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A study on ethical implications of artificial intelligence adoption in business: challenges and best practices

Moinak Maiti[1*], Parthajit Kayal[2] and Aleksandra Vujko[3]

Abstract

Widespread adaptation and implementation of artificial intelligence (AI) across the businesses make ethical implications increasingly important. This study explores the ethical challenges and best practices surrounding the adoption of AI in various business contexts. The study finds that following ethical concerns are the hinderance in the adaptation of AI in business (Privacy and data protection, bias and fairness, transparency and explainability, job displacement and workforce changes, algorithmic influence, and manipulation, accountability, and liability, and ethical decision making). It also shows that these challenges vary across gender, age group, country, profession area, and age of the organizations. Lastly, the study provides insights on how businesses can navigate these challenges while upholding ethical standards. The study finding is highly useful for the business leaders, policymakers, and researchers in ensuring responsible and ethical AI deployment in the business ecosystem.

Keywords Artificial intelligence, Business ethics, Algorithmic bias, Privacy, Transparency, Accountability

Introduction

The concept of artificial intelligence (AI) was first introduced by Alan Turing who conducted pioneering research in a domain termed as Machine Intelligence, marking the initiation of substantial work in this field. While various AI techniques were developed between 1950 and 1980, primarily within computer-related projects, the widespread adoption of AI commenced later, coinciding with advancements in computer technology and the widespread availability of the internet. Researchers, ethicists, and practitioners contribute to these strands of literature, shaping discussions around the ethical dimensions of AI adoption in business [1]. Since modern businesses are adopting AI at an increasing rate, it is essential to recognize the dynamic and evolving nature of ethical considerations as technology advances and societal perspectives change [2, 3]. The adoption of AI in business has transformative implications across various dimensions. From enhancing operational efficiency and decision-making processes to unlocking new avenues for innovation, AI contributes significantly to business optimization [4]. While it creates opportunities for job market evolution, introducing new roles and skill requirements, it also raises concerns about potential job displacement due to automation [5, 6]. Economically, the integration of AI can spur productivity gains and economic growth, but it requires thoughtful consideration of its societal impacts. Ethical implications emerge in areas such as algorithmic bias, data privacy, and accountability, necessitating robust frameworks to ensure responsible AI development and deployment. Striking a balance between harnessing AI's potential for business

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advancement and addressing ethical concerns is crucial for fostering a sustainable and inclusive digital future [7, 8].

The adoption of AI in business serves as a catalyst for societal progress by identifying gaps and fostering knowledge development for the benefit of individuals, communities, and society at large. AI's capacity to analyze vast datasets enables businesses to gain insights into social trends, consumer behaviors, and community needs, contributing to informed decision making. The drivers of AI in business include the pursuit of innovation, efficiency, and improved customer experiences [9]. Ethical practices, such as transparency, fairness, and inclusivity, are crucial in guiding the responsible deployment of AI technologies [10]. As businesses leverage AI to address societal challenges and enhance overall well-being, a commitment to ethical AI practices becomes integral for ensuring positive and sustainable societal impacts [11, 12]. The swift integration of AI into business operations has ushered in a new era of efficiency, innovation, and productivity. Nevertheless, this progress comes with a spectrum of ethical challenges that demand careful consideration. The examination of ethical issues related to the adoption of AI in business is a complex and multifaceted subject, with various strands of literature addressing different facets of these concerns. Some common themes and perspectives include: (i) bias and fairness: concerns about biases in AI algorithms, leading to unfair treatment based on gender, race, or socioeconomic status [13–15], (ii) transparency and explainability: the need for transparency in AI decision-making processes to build trust and accountability, emphasizing the importance of understanding how AI systems arrive at specific conclusions [16–18], (iii) privacy: exploration of the privacy implications of AI technologies involves questions about consent, data ownership, and security, particularly in the context of collecting and processing personal data [19–21], (iv) accountability and responsibility: ethical considerations include determining responsibility when AI systems make decisions, addressing critical questions about accountability for the outcomes of AI applications [22–24], (v) job displacement and economic inequality: discussions revolve around the impact of AI on employment, potential economic inequality, job displacement, retraining needs, and broader socioeconomic consequences [5, 6, 25], (vi) autonomy and decision making: ethical considerations explore the autonomy of AI systems and the role of human oversight in their decision-making capabilities [26–28], (vii) security and malicious use: ethical challenges related to the security of AI systems such as concerns about hacking, malicious use, and the potential weaponization of AI [29–31], (viii) global perspectives and cultural considerations: the importance of considering cultural and global variations when discussing AI ethics, acknowledging that ethical standards may vary across contexts [32–34], and (ix) long-term implications: exploration of the long-term ethical implications of widespread AI adoption includes speculative scenarios, existential risks, and the need for adaptable ethical frameworks (Bostrom, 2002; [35, 36]).

