Journal of Marketing & Social Research

ISSN (Online): 3008-0711

Volume: 02 | Issue 03 | 2025
Journal homepage: https://jmsr-online.com/

Research Article

Reviewing Diversity, Equity and Inclusion in A Fast-Growing World of Artificial Intelligence

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Received: 28/03/2025; Revision: 25/04/2025; Accepted: 08/05/2025; Published: 27/05/2025

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Abstract: Artificial Intelligence (AI) is a branch of computer engineering that helps build systems perform tasks rapidly that would mimic human intelligence enabling data analysis, identifying patterns, make decisions and solve problems. AI usage has been on rise to make the complex tasks simpler. Whereas Diversity, Equity and Inclusiveness (DEI) is the area that studies the heterogenous components of population and tries to give equitable and representative solutions for participation of marginalized sections in different domains. It has been observed that the area of AI requires different stakeholders to work with collective intelligence right from the initiation of the development and not merely address DEI as an afterthought. The research paper intends to study the recent literature to emphasise the challenges in growth of DEI in AI and see how the knowledge of two concepts will help to make AI more efficient and Inclusive, eventually to make AI bias-free and gap-free. Lastly the research paper intends to narrow down the suggestions to mark most important pointers for future development in AI.

Keywords: Artificial Intelligence (AI), Diversity, Equity & Inclusion (DEI, EDI used interchangeably), Data, Data analysis, Data scientist Algorithm, System, Development

INTRODUCTION

AI can both mitigate and accentuate the social biases thereby necessitating the need for attending to the EDI guidelines right from the beginning and this shall facilitate inclusivity and equality (Samira, et al., 2024). "AI might undermine the basis and essence of humanity" (Pawan, Ashish, Silva, & Praveena, 2022). Many research studies have rightly provided models for making more inclusive but the guidelines from epic international institutes and credible research, is at various stages of application. Digital literacy, human rights, legal provisions and AI advances in various parts of the world are at different stages of development. Some of the research and AI systems cannot be generalized as that poses the risk of accentuating biases and creating unfair/unequitable outcomes specially for the marginalized groups. Creating and refining the AI environments is an ongoing pursuit. Though the benefits of AI are enterprising and time saving; the unreasonable harms caused owing to biases in AI systems cannot be ignored.

Research Questions:

Q1: What is the present state of integration of DEI in AI?
Q2: In practice, is the approach to make AI more DEI compliant work in multidisciplinary way? Who are possible stakeholders?
Q3: Which are the possible markers for the successful integration of DEI in AI?

Research objectives:

Research objective is to study different models, theories and guidelines established to make AI systems more diverse and inclusive. Also, understand the challenges in integrating DEI in AI systems. This will necessitate reviewing literature from perspective of different stake-holders involved in driving DEI in AI environments. This endeavour would help create a model for understanding the multidisciplinary thoughts harmonized to simplify the operational flow of integrating DEI in AI and will also crystalize the markers for development of AI in the future. Any biases towards minorities in AI will only propagate with time causing unjust disadvantage and unless research and regulatory bodies reach a consensus on guiding principles for various stages of AI development, arbitrary efforts to address DEI in AI systems will continue.

METHODOLOGY:

The very thought of combining AI and DEI as a study has perplexed many researchers as the computational studies studying AI have used methodologies far different from that of DEI. AI researches have been mostly quantitative, parametric and algorithmic in nature, whereas the research in DEI is mostly done in humanities studies employing qualitative, narrative & exploratory methods (Özbilgin, 2024). Marrying the two has been a challenge, considerable number of research works in the recent past have been observational with regards to different industries, finding gaps and presenting case studies enumerating the real-life imperfections observed in AI. Another hurdle for more empirical studies is how AI development and application differs in different geographies along with the variance in the research material published in different geographies (Köchling, 2020) (Özbilgin, 2024). This paper undertakes the literature review of scholarly articles, white papers to

study different models suggested, observations made, and directions recommended. Based on the recent articles possibly make DEI sensitive recommendations to models and broaden the understanding, contributing towards laying some fundamentals through pure exploration.

LITERATURE REVIEW:

Artificial intelligence (AI) and new technologies are having a pervasive impact on modern societies and communities (Salas-Pilco, Xiao, & Oshima, 2022). In the modern times the deployment of AI in variety of sectors has accentuated the importance of ethical governance and integration of DEI principles (Samira, et al., 2024). "Implementing ethical principles in AI remains challenging due to the absence of proven methods, common professional norms, and robust legal accountability mechanism" (Zowghi & Bano, AI for all: Diversity and Inclusion in AI, 2024).

