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Interactive Legal Consultation Platform: Connecting Users and Lawyers for Civil and Criminal Cases

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ABSTRACT: This platform, in a technological innovation sense, has been meant to fill this gap between these professionals and potential litigants seeking advice or redress. The overall modules that run this system can be classified mainly into two-user and lawyer-that contain complete functional facilities for interacting without hassle, providing maximum clarity and transparency on each process. Detailed lawyer profiles allow users to make informed choices based on expertise, experience, and user ratings. The platform supports real-time chat, enabling direct consultations with lawyers. Users can also post their case details anonymously to a community forum to seek diverse perspectives and feedback from professionals and peers. Additionally, users receive tailored case advice from lawyers to address specific legal concerns effectively. This acts as a professional hub for lawyers to show-off their expertise. They can show off their information by adding extensive profiles and interact with users for resolving their queries. Lawyers can be able to sift through community posts and sort the case out according to specialty, so one can focus upon areas of interests and expertise. Users and lawyers both can work on profile management tools, maintaining an updated presence and professionalism throughout. Real-time notifications, chat functionalities, and a rating system further enhance interaction and build trust within the platform. The system promotes accessibility to legal resources, transparency, and efficient communication between users and legal experts.

KEYWORDS: Accountable artificial intelligence, Artificial intelligence (AI), AI ethics, AI ethics principles, challenges, machine ethics.

I. INTRODUCTION

Artificial Intelligence (AI) is expanded across a vast array of industries, including health, manufacturing, agriculture, and banking [1]. AI technologies have the potential to substantially transform society and offer various technical and societal benefits, which are expected to happen from high-level productivity and efficiency. In line with this, the ethical guidelines presented by the independent high-level expert group on artificial intelligence (AI HLEG) highlight the following [2].

“AI is not an end in itself, but rather a promising means to increase human flourishing, thereby enhancing individual and societal well-being and the common good, as well as bringing progress and innovation.”

However, the promising advantages of AI technologies have been considered with worries that the complex and opaque systems might bring more social harms than benefits [1]. People start thinking beyond the operational capabilities of AI technologies and investigating the ethical aspects of developing

Concomitant with advances in AI systems, we witness the ethical failure scenarios. For example, a high rate of unsuccessful job applications that were processed by the Amazon recruitment system was later found biased in analysis of the selection criteria against women applicants and triggered discriminatory issues [3]. Since decisions and recommendations made by AI systems may undergo people lives, the need for developing pertinent policies and principles addressing the ethical aspects of AI systems is crucial. Otherwise, the harms caused by AI systems will jeopardize the control, safety, livelihood, and rights of people. AI systems are not only concerned with technical efforts but also need to incorporate the social, political, legal, and intellectual aspects. However, AI's current state of ethics is

broadly unknown to the public, practitioners, policy, and lawmakers [4], [5]. Extensively, the ethically aligned AI system should meet the following three components through the entire life cycle [2]:

1) compliance with all the applicable laws and regulations; 2) adherence to ethical principles and values; and 3) technical and social robustness. To the best of our knowledge, there is a dearth of empirical study to uncover the above core components in the view of industrial practitioners and lawmakers. For instance, as will be elaborated in Section VII, Vakkuri et al. [4] conducted a survey study to determine industrial perceptions based only on four AI ethics principles. Lu et al. [6] conducted interviews with researchers and practitioners to understand the AI ethics principles implications and the motivation for rooting these principles in the design practices. Similarly, Leikas et al. [7] mainly focused on AI ethics guidelines. Given the lack of empirical studies exploring principles and challenges associated with AI ethics, we strive to answer the following research questions:

Rationale: RQ1 aims to digest the perceptions of practitioners and lawmakers to empirically evaluate the systematic literature review (SLR) study-based identified AI ethics principles and challenges [8]. The answer to RQ1 provides a better understanding of the most common AI ethics principles and challenges with respect to practitioners and lawmakers' point of views.

RQ2: What would be the severity impacts of identified challenges across the AI ethics principles?

Rationale: RQ2 aims to measure the severity impacts of challenging factors across AI ethics principles. The answer to RQ2 would inform practitioners for the most severe challenges before initiating the AI ethics activities.

RQ3: How these challenges and principles are differently perceived by practitioners and lawmakers?

Rationale: The empirical data were collected from two types of populations (practitioners and lawmakers). The answer to RQ3 would portray a better understanding of significant differences between the opinion of targeted populations for AI ethics principles and challenges.