Examining the ethical concerns and challenges associated with AI reveals a multifaceted landscape that can significantly influence its adaptation in business settings. Ethical considerations pose substantial hurdles, as they vary across diverse demographics such as gender, age groups, countries, professional domains, and the age of organizations (Madaio et al., 2022; [37]). Issues surrounding privacy, bias, accountability, and the potential for job displacement are just a few of the ethical dilemmas that businesses must navigate when integrating AI technologies into their operations [38, 39]. Moreover, disparities in access to AI resources and the exacerbation of societal inequalities further complicate the ethical landscape [19, 40]. For instance, older organizations might struggle with adopting AI due to entrenched processes and resistance to change, while emerging economies may face challenges related to limited infrastructure and expertise. Addressing these concerns requires a multifaceted approach that prioritizes transparency, fairness, and inclusivity to ensure that AI technologies serve the greater good while mitigating potential harm. It is essential for businesses to engage in ongoing dialog with stakeholders, including employees, customers, regulators, and communities, to identify and address ethical risks proactively.

Past and current studies on best practices for mitigating the ethical risks of AI adaptation in businesses have unveiled an array of crucial strategies [41],[42], [43–45], etc.). These encompass the implementation of robust ethical guidelines and frameworks that prioritize transparency, accountability, and fairness throughout the AI development lifecycle [46, 47], Díaz-Rodríguez et al., 2022; [48, 49], etc.). By incorporating diverse perspectives and expertise into AI design and decision-making processes, biases can be mitigated, ensuring the technology's alignment with societal values [2, 50, 51]. Moreover, fostering interdisciplinary collaboration among ethicists, technologists, policymakers, and other stakeholders can lead to more holistic approaches to ethical AI development and deployment (Miller et al., 2023, Ribeiro et al., 2021; Thakur et al., 2022). Additionally, regular audits and evaluations of AI systems, coupled with transparent communication of their capabilities and limitations, bolster trust and enable stakeholders to make informed decisions [52–55]. Cultivating a culture of ethical responsibility within organizations through training, incentives, and accountability mechanisms fosters continuous learning and adaptation to evolving ethical

challenges in the rapidly changing landscape of AI technology [56–58]. By integrating these multifaceted best practices, businesses can effectively navigate the ethical complexities of AI adoption while maximizing its potential benefits for society and minimizing its risks.

The present study on the ethical implications of AI adoption in business is crucial due to the rapidly evolving landscape of technology and its profound impact on societal dynamics. As AI continues to permeate various sectors, including business, understanding, and addressing its ethical challenges are paramount. With businesses increasingly embracing AI technologies, there is a pressing need to comprehensively assess the ethical concerns and best practices associated with its adoption. This study aims to address these two research questions as listed below:

I. What are the ethical concerns and challenges associated with AI adoption in business?
II. What are the best practices for addressing the ethical implications of AI adoption in business, and how effective are these practices in mitigating ethical risks?

This study makes a significant contribution to existing literature as the first to investigate ethical considerations in adopting AI in business. It presents a comprehensive analysis of the challenges faced by organizations in implementing AI adoption, its ethical implications, and the subsequent effects on businesses. Importantly, it identifies variations in the drivers and practices of ethical implications related to AI adoption among different age, gender, country, profession area, and age of organizations. Ultimately, this research provides valuable insights into the literature on the ethical implications of AI adoption in business, illustrating diverse approaches organizations can take to address ethical concerns and strengthen their business practices.

The rest of this study unfolds as follows: The "Literature Review" section provides an overview of relevant literature and outlines the study's framework. The "Data and Methodology" section details the research approach and data collection process, while the "Results and Discussion" section delves into the study's findings. Finally, the "Conclusion" section wraps up the study by offering policy recommendations and suggestions for future research.