The area of both DEI in AI and AI in DEI are relatively less explored with limited research studies and consequently fewer guidelines/solutions for the challenges (Rifat Ara, Didar, & Muneera, 2023). The AI and DEI relationship is reciprocal & bidirectional, meaning AI if unbiased can help explore & support the DEI and give important pointers, on the other hand DEI inclusions can make better AI systems. There is need for diversity to mitigate biases becoming inbuilt into systems (Kaśka & Gnanathusharan, 2019). According to one of the research algorithmic biases and automation can recreate and accentuate the discriminatory and oppressive end results in the system (Rod, et al., 2022). Exacerbation of social inequalities in the AI starts from the early stages of the AI lifecycle and DEI considerations should not be an afterthought (Milka, Elham, Pascale, & Samira, 2023). Why is it of paramount importance to make the AI systems equitable is because it is harder to question the decisions of AI compared to human decisions. Also, the human bias is that the outcomes of machines are correct and devoid of human errors (Miller, 2018).

Though lot of research discusses the Inclusivity & accountability as important concepts as far as AI is concerned but when we dig deep in to the concepts it is difficult to propose universal understanding/guidelines on the subject (Kaśka & Gnanathusharan, 2019). Biases and omissions in AI system algorithms are common and can be caused owing to various reason, few of the obvious reasons are measurement errors, missing data & underrepresentation of minorities (Anne, Marieke, & Tina, 2022). It is agreed upon by the researches in general that DEI is vital in AI and there are problems in implementing DEI guidelines in AI systems in the real world (Bechmann, 2019). AI governance with DEI values cannot be addressed by DEI and AI scholars working in silos (Özbilgin, 2024). Alienation of minorities through silent biases and deep seated social stereotypical expectations will keep perpetuating the inequities embedded deeply in people at large.

BACKGROUND:

Researchers predict substantial growth in the AI market and AI permeating into various industries rapidly. This means organizations should be cautious while integrating AI into their operations to provide equal opportunities without any system biases for minority diverse groups. AI has great potential but it can only be realised if it includes the diversity at every step of its development (WEF, 2022).

AI is only as good as its data and provision for overcoming biases, gaps in the available information can adversely affect certain groups such as minorities, women and marginalized groups (Preeti & Nir, 2022). Previous research also states that presently narrow technical practices are implemented instead of all-encompassing holistic approach in AI and DEI principles should directly be embedded as cautionary risks as a preventive measure right from the beginning (Gaelle & Alain, 2023). Research also suggests importance of contextualized DEI guidelines as generic DEI guidelines are difficult to incorporate in the specific operational tasks (Bano, Zowghi, Mourao, Kaur, & Zhang, 2024). Some of the discussion areas based on the study of recent literatures have been categorised below.

Geography and AI development

Some researchers (Ozbilgin, Aydin, Vassilopoulou, Köchling) believe that most AI systems are developed in developed countries and are used globally, migration of such AI systems with intrinsic biases might have significant impact on the end users in different parts of the world. This can snowball into unfair practices, reinforcing the existing discriminatory practices and can also affect the growth and development of organization at first and society at large. AI systems risk amplifying and exaggerating existing gaps and biases eventually leading to untowardly marginalizing certain groups, nullifying the whole purpose and utility of AI to work more efficiently and improve our lives (Zowghi & Bano, AI for all: Diversity and Inclusion in AI, 2024). Presently AI systems generation involves resources namely human AI experts, capital and ecosystems to develop such systems. Are these resources concentrated in certain parts of the world and with certain organizations? Could there be business interest affecting the final AI outcomes? It is important that AI systems are modified to fit the end users when the end user profiles changes from country to country. Cultural difference also means change in interpretations of language, scenarios and experiences; these nuances cannot be neglected.

Role of HRM and DEI practitioners:

Are Human resource management (HRM) & DEI practitioners slow to react to the fast-moving opportunistic AI systems? Is the algorithmic justice served well? Is there a need for a super-specialization in HRM, professional who could integrate DEI goals in the AI? (Köchling, 2020). The super-specialized intervention has to happen at the developmental stage so as to inculcate the discipline to serve diversity from the very beginning. The ultimate responsibility cannot just be pinned on the data scientist and HRM practitioners could be involved as equal stake holders to create DEI enabled AI tools for industries at large (Kelan, 2023). There is no paucity of literature observing and suggesting participation of HRM & DEI practitioner's participations from the conceptualization of AI systems as a pivotal measure. Eventually the possibility of cross trainings and sensitization between AI developers and

HRM professionals can also lead to more inclusive AI systems.