To address these RQs, we conducted a survey study by encapsulating the views and opinions of practitioners and lawmakers regarding AI ethics principles and challenges by collecting data from 99 respondents across 20 different countries. The rest of this article is structured as follows. Section II details the study background, and Section III presents the research methodology. Results and discussions are reported in Section IV. The key findings, along with the research and practical implications, are contextualized in Section V. Threats to the study findings are discussed in Section VI, and the related work review is provided in Section VII. Finally, Section VIII draws conclusions and potential future avenues.

II.BACKGROUND

Generally, AI ethics is classified under the umbrella of applied ethics, which mainly concerns with ethical issues associated with developing and using AI systems. It focuses on linking how an AI system could raise worries related to human autonomy, freedom in a democratic society, and quality of life. Ethical reflection across AI technologies could serve in achieving multiple societal purposes [2]. For instance, it can stimulate focusing on innovations that aim to foster ethical values and bring collective well-being. Ethically aligned or trustworthy AI technologies can flourish sustainable well-being in society by bringing prosperity, wealth maximization, and value creation [2].

It is vital to understand the development, deployment, and use of AI technologies to ensure that everyone can build a better future and live a thriving life in the AIbased world. However, the increasing popularity of AI systems has raised concerns such as reliability and impartiality of decision-making scenarios [2]. We need to make sure that decision-making support of AI technologies must have an accountable process to ensure that their actions are ethically aligned with

human values that should not be compromised [2].

However, some researchers claim that the extant AI ethics guidelines and principles are not effectively adopted in industrial settings. McNamara et al. [12] conducted an empirical study to understand the influence of the ACM code of ethics in the software engineering decision-making process. Surprisingly, the study findings reveal that no evidence has been found that the ACM code of ethics regulates decision-making activities. Vakkuri et al. [13] conducted multiple interviews to know the status of ethical practices in the domain of the AI industry. The study findings uncover the fact that various guidelines are available; however, their deployment in industrial domains is far from being mature. The gap between AI ethics research and practice remains an ongoing challenge. To bridge this gap, we previously conducted an SLR study to provide a comprehensive and state-of-the-art overview of AI ethics principles and challenges [8]. A total of 27 primary studies are identified, and the systematic overview of the identified studies reveals 22 AI ethics principles.

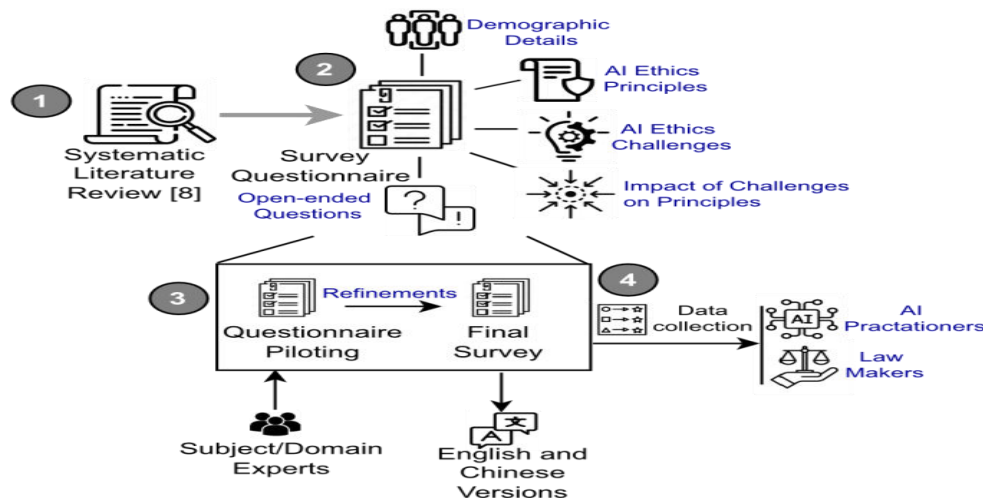


Fig. 1. Overview of the research methodology.

III. METHODOLOGY

We deemed two groups of research participants that would be relevant to this survey—AI practitioners and lawmakers. On one hand, practitioners often make the design decisions and have higher ethical responsibilities compared to others. Practitioners often make the design decisions of complex autonomous systems with less ethical knowledge. The magnitude of risks in AI systems makes practitioners responsible for understanding ethical attributes. To achieve reliable outcomes, it is essential to know the practitioners' understanding of AI ethics principles and challenges.

On the other hand, law resolves everyday conflicts and sustains order in social life. People consider law an information source as it impacts social norms and values [14]. The aim of considering this type of population (lawmakers) is to understand the application of the law to AI ethics. The data collected from legislation personnel will uncover the question, of whether standing AI ethics principles are sufficient, or is there a need for innovative standards [14]?