Literature review

Overview of AI technologies and their business applications

The extensive body of literature surrounding AI technologies and their business applications has undoubtedly contributed to our understanding of the transformative impact AI that has had across diverse industries [59–63]. However, while scholarly works chronicle the historical evolution of AI and delve into its functionalities, there remains a notable gap in addressing the ethical concerns and challenges associated with its adoption in business. Despite highlighting the role of AI in augmenting decision-making processes and fostering innovation, these analyses often overlook the ethical implications of AI deployment [2, 64]. While operational efficiency and enhanced customer experiences are emphasized, the potential risks of algorithmic bias, privacy infringements, and job displacement are often understated or neglected [49, 65]. Moreover, while emerging trends like explainable AI are acknowledged, their ethical ramifications receive insufficient attention [66], Stahl et al., 2020). Thus, there is a critical need for scholarly research to pivot toward addressing these ethical concerns and evaluating the effectiveness of existing best practices in mitigating them. Only through a comprehensive examination of the ethical dimensions of AI adoption can businesses truly harness its potential while minimizing risks and ensuring responsible deployment in real-world scenarios.

Ethical concerns and challenges associated with AI adoption

While the literature on the ethical concerns and challenges associated with AI adoption in business offers valuable insights, it also exhibits certain limitations and areas for improvement [2, 40, 53, 58, 67]. Despite the rigorous examinations of algorithmic bias, fairness issues, and societal consequences, there remains a tendency to overlook the practical implementation of ethical frameworks within business contexts [51, 68, 69]. The discussions around privacy and data protection often lack concrete recommendations for businesses to navigate the complex regulatory landscape effectively [70, 71]. Furthermore, while the societal impact of AI on human labor is explored, there is a need for deeper analyses of the power differentials exacerbated by AI adoption and their implications for social justice and economic inequality [72, 73], [74].

Additionally, the sector-specific explorations in healthcare and finance fail to adequately address the intricacies of implementing ethical practices within these industries, where regulatory compliance and ethical considerations often diverge [75–77]. Moreover, while the literature acknowledges the importance of examining emerging technologies like autonomous systems and quantum computing, there is a lack of practical guidance on integrating ethical considerations into the development and deployment of these technologies within business environments [78–80].

Thus, while the existing literature lays a foundation for comprehending the ethical landscape of AI adoption,

there is a conspicuous need for more actionable insights and practical recommendations tailored specifically to the business context. Addressing these identified gaps is essential to effectively tackle the ethical concerns and challenges associated with AI adoption in business settings.

Existing frameworks and guidelines for ethical AI implementation in business

The literature meticulously evaluates existing frameworks and guidelines aimed at promoting ethical AI implementation across various business contexts [81–84]. Scholars delve into global initiatives, regulatory frameworks, and industry-specific guidelines to delineate ethical standards for AI development and deployment [44, 45, 85–87]. While these analyses reveal insightful commonalities and discrepancies among these frameworks, they often neglect to address the practical challenges of implementation [88, 89]. Notably, there is a dearth of empirical evidence demonstrating the actual effectiveness of these frameworks in real-world business settings [90]. Moreover, the literature tends to overlook the intricate complexities and barriers encountered by businesses in adhering to these ethical standards, including resource constraints, conflicting priorities, and organizational resistance to change [91, 92]. Consequently, although the existing frameworks provide valuable guidance, there is an urgent need for more pragmatic insights and strategies to facilitate their effective implementation across diverse business environments [67].

The exploration of ethical considerations across different cultural and geographical contexts expands the scope of the literature review, acknowledging the global nature of AI adoption [93–95]. Understanding how diverse cultures perceive and address ethical challenges in AI applications is essential for developing inclusive and culturally sensitive ethical guidelines ([96], [97]. However, while the literature acknowledges the significance of cultural diversity in shaping ethical frameworks, it often lacks detailed insights into specific cultural nuances and their implications for ethical AI deployment [40]. Furthermore, empirical research exploring how cultural factors influence the implementation and effectiveness of ethical AI practices in business contexts is notably lacking [88]. Therefore, while cultural diversity is recognized as a crucial aspect of ethical AI adoption, there remains a critical need for further research to unpack its complexities and inform the development of more contextually relevant ethical guidelines.