Models Propose multidisciplinary approaches:
The Global Future Council on Artificial Intelligence for Humanity divide AI life cycle into seven broad steps: 1. Identifying use case/problem 2. Model Design & Iteration 3. Data collection 4. Model development 5. Testing 6. Deployment 7. Monitoring/hypercare and enumerates the DEI recommendations for both, those building the AI ecosystem and other stake holders responsible for governance & DEI compliance (WEF, 2022). World economic forum in its white paper also classifies the stakeholders as 1. Government agencies 2. Civil society organizations 3. Private companies and 4. Individuals. The models are comprehensive but not binding and the compliance mechanism is not regulated by tribunals, moreover the growth and regulation in different countries is at different stage of development.

Samira Abbasgholizadeh Rahimi and co-researchers gave a three-level framework comprising 1. Micro (individual level) 2. Meso (organizational level) 3. Macro (System level) for EDI integration (Samira, et al., 2024). On the similar lines 1. Humans 2. Data 3. Process 4. Systems and 5. Governance are the five pillars identified by Zowghi and Da Rimini (Zowghi & da Rimini, Diversity and inclusion in artificial intelligence, 2023). Some researchers have also suggested industry-wide AI grievance panels (Miller, 2018). How can we integrate the present knowledge advances into trainings of relevant stake holders and put in place ratings to measure efficiency and inclusivity is a question to deliberate over.

Based on findings research also envisions participation of many more stake holders and proposes the interdisciplinary model that following stake holders, AI designers, HRM professionals, DEI experts, Psychologist, Anthropologist, Legal agencies, Governmental bodies and Industry representatives. The committee comprising all the above stakeholders can evaluate the AI systems created in a stage-wise manner to result into more inclusive AI system. Özbilgin proposes the new deal whereby responsible AI is co-designed by interdisciplinary efforts that goes beyond pinning the responsibility just on its developers (Özbilgin, 2024).

Role of Academicians:
Another observation made in the recent research is that DEI & AI differ fundamentally in the methodologies used, DEI research is more of qualitative exploratory in contrast to AI which uses predominantly Quantitative computational research methodology. There is growing consensus on inclusion of DEI in AI but the literature lacks the definitions and methodologies to integrate DEI (Bano, Zowghi, & Gervasi, A Vision for Operationalising Diversity and Inclusion in AI, 2024), it will need sustained efforts and clear structure (Nicole, Emma, & Deirdre, 2021). To promote appropriate acdemic interdisciplinary writings this research proposes that institutes, acdemic journals and researchers should concentrate more on meaningful fundamental research to lay grounds for more decisive and inclusive research that might necessitate broadening the research methodologies in both AI & DEI, integrating the studies in humanities and computational data sciences. The interdisciplinary research will eventually pave the way for different industries to imbibe the principles established through thorough research.

Diversity amongst Developers:
Another interesting observation could be to study the Diversity quotient amongst the AI developers. More diverse composition of data & AI professionals will contribute towards more inclusive AI systems. “If people who develop AI systems are not diverse in themselves, the likelihood of AI system mirroring the homogeneity of developers is high, leading to biases (Rifat Ara, Didar, & Muneera, 2023). Some scholars also call for action from the leaders at all levels of AI system development to make the team more inclusive and diverse and not think od DEI as a afterthought of development (Anne, Marieke, & Tina, 2022). Women, ethnic & racial minorities are underrepresented in the field of Data science. The observations only reemphasize the need for DEI considerations from ground-up and not merely as an afterthought. Most industries have already been putting efforts to make work places more diverse and inclusive, the same principles could be applied to AI and Data systems. Such considerations will not only improve the outcomes but also address the ethical issues around AI.

AI to promote DEI:
Now let us also see how the Data & AI can actually foster the DEI effort. Many organizations who apparently claim to DEI compliant may benefit from use of deep analytics and AI to decipher data that was just not available at first level analysis (Preeti & Nir, 2022). They also emphasise that if the AI systems are developed properly, they might help avoid the human (conscious & unconscious) biases. Amongst many other advantages AI also creates fair opportunities for growth, promotions, compensations, career advancement and other rewards.