We used industrial collaboration contacts to search the AI practitioners and sent a formal invitation to participate in this survey. Moreover, various law forums across the world were sought, contacted, and requested to participate in this study. The targeted populations were approached using social media networks, including LinkedIn, WeChat, ResearchGate, Facebook, and personal email addresses. The overview of research methodology is shown in Fig. 1.

The survey instrument consisted of four core sections: 1) demographics; 2) AI ethics principles; 3) challenges; and 4) challenges impact on principles. The survey questionnaire also includes open-ended questions to know the novel principles and challenges that were not identified in the SLR study [8]. The Likert scale is used to evaluate the significance of each principle and challenge and assess the severity level of the challenging factors. The survey

instrument is structured both in English and Chinese language. The software industry in China is flourishing like never before, where AI is taking the front seat and is home to some of the leading technology giants in the world, such as Huawei, Alibaba, Baidu, Tencent, and Xiaomi. China is emerging as the global leader in the AI industry. The hype in the U.S.–China AI rivalry is an alarm over China’s rapid growth overtaking USA in the AI industry a decade ahead [15]. By 2025, China plans to achieve major breakthroughs in AI research and become a world-leading producer of critical AI applications. The country also plans to grow the AI industry by over 400 billion yuan (U.S. \$61.4 billion) and aims to develop and upgrade ethical standards for AI in law [15].

However, in this study, it would be challenging to collect data from the Chinese industry because of the language barriers. Mandarin is the national and official language in China, unlike USA or India, where English is commonly used for official purposes. Therefore, the Chinese version of the survey instrument is developed to cover the major portion of the targeted population. Both English and Chinese versions of the survey instrument are available online for replication [16].

The piloting of the questionnaire is performed by inviting three external subject/domain experts. The experts’ suggestions were mainly related to the overall design and understandability of the survey questions. The suggested changes were incorporated, and the survey instrument was finalized based on the authors’ consensus (see Fig. 1). The final survey instrument was online deployed using Google forms (English version) and Tencent questionnaire (Chinese version). The first two authors engaged with the data collection process, while the next coauthors frequently monitored/screened the participants’ responses. The data collection process was started in September 2021 and ended up in April 2022 with initial 107 total responses. It should be noted that we provided the consensus details in the information sheet of the survey questionnaire [16] and only considered the agreed responses for further analysis.

The manual screening revealed that eight responses were incomplete and we only considered 99 responses for the final data analysis. The third author mainly extracted and analyzed the survey data. The descriptive data were analyzed using the frequency analysis approach. The frequency-based tables and charts are created for the identified AI ethics principles and challenges (see Section IV). Frequency analysis is more suitable for analyzing a group of variables and for both numeric and ordinal types of data [17]. The significance of identified AI ethics principles and challenges is evaluated based on the level of agreement between the two types of populations (AI practitioners and lawmakers) (see Section IV-D). The same data analysis approach has been used in different other.

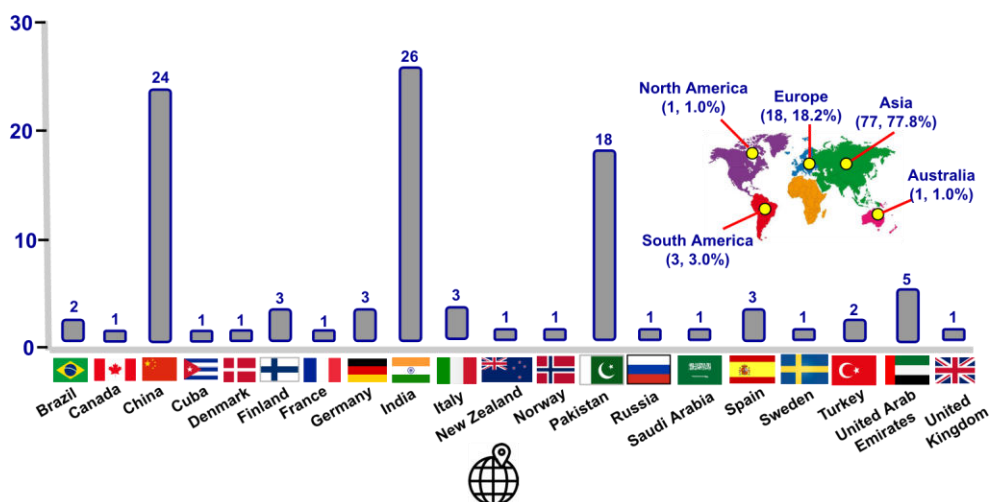


Fig. 2. Geographical distribution of survey participants

IV. RESULTS AND DISCUSSION

We now present the final results and discussions of the survey findings based on the final agreement of all the authors: 1) demography details of survey participants; 2) survey participants’ perceptions of AI ethics principles and challenges; 3) severity impact of identified challenges across the AI ethics principles; and 4) statistically significant differences

between opinion of both types of populations (practitioners and lawmakers) for the identified principles and challenges.

