI developers, and end-users as the primary sources to gather detailed experiences and perceptions.

Besides interviews, focus group discussions were used with other members of the project in order to identify common problems or ideas. Further, the approach incorporated observations of decision-making sessions that included AI systems to consider interactions and contexts. These structured methods were supported by document reviews of internal reports and policy documents to provide further context and background to the data gathering. By sourcing data from various sources, the study established triangulation, which helped improve the quality of the study results (Denzin, 2012). This data collection method perfectly worked under the ADR framework to verify this study's results and enable design-implementation-evaluation feedback cycles.

2.6. Data Analysis

Thematic analysis was used to analyze data since it is commonly employed in qualitative studies when searching for patterns in data. Thematic analysis is a systematic approach to the data but still leaves room to identify themes as the study progresses. These included: The first phase was known as familiarization, where the content of the notes, transcripts, and documents were read several times in order to gain a better understanding of the data. Initial codes were then derived to identify major conventions about AI integration and decision-making procedures stated in the respondents' interviews.

These codes were categorized into generic themes, including "Barriers to user take-up", "Ethical issues", and "Organizational AI alignment". The themes were also discussed and modified further to reflect how consistent they are with each other and the research objectives. The last action taken was to describe and make a final assignment of names to the themes. For this purpose, meaning definitions were used to capture the very essence of the themes identified. In each thematic analysis, significant concepts derived from the ADR framework were identified to reflect the themes as closely as possible, and where these findings were fed directly back into the design process to refine the principles. Such an approach also made it easier to provide a rich and systematic approach in line with maneuvers embraced by qualitative research tradition (Sein et al., 2024).

3. Result and Discussion

The outcome of this research notion is to unveil the key challenges, prospects, and best practices for implementing Artificial Intelligence (AI) in decision-making. In line with this, the data collected was analyzed through thematic analysis with the

development of emerging themes that presented AI's dynamic and nuanced nature as integrated into the decision-making process. These themes were informed by the study's objectives (RO1 and RO2) to remain relevant to the research aim. The results are presented in terms of the following themes: Threats and opportunities of AI in decision-making and recommendations for practical normative framework as shown in Table 1.

Table 1. Thematic analysis of AI-driven decision-making.

Theme	Codes	Description
Complexities and Challenges in AI-Driven Decision-Making	- Lack of transparency - Algorithmic biases - Resistance to change - Ethical concerns	Challenges related to the integration of AI, including technical limitations, ethical issues, and organizational resistance.
Opportunities for Enhanced Decision Making Through AI	- Predictive accuracy - Improved efficiency - Democratization of insights	Benefits of AI for decision-making such as faster and more accurate data processing and fostering inclusivity.
Guidelines for Ethical and Effective AI Use	- Need for transparency - Regular audits - Human oversight	Normative benchmarks for ethical AI implementation, emphasizing accountability, and transparency.
Regulation and Governance of AI in Decision-Making	- Lack of standardized protocols - Sector-specific guidelines - Collaborative governance	Regulatory needs for managing AI applications, including creating sector-specific frameworks and collaborative models.
Best Practices for Integrating AI	- Stakeholder engagement - Training and upskilling - Phased implementation	Strategies for successful AI adoption, such as involving stakeholders, continuous.

3.1. Theme 1: Complexities and Challenges in AI-Driven Decision-Making

Perhaps the most notable aspect repeated frequently across the collected data was the adoption of AI, which entails several challenges due to the inherent nature of incorporating the technology into the decision-making continuum. One, various technical, organizational, and ethical issues were mentioned; concerns related to the quality of the data, the levels of openness of the soul, and the occurrence of algorithms' biases were discussed. Some decision-makers said that the established AI models are typically encoded, making it complex or challenging to decode the results and explain them to the stakeholders. This lack of interpretability is a major hurdle to use and acceptance. For example, one manager said, "There is an issue in explaining why some decisions should be followed while others are not when you

are not sure the AI is not considering".

The major challenge highlighted from an organizational perspective was resistance to change. Employees' lack of enthusiasm for AI was reported to be due to their perception of such innovations as a threat to their employment. Organizational cultures also came into play to determine the efficiency of AI systems in organizations. One of the participants working for the firm from the traditional manufacturing industry added, "Our workforce views AI as something out of this world, which is why it requires integration".

There are three concerns regarding the ethical deployment of AI, and there are worries that these systems compromise fairness and accountability. Participants were concerned about how new AI systems could continue to perpetrate bias or discriminate against specific categories of people. The lack of practical guidelines in handling these ethical issues also escalated the problem to new heights because organizations found themselves in a legal fog.

3.2. Theme 2: Opportunities for Enhanced Decision-Making through AI

However, participants highlighted numerous possibilities AI applications present to organizational decision-making processes. A repeated observation noted was AI's capability to deal with large volumes of data and generate decisions and solutions in shorter timeliness. Management in industries characterized by massive data usage, such as finance and healthcare, were incredibly optimistic about AI. A participant said, "We can no longer call ourselves a dinosaur company because of what AI has done to us in analyzing trends that used to take days and are now done in hours".

A new potential exists in increasing predictive probability. More than one participant said that AI systems improved their capacity to anticipate market needs, future threats, and resources. A logistics manager also described how AI-based discoveries led his organization to cope with an uncertain supply chain environment. He said, "We have effectively made the right decisions at the right time with the support of AI and prevented delays along with consequential costs".

Moreover, decentralizing decision-making was noted as an unexpected emerging positive development. By putting some sources of information most crucial to the organization in the hands of employees, AI can help formal custodians use frontline staff talent to contribute to decision-making at a superior tier. This inclusion helps create a more proactive status of decision-making by including other stakeholders as representatives and giving them the floor to be heard.

