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The Impact of Machine Learning Algorithms in Financial Forecasting on Accountants' Professional Ethical Conflicts: The Guiding Role of AI Governance and Ethical Standards

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ABSTRACT: This study aims to explore the emerging professional ethical conflicts faced by accountants when applying machine learning (ML) algorithms in financial forecasting, while also evaluating the guiding role of Artificial Intelligence (AI) governance frameworks and current ethical standards. Using a qualitative research method, the paper conducted 20 semi-structured interviews with senior managers and experts in the finance-accounting and technology sectors in Vietnam, followed by thematic data analysis. The findings indicate the emergence of new, complex ethical conflicts, including algorithmic bias challenging objectivity, the “black box” problem eroding professional judgment, and an accountability gap leading to a “blame the machine” mentality. The study also reveals that current ethical standards have become inadequate, while corporate AI governance frameworks remain formalistic and limited. Theoretically, the study proposes an expansion of the concept of accountants' professional competence to include both “digital literacy” and “digital ethics literacy.” Practically, the results emphasize the urgent need for professional associations to update standards, for businesses to build substantive AI governance frameworks, and for educational institutions to reform their curricula to equip the future generation of accountants.

KEYWORDS: Machine learning, financial forecasting, accounting professional ethics, ethical conflicts, AI governance, ethical standards.

1. INTRODUCTION

The Fourth Industrial Revolution is profoundly reshaping many economic and social sectors, with the finance and accounting industry witnessing one of the most dramatic transformations (Moll & Yigitbasioglu, 2019). At the heart of this transformation is the application of artificial intelligence (AI) and machine learning (ML) algorithms to core business processes. Particularly in financial forecasting, ML models have demonstrated superior capabilities in analyzing large, complex, and unstructured datasets, thereby significantly enhancing the accuracy of forecasts for revenue, cash flow, credit risk, and market volatility compared to traditional statistical methods (Fischer & Krauss, 2018). These advancements not only help optimize operational efficiency but also provide managers with deep insights for making more timely and effective strategic decisions.

However, alongside these undeniable benefits, the integration of ML systems into financial decision-making processes also gives rise to shortcomings and unprecedented professional ethical conflicts for professional accountants. The fundamental ethical principles that have long served as the cornerstone of the accounting profession - such as integrity, objectivity, professional competence, due care, and professional behavior - are being challenged in entirely new ways (Chin et al., 2023). When a critical financial decision is based on the output of a machine learning model with a complex and non-traceable decision-making mechanism, questions of accountability, transparency, and fairness in the accountant's judgment become more pressing than ever.

Despite the growing recognition of this issue, research in the accounting field has largely remained focused on the technical aspects, application performance, or economic impacts of AI and ML (Moll & Yigitbasioglu, 2019). A significant research gap persists in deeply understanding the experiences, perceptions, and ethical dilemmas that accountants face in their daily professional practice. In particular, in-depth qualitative studies exploring these conflicts within the context of emerging markets like Vietnam, where legal and technological governance frameworks are still in their formative stages, are even scarcer.

Therefore, this study is conducted to fill the aforementioned academic gap. The main research question of this paper is: What professional ethical conflicts does the application of machine learning algorithms in financial forecasting create for accountants, and what is the guiding role of AI governance frameworks and current ethical standards in resolving these conflicts? To answer this question, the study will delve into sub-questions: (i) How do specific forms of ethical conflicts (bias, black box, accountability) manifest in the practical work of accountants? (ii) Are current accounting ethical standards still relevant and sufficient to guide accountants' behavior in the AI era? (iii) What is the practical role of corporate AI governance frameworks in supporting accountants?

The objective of this paper is to explore and systematize emerging ethical conflicts while evaluating the effectiveness of existing guidance mechanisms. Through this, the study expects to make significant contributions. Theoretically, it extends theories of accounting professional ethics into the context of digital transformation, providing a new analytical framework for ethical challenges in the AI era. Practically,

the research findings will offer valuable empirical evidence, serving as a basis for policy recommendations to professional associations, corporate managers, and educational institutions in developing and refining ethical standards, governance frameworks, and curricula to suit the new reality.