A. Demographic Details

Frequency analysis was performed to organize the descriptive data. We noticed that 99 respondents from 20 countries across five continents with nine roles and ten different backgrounds participated in the survey study (see Figs. 2 and 3). The organizational size (number of employees) of survey participants mostly ranges from 50 to 249, which is 28% of the total responses [see Fig. 3(a)]. We mapped the respondents' roles across nine different categories using thematic mapping [see Fig. 3(b)]. The final results show that most of the respondents (29%) are classified across the law practitioner category. Similarly, the working domains of the participants' organizations are conceptually framed in ten-core categories and the results revealed that most (19%) of the organizations are working on smart systems [see Fig. 3(c)].

Participants were asked to explain their opinions to perceive the significance of AI ethics in their respective organizations. The majority of the participants positively agreed. For instance, 77% mentioned that their organizations consider ethical aspects in AI processes or develop policies for AI.

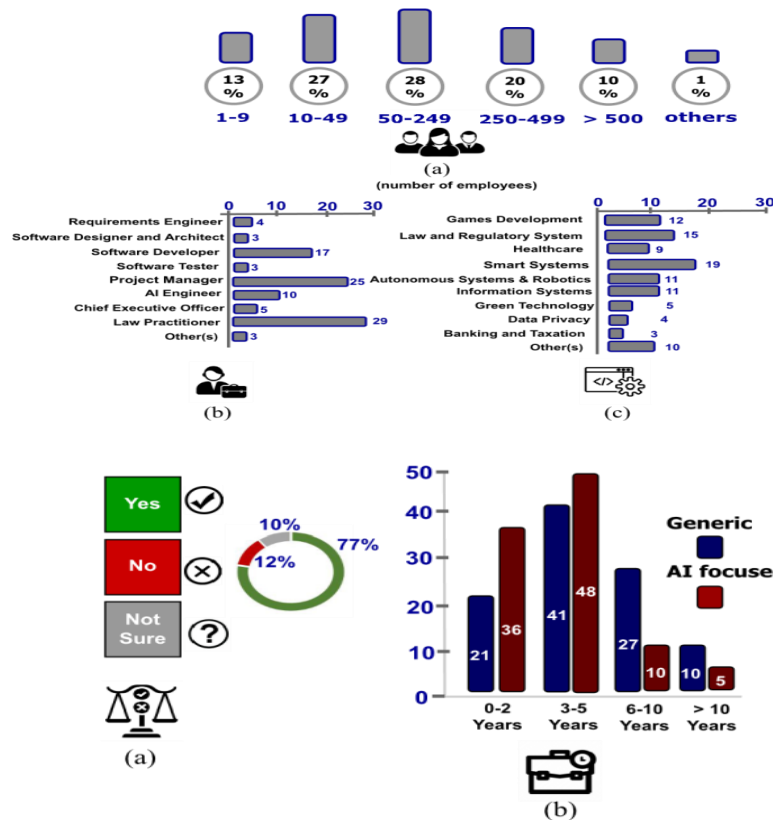
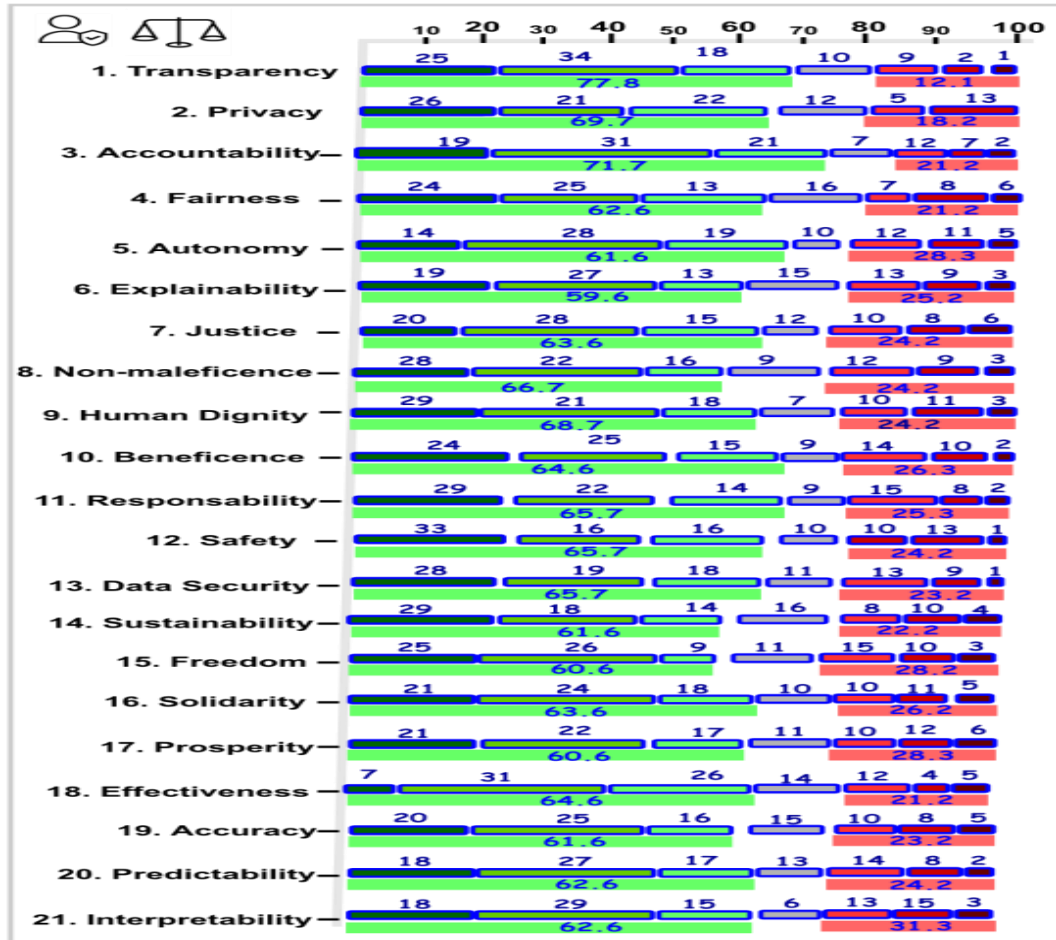
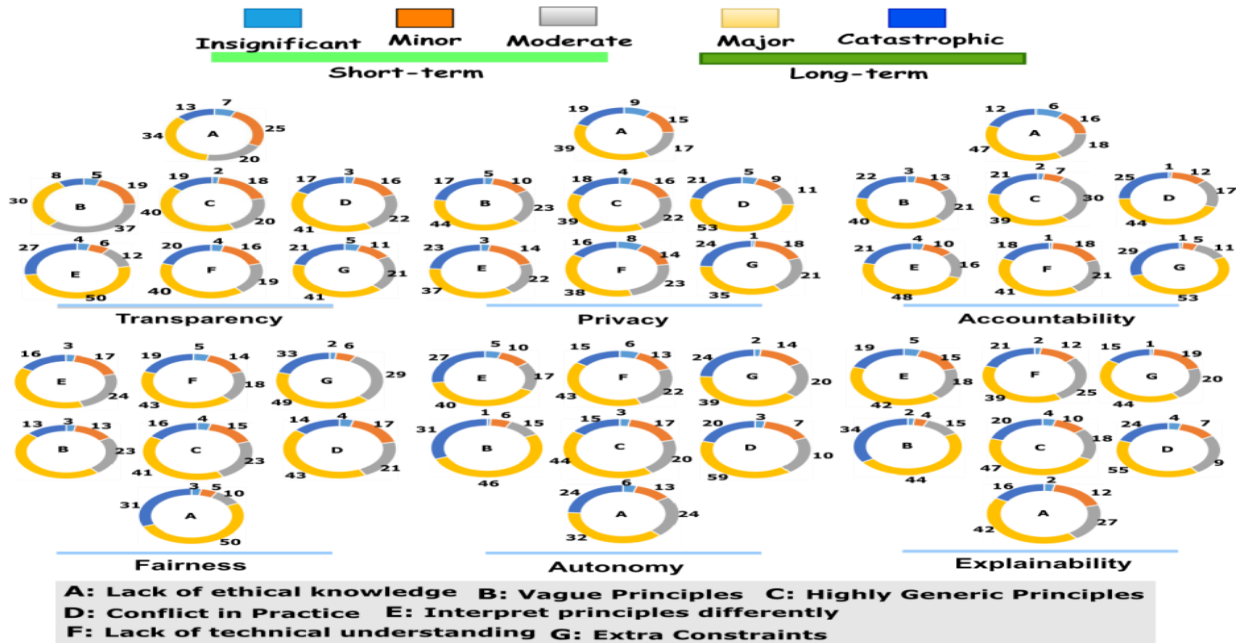


Fig. 3. Organization size, professional roles, and product type. (a) Size of Organisation. (b) Professional Roles. (c) Types of Software/Systems.