Synthesizing these three key strands of literature underscores the fact that while AI technologies offer unprecedented opportunities for businesses, they also introduce a complex web of ethical challenges. As businesses strive to capitalize on the manifold benefits of AI, a robust understanding of these challenges is imperative [83]. The existing literature, abundant in insights and diverse perspectives, serves as the backdrop against which this paper makes a significant contribution—a detailed examination of the ethical implications of AI adoption in business. This analysis not only provides critical insights into the challenges posed by AI but also presents a comprehensive set of best practices to guide ethical AI deployment, aligning technological advancements with societal values and ethical principles. However, while the literature offers a valuable foundation for understanding the ethical landscape of AI adoption, there is an evident need for more empirical research and practical guidance to effectively address the identified ethical concerns.

Identifying the literature gap

In this study, we address several critical gaps in the prior literature on the ethical implications of AI adoption. For example, prior literature mainly focuses on AI's impact on business transformation, such as efficiency, innovation, employment, and decision making but ignores the ethical challenges related to AI adoption. Furthermore, existing literature highlights the operational efficiency of AI adoption but lacks discussion on important ethical issues like algorithmic bias, data privacy, job displacement, and accountability [2, 49, 64]. Although there are a few studies that emphasize the ethical dilemmas of AI adoption, they are concentrated on sector-specific contexts (e.g., healthcare and finance) through discussion. However, the AI adoption literature lacks discussion on multi-sector businesses or the practical implementation of ethical frameworks [75, 77]. Overall, existing guidance for ethical AI adoption remains mainly theoretical, with limited discussion on the practical challenges faced by businesses of multiple sectors or of different scales and sizes. Specifically, discussions on resource constraints, regulatory compliance, and organizational resistance to change remain unexplored areas [89, 91]. Moreover, the influence of cultural and contextual variations on how organizations in different regions approach and prioritize ethical AI adoption is an important but unexplored aspect [93, 95]. Our study attempts to address these gaps through a data-driven approach. We discuss how the

Table 1 Comparative analysis of existing studies on ethical implications of AI adoption in business

Criteria	Previous studies	This study	Unique Contribution
Focus of study	Sector-specific (healthcare, finance, etc.) or general AI ethics	Comprehensive focus on business sector-specific ethical issues	Tailored insights into ethical issues specific to the business context
Scope of ethical issues	Focus on limited issues like bias, privacy, and accountability	Comprehensive exploration of multiple ethical issues	A holistic view of AI's ethical challenges in business
Theoretical foundation	Emphasis on conceptual/theoretical models for AI ethics	Empirical analysis with theoretical grounding	Empirical validation of ethical challenges across demographics
Demographic factors	Limited exploration of demographic factors (gender, country, etc.)	Analyzes variation across gender, age, profession, country, and age of organizations	Unique analysis of demographic variations in ethical considerations
Data and methodology	Conceptual or sector-specific case studies	Data-driven analysis using organizational data	Empirical evidence supporting the role of demographics in ethical challenges
Guidelines and best practices	General principles or conceptual frameworks	Actionable best practices for businesses	Specific, practical guidance for businesses on ethical AI implementation
Nature of ethical concerns	Limited to certain key concerns (like fairness and bias)	Comprehensive exploration of 9 + ethical concerns	Recognition of contextual factors affecting ethical AI adoption
Consideration of cultural context	General discussions on cultural considerations	Detailed analysis of cultural differences in ethical concerns	Addresses global variation in ethical AI practices
Contribution to literature	Theoretical exploration, conceptual frameworks	Empirical validation, comparative analysis, contextual insights	Bridges theory and practice by providing empirical insights
Empirical evidence	Conceptual, anecdotal, or small-sample case studies	Empirical data from diverse firms and countries	Empirical evidence from diverse industries and organizations

ethical challenges of AI adoption vary across organizations of different sizes, regions, and domains.

Theoretical and practical contributions and implications

In this study, we make notable theoretical and practical contributions while also discussing the challenges related to the practical implementation of ethical AI adoption in business. Our work demonstrates that the conventional "one-size-fits-all" approach is not appropriate. We discuss how demographic factors and variations in organizational maturity (size, age, etc.) play a role in this context, thereby providing a more contextualized perspective on ethical AI adoption. Moreover, we emphasize overlooked dimensions such as power imbalances, social justice, and environmental impact. Highlighting the concept of "ethical agility," we stress the need for continuous adaptation of ethical guidelines to match the evolving nature of AI technology and its usage in business. We further underscore the importance of flexible, context-aware models for ethical AI adoption in future research (Sheikh, 2020; [98]).