The paper is structured into the following main sections: Section 2 presents the theoretical framework on machine learning in financial forecasting and related ethical issues. Section 3 describes the qualitative research methodology used. Section 4 presents the main research findings drawn from in-depth interviews. Section 5 discusses these findings and highlights their theoretical and practical implications. Finally, Section 6 provides a conclusion, acknowledges limitations, and suggests directions for future research.

2. THEORETICAL FRAMEWORK

2.1. Machine Learning in Financial Forecasting

Machine learning, a branch of artificial intelligence, is the field of study that gives computer systems the ability to learn from data to perform tasks without being explicitly programmed (Samuel, 1959). In the financial sector, machine learning algorithms have become powerful tools for analysis and forecasting. Common techniques include regression models (e.g., linear regression, logistic regression) for predicting continuous values or probabilities; classification algorithms like decision trees and support vector machines (SVM) for classifying credit risk; and more complex architectures such as artificial neural networks and deep learning, capable of identifying non-linear patterns hidden in large datasets (Gu et al., 2020).

The applications of these techniques in financial forecasting are diverse. They are used to forecast revenue and cash flow by analyzing historical data and macroeconomic variables; assess the credit risk of individuals and businesses with higher accuracy than traditional scorecard models; and predict stock price movements by processing vast amounts of market data and unstructured information such as news or social media posts (Fischer & Krauss, 2018).

The main advantage of applying machine learning is its ability to process massive datasets (big data) with superior speed and accuracy, helping to detect complex relationships that traditional statistical methods might miss. However, the application of machine learning also has inherent drawbacks. These models require a large amount of high-quality, cleaned input data, a requirement that is not always easy to meet. They also face the risk of "rote learning" or overfitting, where the model performs well on training data but forecasts poorly on new data. Furthermore, the complexity of advanced models, especially deep learning, often leads to a "black box" nature, making interpretation and verification difficult (Moll & Yigitbasioglu, 2019).

2.2. Accounting Professional Ethics

The foundation of the accounting and auditing profession globally is adherence to fundamental ethical principles, codified in the *International Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants (IESBA). This code, which is regularly updated, identifies five fundamental principles:

- (i) *Integrity*: To be straightforward and honest in all professional and business relationships.
- (ii) *Objectivity*: Not to allow bias, conflict of interest, or undue influence of others to override professional or business judgments.
- (iii) *Professional Competence and Due Care*: To attain and maintain professional knowledge and skill at the level required to ensure that a client or employing organization receives competent professional service, and to act diligently in accordance with applicable technical and professional standards.
- (iv) *Confidentiality*: To respect the confidentiality of information acquired as a result of professional and business relationships.
- (v) *Professional Behavior*: To comply with relevant laws and regulations and avoid any conduct that the professional accountant knows or should know might discredit the profession (IESBA, 2022).

In a traditional context, ethical conflicts often arise from management pressure to manipulate financial figures to improve reports, or from personal conflicts of interest when accountants possess critical inside information. The principles above serve as a guide for accountants to direct their behavior and make sound judgments.

2.3. Theoretical Framework for New Conflicts

The convergence of machine learning and financial accounting processes creates a new context for ethical conflicts, directly challenging established fundamental principles. Pioneering studies have begun to identify and analyze these issues.

Algorithmic Bias: One of the most serious ethical challenges is algorithmic bias. This issue occurs when a machine learning model systematically produces skewed results, creating unfair treatment for a particular group. Bias can originate from training data that carries historical prejudices (e.g., historical lending data showing discrimination against a certain ethnic group) or from the algorithm's design itself (O'Neil, 2017). When an accountant relies on a biased credit risk forecasting model, they may inadvertently make discriminatory decisions, directly violating the core principle of objectivity.