Overall, we could interpret that conflict in practice is the most severe challenge, and its average occurrence is >60% for all the principles. It gives a general understanding to propose specific solutions that focus on tackling the opinion conflict regarding the real-world implication of AI ethics principles. The results further reveal that lack of ethical knowledge has an average (28%) short-term impact across selected AI ethics principles. The lack of knowledge gap could be covered by conducting training sessions, workshops, certification, and encouraging social awareness of AI ethics [8]. Knowledge increases the possibility of AI ethics success and acceptance in the best practice of the domain.

A. Statistical Inferences (RQ3)

We performed nonparametric statistical analysis [27], [28] to evaluate the significant differences and similarities between the opinion of lawmakers and software practitioners. The same nonparametric statistical analysis is previously performed in different other similar nature of studies [18], [19], [29]. The frequency-based ranking of both datasets is identified for AI ethics principles (see Table I) and challenges (see Table V) to set common measures for nonparametric Spearman's rankorder correlation coefficient. It gives the linear dependence between a set of variables, ranging from (rs (correlation coefficient) =+1 to -1), where +1 indicates a total linear dependency [27], [28].

Significant Differences for AI Ethics Principles: Spearman's rank-order correlation test was applied to statistically evaluate the significant differences between the practitioners and lawmakers perceptions on AI ethics principles. We obtained the Spearman's rank-order correlation coefficient value (rs = 0.819), which is statistically significant (p = 0.000) (see Table II). The value (rs = 0.819) and the scatter plot given in Fig. 8 show the strong correlation between the ranks of both datasets (lawmakers and software practitioners). The identified principles are widely discussed across multiple AI ethics guidelines, and it might be the reason why both practitioners and lawmakers equally agreed with the significance and implications of these principles. For example, transparency is a common AI ethics principle, and practitioners and lawmakers ranked it in the first position. However, we also noticed significant differences (p = 0.000) between both types of the population. For instance, lawmakers ranked fairness at position five as the most important principle; however, the software practitioners placed it at position seven. It shows that fairness across AI activities is relatively important based on lawmakers' perceptions. It is because fairness is a nontechnical and more socially used term. Laws such as EU GDPR impose different other similar nature of studies [18], [19], [29]. The frequency-based ranking of both datasets is identified for AI ethics principles (see Table I) and challenges (see Table V) to set common measures for nonparametric Spearman's rankorder correlation coefficient. It gives the linear dependence between a set of variables, ranging from (rs (correlation coefficient) =+1 to -1), where +1 indicates a total linear dependency [27], [28].

***. Correlation is significant at the 0.001 level (2 tailed).

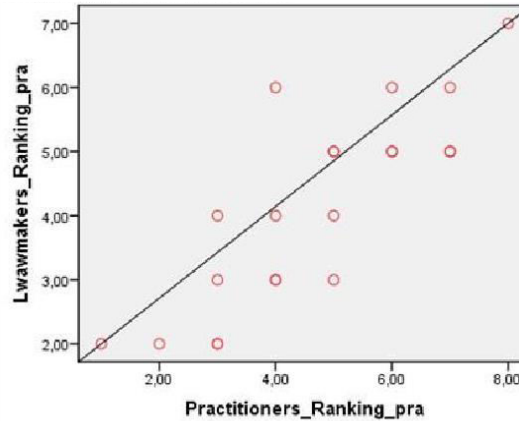


Fig. 6. Scatter plot of ranks for AI ethics challenges.

1) Significant Differences for AI Ethics Challenges: Similar to AI ethics principles, the identified challenges are ranked (see Table V) and applied Spearman’s rank-order correlation coefficient test to measure the significant differences. The correlation coefficient value ($r_s = 0.628$) shows a positive and statistically significant ($p = 0.012$) correlation between both types of population (see Table VI). It indicates a moderate and statistically significant agreement between the opinions of lawmakers and practitioners concerning the AI ethics challenges (see Fig. 9). For example, lacking monitoring bodies is ranked second by the practitioners and fifth by the lawmakers. The practitioners mainly engage in team-oriented activities and are more concerned about human bias [31]. Continuous sociotechnical monitoring ensures delivering reliable, unbiased, and fair outcomes. Avoiding proper monitoring deems to bring high ethical harm to practitioners and increase reputational risk [31].

We also applied the independent t-test (see Tables VII and VIII) to assess the mean differences between both types of the population with respect to AI ethics challenges. The calculated significance value of Levene’s test is ($p = 0.051 > 0.05$); therefore, we assume the variances equally (see Table VII).

The t-test results, assuming equal variances ($t = 1.291$ and $p = 0.207 > 0.05$), show that practitioners and lawmakers consider the significance of identified challenges equally. We could suppose that practitioners and lawmakers are equally aware of the reported challenges and understand their importance. The group statistics for both variables are provided in Table VIII.