More practically, we offer evidence-based practices for ethical AI adoption that go beyond abstract guidelines and can be implemented in business operations. The actionable guidelines discussed in our work can be utilized by various stakeholders, such as business leaders and regulators, to identify key ethical risks and develop targeted strategies to address privacy breaches, algorithmic bias, and issues related to accountability and transparency.

We also highlight the need to foster a culture of ethical responsibility through collaboration, stakeholder engagement, regular audits, and organizational training. Table 1 underscores this study's unique approach, emphasizing its comprehensive ethical analysis, demographic insights, and practical business guidance.

Data and methodology

The study relies on the data collected through online questionnaire (surveyheart.com) between the period July 2023 and December 2023 using probability sampling technique. The dataset used in the study is extensive and contains a total of 1053 valid datapoints. The variables used in the study are directly related to the questionnaire.[1] Table 2 shows the descriptive statistics of the sample. The gender ratio of the sample is almost balanced as male (48%) and female (52%), respectively. The data represent a total of 13 different countries namely Bosnia and Herzegovina (12%), Serbia (20%), Croatia (21%), Slovenia (13%), Austria (11%), Germany (9%), Italy (1.3%), Hungary (2.3%), Bulgaria (2.1%), Romania (2%), China (1.4%), RN Macedonia (2.6%), and Switzerland (0.6%). The obtained data sample belongs to the educated populations with following qualifications as high school (15.6%),

[1] The dataset and questionnaire online at Mendeley. Please have a look into the following link https://data.mendeley.com/datasets/xgz6rmxj84/1.

Table 2 Descriptive statistics of the sample

Age		Gender	
Under 18	30	Male	510
19–24	160	Female	543
25–34	322		
35–44	354	Country	
45–54	127	Bosnia and Herzegovina	128
55–64	54	Serbia	215
Above 65	6	Croatia	225
		Slovenia	139
Education		Austria	120
High school	164	Germany	97
Some college	201	Italy	14
Vocational	81	Hungary	24
Associates	57	Bulgaria	22
Bachelors	187	Romania	21
Masters	172	China	15
Professional	110	RN Macedonia	27
Doctorate	81	Switzerland	6

Table 3 Professional details of the sample

Profession area		Age of organization	
Agribusiness	40	1 to 10	66
Tourism	33	11 to 20	127
Management	24	More then 21	859
Geography	29	Not sure	1
Ecology	25		
Government	22	Experience in current organization	
Economics	28	Less than 5 years	344
Forestry	11	6 to 15	454
Education	36	16 to 24	198
Real estate	103	More than 25	57
FMCH	162		
Chemistry	46	Total experience	
Transportation	252	Less than 5 years	178
Healthcare	138	6 to 10	316
Public relations	104	11 to 20	377
		21 to 30	144
		More then 31	38

some college (19.1%), trade/vocational/technical (7.7%), associates (5.4%), bachelors (17.7%), masters (16.3%), professional (10.4%), and doctorate (7.7%).

Similarly, Table 3 details the professional details of the respondents. It is mixed in terms of different profession areas with wide-ranging of total years of working experiences as following: agribusiness (3.8%), tourism (3.1%), management (2.3%), geography (2.7%), ecology (2.4%), government (2.1%), economics (2.6%), forestry and protection (1%), education (3.4%), real estate (9.8%), FMCG (15.4%), chemistry (4.4%), transportation (24%), healthcare (13.1%), and public relations (9.9%). Tables 1 and 2 estimates suggest that

the study sample is diverse (gender, age, country, education, profession, and others) that is essential for robust analysis, and validity of the study.

To examine the ethical concerns and challenges associated with AI, the present study frame following research hypotheses based on the literature discussed in Sect. "Literature Review":

I. Ethical concerns may challenge the adaptation of AI in business.
II. These challenges are likely to vary across gender, age group, country, profession area, and age of the organizations.
III. Best practices for managing the ethical implications of AI adoption in business are likely to be effective in mitigating ethical risks associated with AI adoption.

To test the above hypotheses, it deploys various methodologies such as t-test, ANOVA (Analysis of variance), and graphs. It is explained in more details in the subsequent section.