3.3. Theme 3: Guidelines for Ethical and Effective AI Use

In response to RO2, the study documents the lack of norms and standards by using AI in decisions as a gap that must be closed. This focus ensued to mean that the participants maintained that there was a need to set ethical frameworks to guide the AI systems. These guidelines should include topics such as transparency, accountability, and fairness. One participant said, "There must be reference points

that everyone can adopt across fields in the industry to avoid a situation where artificial intelligence systems are enhancing prejudice or making immoral suggestions".

Also, according to the participants, the AI system's interpretability was considered significant, the respondents demonstrated a high degree of preference for models emphasizing explaining ability while not necessarily discounting more practical factors. The notion that transparent algorithms were essential for creating stakeholder trust was understood. For this, participants urged that AI systems be audited often to determine whether they align with ethical policies and to ascertain that biases are kept to a minimum.

The other suggested principle was to require human intervention in using artificial intelligence. For all the superintending performance of the AI tools, it was pointed out that the final decision-making process should be with the human resource managers. One of the respondents was very keen to point out that "AI is an aid, not an absolution for decision-making". Due to its nature, AI will always have to offer recommendations to be reviewed by a human authority.

3.4. Theme 4: Regulation and Governance of AI in Decision-Making

The conclusions pointed out that regulatory systems played significant roles in facilitating and governing the usage of AI systems. The study findings made it apparent that participants wanted improved and enhanced policies at individual organizational and governmental levels. Another issue was the need for more norms for judging the effectiveness of an AI system, which is problematic from an organizational standpoint because it allows for different implementation methods across organizations.

In this regard, participants recommended drawing standard operating procedures that would be specific to the needs of each industry, as each one is faced with unique problems. For instance, the patient participants stressed the issue of enhanced data protection, whereas the financial participants pointed out the problem of anti-fraud legislation compliance. Another participant said, "AI guidelines should be differentiated by industry; what might apply to retail may not resonate with healthcare".

Finally, collaborative governance was suggested to address the need for developing AI regulation and involving various stakeholders, beginning with the industry and policymakers and ending with the consumers. This approach would promote the development of non-distorted and flexible policies since it reduces the chances of forming a politics of regrets.

3.5. Theme 5: Best Practices for Integrating AI into Decision-Making Processes

Participants discussed issues concerning the implementation of AI in decision-making within organizations. Stakeholder engagement was an essential practice by any of the SCMSs under analysis. Inviting employees, managers, and end-users

was necessary to demonstrate trust and set the goal that everyone needs to achieve. For instance, one of the participants wrote, "When employees get to know how the concept of AI functions and why it has been adopted, then individuals are willing to accept the system".

Other valuable insights for implementation were also acknowledged: Education and staff development. Several participants pointed out that there has been an emphasis on promoting training interventions for staff to acquire competencies with the functions that AI systems can deliver. For example, one organization implemented a set of workshops where the staff gets oriented with executable AI tools; this way, the transition was more straightforward and with higher acceptance.

4. Summary

4.1. Conclusion

This research aims to examine the future AI within the context of the business environment and offer normative patterns for its rational, ethical deployment. The findings reveal a dual narrative: Daily, decision-makers can harness the power of AI to achieve greater accuracy and speed and gain a better understanding of the future while grappling with wholly new technical, ethical, and organizational use cases every day.

The research establishes that transparency, user trust, and accountability are vital issues companies must consider. People expressed concern that the current AI models could be more easily interpretable, leading to distrust among people. Several issues relating to ethics have also emerged, such as balances, algorithms, and fairness. Overcoming these challenges necessitates abuse-resistant frameworks that support transparency policies and the construction of solid auditing protocols.

AI-related opportunities for better decision-making were also visible. Some of the positives were that participants noted that AI could handle a vast amount of data, meaning organizations were in a position to make decisions ahead of time and accurately. Additionally, the study established that using AI in decision-making provided tools for employees at different hierarchical levels with decision-making information. They argued that this inclusion helps create a positive interaction towards creating a dynamic decision-making system.

Based on the findings of this research, this study encourages the development of sector-based policies that tackle challenges arising from particular industries when implementing AI solutions. Shared governance approaches that engage multiple relevant stakeholders include policymakers, practitioners, and users of policies and services when developing contingency-oriented and sustainable strategies.

On balance, it can be affirmed that AI can improve organizational decision processes if only it is deployed in compliance with the values of ethics and practicality. Suppose organizations are to fully exploit the benefits that the existence of CSR brings and the risks that accompany it. In that case, they have to ensure that they

gain support from the organization's stakeholders, that there is full disclosure of information regarding the implementation of the strategy, and that CSR is implemented progressively. According to the proposed principles of AI design, the organization can achieve practical solutions and avoid negative consequences in decision-making systems.

4.2. Limitation and Future Direction

The present study has some limitations, which give rise to several opportunities for further research. The research is conducted on a single case study level. In contrast, as is known, such case studies give more detailed information from a very concrete context, but at the same time, the results cannot be considered universal. Still, the practical applicability of these principles that emerged with the help of the Action Design Research (ADR) framework would benefit from the improved ability of their testing across the organization contexts.

Future research should also consider more culture—and industry-specific approaches and their relation to the use of AI technologies. Comparative studies between and within sectors and across different geographical regions would do much to illuminate how organizational and cultural requirements affect artificial intelligence utilization. Last, as AI technologies are growing rapidly, further research is needed to refine the proposed design principles and make them relevant to new problems and solutions.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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