Overall, we believe that practitioners and lawmakers are on the same page in considering AI ethics principles and challenges. However, for AI ethics challenges, the perceptions of practitioners and lawmakers are slightly different. We noticed that various AI ethics principles and guidelines are released in private and public sectors, which are very abstract, and incoherent for various stakeholders to implement [32]. The challenges of interpreting these vague principles are different with respect to the targeted group of stakeholders, e.g., industrial and legislation perspectives [32]. In conclusion, there is a gap between high-minded principles and industrial practices, which needs alternative approaches based on mutual industrial and legislation consensus.

A. Summary and Interpretation of the Key Findings

It is because the existing principles are too vague, generic, and no match for specific and complex AI problems. Stakeholders have different perceptions of the challenges raised because of implementing the generic AI ethics principles. A broader consensus of multiple stakeholders, practitioners, lawmakers, and regulatory bodies required to define domain-specific principles and guidelines [33]. Overall, the summary of the findings in Table IX is self-explanatory and encapsulates the core results discussed in Section IV.

A. Research Implications

The core research implications stemming from this study are as follows:

1) We found that most survey respondents agreed to consider the reported principles of AI ethics; however, transparency, accountability, and privacy are identified as the most common principles. The study findings complement

the existing literature by revealing the most critical principles and call for future research to define the best solutions for scaling the highly significant principles in practice [34].

2) Regarding the challenges of AI ethics, the survey results confirm the findings of our recent SLR study [8] and determine lack of ethical knowledge, no legal frameworks, and lacking monitoring bodies as the high-ranked barriers. The identified challenges are core focus areas that need further research to explore the root causes and best practices to mitigate them.

candidates. Furthermore, we explicitly mentioned the characteristics of prospective participants in the survey information sheet [16]. The interpersonal bias in the data collection and analysis process could threaten the internal validity of study findings. However, the survey data are collected, analyzed, organized, and reported based on the final consensus made by all the authors (see Sections III and IV).

A. Construct Validity

It is the extent to which the study constructs are well-interpreted, defended, and measured. In this study, AI ethics principles and challenges are the core constructs. The reliability and authenticity of the selected data sources (platforms) is a possible construct validity threat. This threat has been alleviated by searching social media and professional research networks to identify the most relevant groups or individuals. We thoroughly read the group discussions to ensure that the group members mainly discussed AI ethics issues. Similarly, we explored the profile details and interests of the targeted individuals.

B. External Validity

It is the extent to which the study findings based on a consider the identified principles and challenges for all types of AI systems. However, considering the demographic details of the survey respondents (see Fig. 2), we believe that the study results can support the overall generalizability to some extent.

C. Conclusion Validity

It is the extent to which certain factors affect valid conclusions in empirical research. To lessen this threat, the first two authors mainly participated in the data collection process; however, the next authors participated in the consent meetings to share feedback and review the survey activities (see Section III). Similarly, the third author conducted the data analysis, and the final results were presented based on the feedback shared by all the authors (see Section IV). Finally, all the authors were invited to participate in the brainstorming sessions to discuss the core findings and draw concrete conclusions.

V. RELATED WORK

We review the most relevant existing work classified into two categories, focused on: 1) AI ethics principles and guidelines and 2) AI ethics frameworks. A conclusive summary of the related work provided at the end delineates the extent and contributions of this study.

A. AI Ethics Principles and Guidelines

Lu et al. [6] interviewed 21 practitioners and verified that the particular sample data could be broadly generalized to other contexts. The survey sample size might not be representative to provide a concrete foundation for generalizing the study findings. However, we received 99 valid responses from 20 countries across five continents, having a diverse range of experiences, working in various domains on distinct roles in different size organizations (see Figs. 2–4). We concede that the study findings could not be generalized at a large scale or existing AI ethics principles are broad and do not provide tangible guidance to develop ethically aligned AI systems. Their study findings uncover the fact that AI ethics practices are often considered ad hoc and ignored for continuous learning. Based on the interview findings, Lu et al. [6] proposed a list of patterns and processes, which can be embedded as product features to design a responsible AI system. The proposed design patterns are mainly used to support the core AI ethics principle [36] also conducted an SLR study and defined a software engineering roadmap to develop AI systems. The proposed roadmap covers the entire process life cycle focusing on responsible AI governance, defines process-oriented practices, and presents architectural patterns, styles, and methods to build responsible AI systems by design.

Vakkuri et al. [37] conducted an industrial survey with 249 practitioners to understand and verify the mentioned research gap based on the EU AI ethics guidelines [2]. The survey results highlight that most of the companies ignored considering the societal and environmental requirements for developing AI systems. Moreover, the surveyed

participants largely considered the product customers as the only stakeholders of AI ethics perspectives; however, it is more narrow in the AI domain, covering customers, regulatory bodies, practitioners, and society. Consequently, the focus should be on multiple AI ethics principles, e.g., accountability, responsibility, and transparency.