Results and discussion

To test the first hypothesis of whether ethical concerns may challenge the adaptation of AI in business. The respondents were asked to rank each of these challenges in the scale of low, moderate, and high as shown in Fig. 1.

The estimates (Fig. 1) suggest that ethical challenges of AI adoption in business are diverse (as mentioned by Due & Xie, 2021), and maximum respondents rated either moderate or high for each of these challenges namely data protection and privacy, biases, transparency and explainability, job displacement, algorithmic influences and manipulation, accountability and liability, and ethical decision making. It indicates that there are ethical concerns that may challenge the adaptation of AI in business concurring with study by Eitel-Porter [43].

The study's next research question is whether these above listed challenges (as shown in Fig. 1) are likely to vary across the groups such as gender, age, country, and profession area. The study deploys a t-test and ANOVA (Analysis of variance) to examine the differences among the groups. It deploys a t-test to examine the differences among the gender (male and female), and the estimates are shown in Table 4. The obtained estimates indicate that for "Job displacement and workforce changes" and "Algorithmic influence and manipulation," a statistically

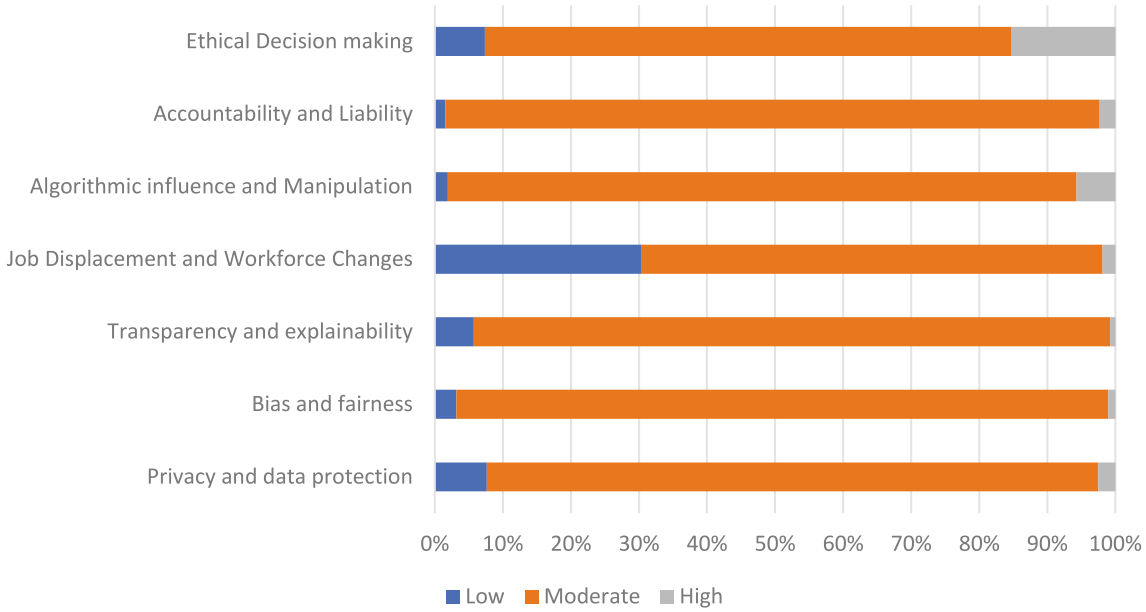


Fig. 1 Ranking of different ethical challenges by the respondents

Table 4 t-test estimates for gender

	t Stat	P(T < = t) one-tail	P(T < = t) two-tail
Privacy and data protection	0.4251	0.3354	0.6708
Bias and fairness	0.5046	0.3070	0.6139
Transparency and explainability	−0.6953	0.2435	0.4870
Job displacement and workforce changes	−1.6556	0.0491*	0.0981#
Algorithmic influence and manipulation	−1.6771	0.0469*	0.0938#
Accountability and liability	−0.2777	0.3906	0.7813
Ethical decision making	−0.8179	0.2068	0.4136

* significant @ 5% level, and #significant@ 10% level

significant variations are observed among the gender (like the observations made by [50]).

The t-test is useful only to deal with two groups. The age, country, and professional area are clustered into multiple categories (more than two). However, to deal with such multiple groups, ANOVA is advisable.