The "*Black Box*" Problem and Accountability: Many complex machine learning models, such as deep neural networks, operate as opaque "black boxes," meaning the process from input data to output result cannot be easily and fully explained by humans (Zarsky, 2016). This poses a major challenge to the principle of *professional competence and due care*. Accountants are responsible for understanding and justifying their judgments. However, if they cannot explain why a model produced a specific forecast, are they truly exercising "professional competence" or merely blindly trusting technology (Alles, 2015)? This leads to an ethical dilemma of being held responsible for a decision they do not fully understand.

Accountability Gap: The "black box" problem inevitably leads to an "accountability gap." When an erroneous forecast from a machine learning model causes significant financial damage, the question arises as to who is ultimately responsible. Is it the accountant who used the model's output? Or the data scientist who built the algorithm? Or the company that provided the training data? Or even the software vendor? This ambiguity creates a legal and ethical vacuum where responsibility can be shifted, and no one is truly held accountable (Matthias, 2004; Bhimani & Willcocks, 2014).

The Guiding Role of AI Governance Frameworks and Ethical Standards: To address these challenges, international organizations have begun to develop AI governance frameworks. A prime example is the OECD Principles on AI, which emphasize values such as inclusive growth, sustainable development, human-centered values, transparency and explainability, robustness, security and safety, and accountability (OECD, 2019). These governance frameworks provide high-level guidance. However, interpreting and applying these general principles to the specific context of the accounting profession remains a challenge. This necessitates an urgent review, update, and possible supplementation of current professional ethical standards to provide more specific guidance for accountants, helping them navigate an environment increasingly dominated by AI. This is precisely the "guiding role" that this study focuses on exploring.

3. RESEARCH METHODOLOGY

To answer the research questions, which focus on exploring the depth of personal experiences and perceptions, this study adopts a qualitative approach. This allows for an in-depth understanding of the views, perceptions, and experiences that industry professionals attribute to the ethical conflicts arising from the application of machine learning technology. This approach is best suited to capture the complexity and subtle nuances of ethical dilemmas, which quantitative methods would struggle to measure.

The study uses purposive sampling to access participants who can provide the richest and most insightful information related to the research problem. The selection criteria for participants were strictly defined, including: (i) a minimum of 10 years of experience in the accounting and finance field; (ii) holding senior management positions such as Chief Accountant, Chief Financial Officer, or Chief Risk Officer; and (iii) working in organizations in Vietnam that are applying or are in the research and testing phase of applying machine learning to financial forecasting, primarily multinational corporations, large commercial banks, and financial technology (fintech) companies. To gain a multi-faceted perspective, the study also invited experts from the Vietnam Association of Accountants and Auditors (VAA/VACPA) and technology experts. The target sample size was 20 participants (N=20). This sample size is considered appropriate for an in-depth qualitative study, allowing for sufficient data collection to reach data saturation, where new interviews no longer yield new significant themes or information.

The primary data collection tool was semi-structured interviews. The interviews were conducted between March 2025 and July 2025, lasting from 45 to 60 minutes each, and were held either in-person or online depending on the participant's convenience. The interview guide was designed with open-ended questions, focusing on eliciting participants' practical experiences with ML applications, the ethical dilemmas they faced (related to bias, "black boxes," accountability), how they verified unusual results from models, and their assessment of the adequacy of current ethical standards and the role of corporate AI governance frameworks. All interviews were audio-recorded with the explicit consent of the participants. The audio data was then transcribed and fully anonymized to ensure confidentiality and privacy.

The transcribed data was analyzed using thematic analysis following the six-step process of Braun & Clarke (2006). This process included: (i) familiarizing oneself with the entire dataset; (ii) systematically generating initial codes; (iii) searching for potential themes from the created codes; (iv) reviewing and refining the themes; (v) defining and naming the final themes; and (vi) writing the analytical report. The qualitative data analysis software Nvivo 12 was used to effectively support the process of managing, coding, and identifying patterns in the data.

4. FINDINGS

The analysis of data from 20 in-depth interviews with senior managers in finance and accounting, experts from professional associations, and technology specialists highlighted three main themes. These themes clearly reflect the emerging ethical conflicts accountants face in the digital age, the inadequacy of current guidance mechanisms, and the limited role of corporate governance frameworks.