Ibáñez and Olmeda [38] conducted semistructured interviews with 22 practitioners and two focus groups to know how software development organizations address ethical concerns in AI systems. The interview findings raised various issues related to AI ethics principles and practice, including governance, accountability, privacy, fairness, and explainability. Moreover, the interview participants provide some suggestions to operationalize AI ethics, e.g., promoting domain focus standardization, embracing data-driven organizational culture, presenting a particular code of ethics, and fostering AI ethics awareness. In conclusion, Ibáñez and Olmeda [38] called for a set of actions to distinguish project stakeholders developed a sociotechnical project team and regularly evaluated the AI projects practices, processes, and policies.

B. AI Ethics Frameworks

Vakkuri et al. [39] developed the ECCOLA framework to provide a tool for implementing ethics in AI. ECCOLA aims to assist practitioners, and AI-specific software development organizations in adopting ethically aligned development processes. The proposed framework supports iterative development and consists of a deck of cards (modules) that could be tailored to a specific context. The card mainly defines various themes of AI ethics, which were identified in the existing AI ethics guidelines. The ECCOLA framework is evaluated in both the academia and industrial domain to understand its real-world implications and limitations.

Floridi et al. [40] proposed the AI4People framework comprising five principles and 20 recommendations to lay the foundation for “Good AI Society.” The available sets of AI ethics principles are comparatively synthesized to understand the commonalities and significant differences. The comparison findings reveal four AI ethics principles (beneficence, nonmaleficence, autonomy, and justice) with a new additional principle (explicability) to structure the AI4People framework. Finally, 20 action points were devised to scale the mentioned principles in practice. The overall aim of the proposed framework is to move the dialog forward from theoretical principles to in-action policies. Such policies shield human autonomy, increase social empowerment, and decrease inequality.

Leikas et al. [7] presented a framework that focuses on ethics by design in decision-making systems. The current design approaches, practices, theories, and concepts of autonomous intelligent systems are reviewed to structure the proposed ethical framework. The framework could use to recommend a set of AI ethics principles and practices for a specific scenario. The framework captured the human-centric details of a particular case study and used the details to identify the ethical requirements of concerned stakeholders and transfer them to the design goals. Leikas et al. [7] called for future studies to evaluate the real-world significance of the proposed framework in industrial scenarios.

C. Conclusive Summary

The reported studies [6], [36], [37], [38] are grounded on empirical findings and fine-granular analysis of extant AI ethics principles and guidelines. To complement empiricism in exploring AI ethics principles and challenges, this study explicitly investigated the principles based on the perceptions of two different types of populations (practitioners and lawmakers). Studies [7], [39], [40] are conducted to design various frameworks to operationalize the AI ethics principles; however, no research has yet been done to streamline the plethora of challenges in adopting the widely defined principles and frameworks. Our study preliminarily focused on survey-driven validation of AI ethics principles and challenges by practitioners and lawmakers to complement the body of research comprising the recent industrial studies on AI ethics principles [6], [36], [37], [38] and frameworks [7], [39], [40].

VI. CONCLUSION AND FUTURE WORK

This empirical study explored the perceptions of representative practitioners and lawmakers on AI ethics principles and potential challenges. We outlined the following observations based on the data collected from 99 respondents working in 20 different countries on various roles with diverse working domains:

A. Emerging Roles

Besides practitioners, the role of policy and lawmakers is also important in defining the ethical solutions for AI-based systems. Based on our knowledge, this study is the first effort made to encapsulate the views and opinions of both types

of populations.

B. Confirmatory Findings

This study empirically confirms the AI ethics principles and challenging factors discussed in our published SLR study [8]. Based on the survey findings, most participants agreed that the identified principles and challenges should take into consideration for defining ethics in AI.

C. Adherence to AI Principles and Challenges

The most common principles (e.g., transparency, privacy, and accountability) and challenges (e.g., lack of ethical knowledge, no legal frameworks, and lacking monitoring bodies) must be carefully realized in AI ethics. Companies must consider the mentioned common principles and challenges to define EAD methods and frameworks in practice.

D. Risk-Aware AI Ethics

The challenging factors have mainly long-term severity impacts across the AI ethics principles. It opens a new research call to identify the causes of the most severe challenging factors and propose solutions for minimizing or mitigating their impacts.

E. Practitioners and Lawmakers Perceptions

The identified principles and challenges are statically analyzed to understand the significant differences between practitioners' and lawmakers' perceptions. We noticed that the opinions of both types of populations are positively and significantly correlated.

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