Following, ANOVA tests are performed to examine the differences among the groups namely age, country, and professional area, and the estimates are shown in Table 5. The P-values suggest a statistically significant variation among the ages for "Transparency and explainability." "Job displacement and workforce changes," "Accountability and liability," and "Ethical decision making," respectively. Similarly, a statistically significant variations are observed for the country (Privacy and data protection, transparency and explainability, job displacement and workforce changes, algorithmic influence and manipulation, and ethical decision making), and profession area (Privacy and data protection, bias and fairness, transparency and explainability, job displacement and workforce changes, and ethical decision making) groups for various challenges of AI adoption in business as shown in Table 5.

The likely reasons for such variations (Tables 4 and 5) in these challenges could be many such as the complexity of the AI system itself, economic condition of the country, cultural differences, gender discriminations, nature of profession, stage of life cycle, social media, and technological disruptions. Let us try to understand it one by one. A complex AI system is difficult to adapt and understand. Such systems give rise to several ethical challenges related to transparency, accountability, and bias [99]. The economic status of any nation can greatly influence the ethical behaviors among the people [100]. A sound economy has more prospects for overall development, and citizens of such nations expect to bear a good ethical

Table 5 ANOVA test estimates for age, country, and profession area

	Age		Country		Profession Area	
	F	*P*-value	F	*P*-value	F	*P*-value
Privacy and data protection	0.8534	0.5288	12.5247	0.0000*	4.1935	0.0000*
Bias and fairness	0.8130	0.5598	1.4606	0.1330	1.8702	0.0258*
Transparency and explainability	2.1093	0.0498*	11.4167	0.0000*	3.6942	0.0000*
Job displacement and workforce changes	4.8137	0.0001*	4.6189	0.0000*	4.0774	0.0000*
Algorithmic influence and manipulation	0.6408	0.6977	5.9151	0.0000*	1.6633	0.0577
accountability and liability	2.5052	0.0206*	1.7502	0.0520	0.7731	0.6994
Ethical decision making	5.6186	0.0000*	6.6268	0.0000*	5.9140	0.0000*

* significant @ 5% level

conduct. On the other hand, an individual from disruptive economy may faces difficulty and act unethically to maintain their livelihood. Difference in the cultural has a direct impact on the individual's ethics and moral values. Social expectations and gender discriminations often lead to ethical challenges [101]. Then, the context of ethical dilemma varies from profession to profession [102]. Similarly, persons of dissimilar ages have different choices and preferences that often influences the individual ethical perspective [101]. Growth of social media and internet has introduced new ethical challenges related to privacy, data security, and online behavior that vary across age groups and countries (Stahl et. al, 2022). In addition to the above due to combined effects, these ethical challenges of AI adoption in business are likely to vary across gender, age group, country, and profession area.

The study by [103] highlighted that code of ethics of an organization generally have a long tradition and it evolves over a period. Thus, age of an organization can impacts its ethical concerns in many ways as follows. An older organization may have well-established organizational culture and ethical codes in place by its leadership. On the other hand, a young organization may not have the well-established ethics programs, and ethical culture in workplace. But, they have an advantage of flexibility in adapting the changing ethical landscapes and resistance to change as compare to the older organizations. Following, the present study inspects whether these ethical challenges of AI adoption in business (Fig. 1) are likely to vary across the age of organizations, and the estimates are shown in Table 6. The ANOVA test results confirm that the age of an organization can impact its ethical concerns of AI adoption in business in several grounds such as "Privacy and data protection," "transparency and explainability," and "Job displacement and workforce changes."

Table 6 ANOVA test estimates for age of organizations

	F	P-value
Privacy and data protection	4.8919	0.0022*
Bias and fairness	0.4956	0.6854
Transparency and explainability	3.1269	0.0251*
Job displacement and workforce changes	2.7833	0.0398*
Algorithmic influence and manipulation	0.4616	0.7092
Accountability and liability	1.2878	0.2772
Ethical decision making	0.0105	0.9985

* significant @ 5% level

To test the last hypothesis of the study whether best practices for managing the ethical implications of AI adoption in business are likely to be effective in mitigating the associated ethical risks. Respondents are asked the following set of questions on best practices for addressing the ethical implications of AI adoption in business as shown in Table 7. Majority of the respondents answered positive about best practices for managing the ethical implications of AI adoption in business are likely to be effective in mitigating the associated ethical risks. It suggests that there is a growing concern for data privacy, security, biases, transparency, and accountability in AI systems. AI applications in businesses would induce change in existing work. Hence, businesses should design best practices and invest in upgrading the work force to adapt these changes.