Data trends, when used effectively, can drive equity in career opportunities and advancement (Preeti & Nir, 2022). In order to understand benefits and implications of AI on DEI, Organizations need to fully evaluate socio-economical, techno-legal, geo-political considerations (Jimenez, 2022). Though at this point there are hurdles envisioning the more inclusive AI systems, it’s a growing industry which is here to stay, the benefits are there to be seen. There is no reason to fear the imperfections might perpetuate in the future. In fact, the competition, research, failures and law will keep making the ecosystems better and equitable.

DISCUSSION:

Özbilgin and his coresearchers draw attention to the three main areas firstly the relation between human Diversity and Technodiversity, secondly the Interdesciplinary approach to designing AI and thirdly Grievance and regulatory challenges owing to algorithmic biases in AI. Though Deshpande and Sharp in their study outline three tiers of stake holders namely Individual, organizational and

national/international (Deshpande & Sharp, 2022), such classification will create challenges in collaboration, cross-sectional committees might help the collaborative effort better. The New Deal (Özbilgin, 2024) stated by Özbilgin and his coresearchers contrasts between the exclusive social policy (Self-interest) against the inclusive social policy (Social commons), lets go a little further to creat an intermediary sensoring body comprising of all the stakeholders discussed earlier in the paper to make AI more Inclusive.

Technology does not exist in isolation but is immersed in society, thus technology and society mutually shape each other (Salas-Pilco, Xiao, & Oshima, 2022). DEI considerations in AI are vital in designing, developing and deploying AI system, this is true not only for ethical reasons but also for delivering reliable, trustworthy and equitable outcomes (Zowghi & Bano, AI for all: Diversity and Inclusion in AI, 2024).

Rifat Ara Shams and coresearchers suggest raising awareness and providing training on cultural competency and algorithmic vigilance (Rifat Ara, Didar, & Muneera, 2023). Though this will help remove the stereotypes and human biases in AI system, it will need collaborative effort. Another solution proposed by author is to train AI systems to process data by disregarding certain information that leads to passive discrimination. Accountability is of fundamental importance to inclusion, diversity and fairness in AI based systems (Kaśka & Gnanathusharan, 2019).

Didar Zowghi & Muneera Bano in their paper 'AI for all: Diversity and Inclusion in AI' state reasons like reducing biases, increasing fairness, enhancing creativity and preventing harmful social incidents to emphasise importance of DEI in AI. AI has a potential to affect all facets of organizational operations and might have an impact on goodwill, revenue, public sentiments, customer satisfaction, hiring promotion, marketing etc. In order to better already convenient & futuristic AI systems bias-free, it is proposed that the DEI consideration more regularised. An all-encompassing model is suggested through this study to make the DEI considerations in AI multidisciplinary and harmonious.

Diagram 1. DEI considerations in AI

CONCLUSION:

Studies Identify significant gaps in DEI considerations within the lifecycle of AI spanning from data accumulation, defining the problem and implementing the AI systems.

In order to develop DEI sensitive AI, Scholars and practitioners from both fields should work together.

Discussions of DEI in AI should not only be aspirational ethics (Bano, Zowghi, & Gervasi, A Vision for Operationalising Diversity and Inclusion in AI, 2024) and requires laborious and tedious multidisciplinary approach.

Computers learn the biases the same way as humans unless DEI training and risk evaluation is inculcated into the stake holders of the AI creation, we cannot expect AI systems to be equitable

AI and DEI are supportive considerations to each other, AI can make our society more inclusive and equitable if the systems are built well from the start addressing DEI, on the other hand inclusion of DEI gives us better AI ecosystems to deal with modern day business challenges.

All though most AI systems are built with good intentions to begin with the technology is far from reaching the most beneficial state with equity and inclusion as considerations. Not to forget that skewed AI systems are the projections of innate human biases first (Reisman, Schultz, Crawford, & Whittaker, 2018).

Majority of studies with respect to AI and DEI are done in the field of Medicine, Education, Manufacturing and Service Industries

Limitations:

How much of an impact AI system built in one culture can have on regions different culture, should the AI ecosystem be built by localizing the development process should be studied separately

How big a role does HRM and DEI practitioners play presently in developing AI systems is not known and some advances in the matter can lead to better union of AI & DEI A separate statistical study to observe diversity amongst AI developers can be undertaken to promote Inclusive development teams

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