4.1. Theme 1: The Emergence of New Ethical Conflicts

The findings show that ethical conflicts no longer stem merely from human pressure or individual error but have transformed into a new form, existing at the complex intersection of algorithms and the professional judgment of accountants.

(i) Algorithmic Bias and the Challenge to Objectivity:

Most interviewees were acutely aware of the risk of algorithmic bias, where machine learning models can reproduce and amplify existing prejudices in historical data. This poses a direct challenge to the core ethical principle of "objectivity." A Chief Financial Officer at a large commercial bank shared his experience:

"We ran a credit risk forecasting model and noticed it systematically assigned higher risk scores to small and medium-sized enterprises or customers in certain rural areas. Statistically, it made sense based on past data. But as an accountant, I felt something was ethically wrong. Are we inadvertently perpetuating a historical bias and denying them opportunities? This directly challenges the principle of objectivity we must always adhere to." (P11, Chief Financial Officer)

This situation places accountants in a difficult position: on one side is the "objective" result generated by the computer, and on the other is the professional ethical awareness that this result could lead to injustice. Adhering to the model's output could violate objectivity in a more subtle way, not due to pressure from superiors, but from the very tool they are using.

(ii) The "Black Box" Problem and the Erosion of Professional Judgment

The "black box" nature of many complex machine learning algorithms is a source of anxiety and unease for accounting professionals. The principle of *professional competence and due care* requires them to understand and be able to justify their decisions. However, when faced with a model's output that they cannot explain, their role is significantly diminished. A Chief Accountant with over 15 years of experience at a retail corporation stated:

"There were times when the model produced a sudden revenue forecast, up 30% year-on-year. The Board of Directors was thrilled and asked me to explain the basis for this number to develop an action plan. But when I asked the data team, they just said, 'that's what the algorithm produced.' I was completely unable to explain the logic behind it. I felt truly powerless in that moment, as if my professional judgment role had been nullified. I was just a person reading results from a machine." (P04, Chief Accountant)

This erosion not only affects individual morale but also diminishes the value of accountants within the organization. They transition from an expert providing judgment to a tool operator, raising questions about the future and nature of the profession.

(iii) *The Accountability Gap and the "Blame the Machine" Mentality*

The ambiguity caused by the "black box" problem inevitably leads to an "accountability gap." When errors occur, assigning blame becomes extremely difficult, creating a new moral hazard: the tendency to blame technology. A Chief Risk Officer frankly admitted:

"When a wrong forecast leads to an inefficient investment decision, the first reaction of many in the team is that the model was wrong. There's a very dangerous psychological tendency to blame the algorithm. Although I was the final approver based on that recommendation, the model's complexity creates a gap in responsibility. Deep down, I know that blaming the machine is a way of evading responsibility, but identifying who was wrong where in this whole chain is extremely difficult." (P18, Chief Risk Officer)

This mentality undermines the principles of *professional behavior* and *integrity*, as it allows individuals to evade responsibility for their professional decisions, hiding behind the complexity of technology.

4.2. Theme 2: The Obsolescence and Inadequacy of Current Ethical Standards

Another prominent theme was the general perception that current professional accounting ethical standards, while still fundamentally valuable, have become insufficient and outdated in the face of challenges posed by AI. These standards were developed in an environment where humans were the primary agents in all judgments and decisions. An expert from the Vietnam Association of Accountants and Auditors commented:

"Our current code of professional ethics is a solid foundation, but it was written for a world where the accountant's judgment is central. It talks about professional competence and due care, but it doesn't define what 'due care' means when you're using a tool you don't 100% understand. It also lacks specific guidance on how to audit a decision recommended by AI. We are in a vacuum where the standards haven't caught up." (P20, Association Expert)

This lack of specific guidance leaves accountants feeling isolated and without a firm basis to guide their behavior when encountering ethical dilemmas related to algorithms.