Theoretical contribution

The present study shows empirically that there exists a complex dynamic among ethical concerns, AI adoption, demographics, and organizational factors. It contributes to the understanding of the non-technical barriers of ethical concerns that may challenge the adaptation of artificial intelligence (AI) in business. The present study

Table 7 Respondents responses on best practices for addressing the ethical implications of AI adoption in business

	Yes	No	Unsure
Should business have clear policies and guidelines regarding collection and use of personal data in AI systems?	1014	9	27
Should organizations be held responsible for addressing and mitigation biases in AI systems?	996	0	54
Should businesses be required to provide explanation for the decisions made by AI systems?	1014	3	33
Should business invest in reskilling and upskilling programs to address the potential impact of employment?	741	165	144

Table 8 Summary of group variation analysis

	Age	Gender	Country	Profession Area	Age of Organizations
Privacy and data protection			✓	✓	✓
Bias and fairness				✓	
Transparency and explainability	✓		✓	✓	✓
Job displacement and workforce changes	✓	✓	✓	✓	✓
Algorithmic influence and manipulation		✓	✓		
Accountability and liability	✓				
Ethical decision making	✓		✓	✓	

shows empirically that these challenges (Privacy and data protection, bias and fairness, transparency and explainability, job displacement and workforce changes, algorithmic influence, and manipulation, accountability and liability, and ethical decision making) vary across gender, age group, country, profession area, and age of the organizations as shown in Table 8.

There is the need for a holistic understanding of these factors in addressing ethical challenges in AI adoption. Lastly, the study shows that best practices (See Table 7) for managing the ethical implications of AI adoption in business will be effective in mitigating the associated ethical risks. This contributes to the development of guidelines and frameworks for organizations to navigate ethical issues related to AI adoption effectively.

Practical contribution

The present study tries to provide a direction to businesses those are looking to adopt AI systems. It highlights the importance of business ethics, and businesses can use the study findings to develop strategy to integrate ethical practices while adopting an AI system. Second, by understanding the variations of various ethical challenges across diverse demographics and organizational dimensions can help businesses in tailor their approaches to address these challenges more efficiently. Additionally, businesses while developing policies or training programs can take these challenges into account while dealing with these specific groups. Lastly, the present study encourages businesses to adopt best practices for managing the ethical implications of AI adoption to mitigate the risk such as reputational damages and litigation issues.

Conclusions

This study has illuminated the intricacies and viability of integrating AI into business operations, with a particular focus on the ethical considerations involved. Leveraging data gleaned from a meticulous online survey conducted between July 2023 and December 2023, and employing a range of statistical methodologies, including t-tests and ANOVA, we have delved into the multifaceted landscape of ethical challenges confronting AI adoption across various demographic and organizational dimensions. Our findings underscore the formidable hurdles posed by ethical concerns such as data protection and privacy, biases, transparency and explainability, job displacement, algorithmic influences and manipulation, accountability and liability, and ethical decision making in the realm of AI integration within business environments. Moreover, our research reveals that these challenges manifest differently across different segments, including gender, age group, country, profession area, and organizational age, underscoring the imperative for a nuanced understanding of these factors to effectively address the ethical quandaries associated with AI adoption.

Importantly, our study emphasizes the criticality of instituting best practices to manage the ethical ramifications of AI adoption in business settings. The overwhelming majority of respondents expressed confidence in the efficacy of such practices in mitigating associated ethical risks, indicative of a burgeoning

awareness and concern for issues surrounding data privacy, security, biases, transparency, and accountability in AI systems. Looking ahead, future studies could explore the longitudinal effects of AI adoption on ethical considerations within diverse organizational settings. Moreover, investigating the efficacy of novel approaches to managing ethical implications and assessing the impact of regulatory frameworks on AI adoption practices could further enrich our understanding of this complex landscape. Then, other potential area to study is on the ethical concern involves the environmental impact of AI, particularly in terms of energy consumption [98, 104, 105]. Ultimately, continued research in this domain will be instrumental in fostering responsible AI deployment and ensuring ethical integrity in business operations.

Abbreviations

AI	Artificial Intelligence
ANOVA	Analysis of variance
FMCG	Fast-moving consumer goods

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Declarations

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