4.3. Theme 3: The Limited Guiding Role of Corporate AI Governance Frameworks

Although international organizations have issued principles for responsible AI, their implementation into practical governance frameworks at businesses in Vietnam remains very limited. The analysis shows that many companies either have no formal AI governance framework, or if they do, it is merely formalistic and often focuses on technical aspects like performance and cybersecurity rather than ethical issues. A Head of Management Accounting shared:

"At my company, the concept of 'Responsible AI' is mentioned a lot in high-level meetings. But in practice, it's limited to policies on data security and system protection. There is no set of rules or procedures to specifically guide the finance and accounting department on what to do when facing an ethical issue from a model. It's more like a slogan on a presentation slide than a real governance tool." (P07, Head of Management Accounting)

This deficiency creates a governance gap, leaving accountants without the necessary organizational support to resolve ethical conflicts. The guiding role of AI governance frameworks, therefore, remains very faint in their daily work.

5. DISCUSSION

The research findings have strongly confirmed and specified the theoretical concepts of algorithmic bias (O'Neil, 2017), the "black box" problem (Zarsky, 2016), and the accountability gap (Matthias, 2004) that scholars have previously discussed. While prior studies mainly analyzed these issues from a theoretical perspective or in the context of developed markets, this study expands the scope of understanding by providing the first empirical evidence from an emerging market context like Vietnam. The finding on the existence of "new ethical conflicts" - where technology and humans interact to create new dilemmas—is a significant contribution, showing that ethical challenges are not simply the fault of machines or human error, but a complex product of the convergence between these two factors.

Theoretically, the most important contribution of this study is the argument that the principles of accounting professional ethics, especially the principle of *"professional competence and due care"*, need to be reinterpreted and expanded to fit the digital age. The results show that the competence of a 21st-century accountant cannot be limited to traditional financial knowledge and accounting standards. Instead, the concept of "professional competence" must be supplemented with two core components: *"digital literacy"*, which is the ability to understand the fundamental principles of how ML models work, their limitations, and risks; and *"digital ethics literacy"*, which is the ability to identify, analyze, and address ethical issues arising from the use of technology. Without this expansion, the independent judgment and accountability of professionals will be severely eroded, as reflected in the concerns shared by the experts.

From these analyses, the study proposes important practical implications for three main groups:

(i) For professional associations (such as VACPA, VAA, and IESBA): The findings indicate an urgent need. These associations must promptly research, update, and issue supplementary guidance or addendums to the current code of professional ethics. This guidance needs to specify how to apply principles like objectivity, professional competence, and accountability in the context of working with AI systems, and recommend procedures for validating and cross-checking results from algorithms.

(ii) For businesses: Merely paying lip service to "Responsible AI" is not enough. Businesses need to take decisive action to build comprehensive and substantive AI governance frameworks. This includes establishing clear principles on transparency, fairness, and accountability in AI development and deployment; forming interdisciplinary AI ethics committees (including representatives from finance-accounting, technology, and legal departments) to oversee and advise; and developing procedures for regular algorithmic audits.

(iii) For educational institutions: A systemic change is needed in accounting and auditing training programs. Instead of being elective courses, knowledge of data analytics, data science, and especially digital-era ethics must be deeply integrated into the core curriculum. This will equip the future generation of accountants with the necessary competencies not only to use technology effectively but also to master it responsibly.

6. CONCLUSION

This study confirms that the application of machine learning algorithms in financial forecasting is creating profound and unprecedented professional ethical conflicts for accountants. The main findings point to the formation of "new ethical conflicts" related to algorithmic bias, the "black box" nature, and the accountability gap. The research also shows that current ethical standards have become outdated, while corporate artificial intelligence governance frameworks are still formalistic and insufficient to guide and support accounting professionals. Theoretically, the study proposes expanding the concept of "professional competence" to include "digital literacy" and "digital ethics literacy" as mandatory requirements for accountants in the new era.

Although the research objectives were achieved, the study has limitations due to the nature of the qualitative method and its scope being confined to the Vietnamese context. Future research could expand in a quantitative direction on a larger scale or conduct comparative studies between countries to increase the generalizability of the findings.

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