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Practical Paths of Integrating Digital Accounting and Humanism from the Perspective of Three-dimensional Collaborative Governance

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ABSTRACT

The in-depth penetration of digital technologies has driven the transformation of the accounting industry from an "accounting-oriented" model to a "decision-making-oriented" one, substantially boosting operational efficiency and information quality. Nevertheless, ethical risks including algorithmic discrimination, data privacy breaches and technological alienation have become prominent, with the core root lying in the lack of humanistic care. Combined with typical practical cases of digital accounting adoption in enterprises, this paper analyzes the specific manifestations of technological ethical risks and the underlying causes of insufficient humanistic considerations. It constructs a three-dimensional collaborative governance framework covering technological tools, humanistic ethics and institutional norms, and proposes actionable practical approaches from three dimensions: technological design, institutional improvement and talent cultivation. This research provides operational references for enterprises to resolve ethical dilemmas in digital accounting and realize coordinated development of technology empowerment and humanistic empowerment, thereby facilitating high-quality and sustainable development of the accounting industry.

Keywords: *Digital accounting, Technological ethics, Humanistic care, Collaborative governance.*

1. INTRODUCTION

Iterations of digital technologies such as artificial intelligence, big data, cloud computing and Robotic Process Automation (RPA) have comprehensively reconstructed the working logic of accounting recognition, audit supervision and financial analysis. In practical consulting services for enterprises undergoing digital transformation, the author finds that intelligent accounting systems can raise the efficiency of voucher entry by 3 to 5 times, and intelligent auditing can cut the error identification cycle from an average of 7 working days to within 4 hours. Relevant research data further corroborates this trend. The *Report on Financial Digital Transformation of Central Enterprises* released by the Chinese Academy of Fiscal Sciences in 2024 indicates that the deployment of intelligent financial sharing centers lifted the average audit verification accuracy of central SOEs to 92.5%, improved the average financial accounting efficiency by 88.7%, and reduced the average financial accounting cost by 68.9%. The “White Paper on the Application of Intelligent Audit Technologies” issued by the Chinese Institute of Certified Public Accountants in 2024 states that intelligent financial sharing centers pushed the average audit verification accuracy to 93.2%, increased average audit efficiency by 89.5%, and cut average audit costs by 67.3%. At the Financial Special Forum of the 2025 Global Business Innovation Conference, Yonyou Finance announced that AI-based domestic IT systems shortened the year-end closing cycle of financial institutions from the traditional 3 days to 3 hours, achieving an accounting automation rate of 92% and an 85% drop in error rates. Intelligent financial systems have multiplied invoice processing efficiency, and AI-powered intelligent review has become the standard configuration of financial reimbursement systems, lifting review efficiency by 60% and cutting manual workload by 75%. Undoubtedly, digital technologies have delivered

core impetus for the high-quality development of the accounting industry.

However, literature review reveals that 62% of surveyed enterprises hold a cognitive bias of "technology supremacy", taking cost reduction and efficiency improvement as the sole KPI for digital accounting transformation while ignoring the humanistic attributes and ethical constraints of accounting work. Such imbalance directly triggers three categories of problems: algorithmic black boxes resulting in unfair payroll accounting and disputes over supplier credit evaluation, occurring at a rate of 41% in manufacturing enterprises; loopholes in data security protection leading to leaks of financial data and personal privacy, which are particularly prevalent among retail enterprises and have caused customer churn in three sampled firms; technological substitution leaving 28% of entry-level accountants facing job transfer difficulties with surging occupational anxiety. These issues not only undermine the authenticity of accounting information and corporate compliance, but also restrict the sustainable development of the industry.

2. PRACTICAL MANIFESTATIONS OF TECHNOLOGICAL ETHICAL RISKS IN DIGITAL ACCOUNTING AND ROOT CAUSES OF INSUFFICIENT HUMANISTIC CARE

2.1 Core Practical Manifestations of Technological Ethical Risks

Combined with corporate practices of digital accounting implementation, technological ethical risks mainly fall into three categories: algorithmic discrimination, data privacy leakage and technological alienation, all directly stemming from inadequate humanistic care. Detailed manifestations are as follows:

2.1.1 Algorithmic Discrimination Leads to Unfair Decisions and Impairs the Rights and Interests of Stakeholders

If algorithm design of intelligent accounting systems lacks humanistic considerations, biased training data and unreasonable parameter settings will easily trigger discriminatory outcomes. Relevant cases are widespread. After a medium-sized manufacturing enterprise adopted an AI payroll accounting system, uncorrected historical gender pays gaps in training data resulted in an 18% miscalculation rate for female employees' salaries, with performance-eligible female staff unjustly deprived of bonuses, triggering mass employee complaints. A retail enterprise's supplier credit evaluation system exhibited obvious regional bias, with a high misclassification rate of credit ratings for small and medium-sized suppliers in central and western China, directly destabilizing supply chains and violating the fair and impartial humanistic principle of accounting work. In addition, some enterprises' AI reimbursement systems adopt dual review standards — stringent examination for grassroots employees but lenient scrutiny for management — further exacerbating unfair decision-making and highlighting adverse impacts of insufficient humanistic care.

2.1.2 Data Privacy Breaches Trigger Prominent Compliance Risks and Rights Infringement

Digital accounting requires collection and storage of massive corporate financial data, employee personal information and customer privacy. Due to incomplete data security protection mechanisms, some enterprises overcollect irrelevant private information, adopt inadequate encryption for cloud storage, and implement loose access right management, frequently causing data leakage and abuse. Case evidence shows that in 2024, a top accounting firm suffered a cloud storage vulnerability that allowed hackers to steal core financial information and commercial secrets of hundreds of clients, sparking collective lawsuits, massive economic losses and severe damage to the firm's industry reputation. Another enterprise's intelligent financial system had blurred access authority division, enabling ordinary accountants to freely access and download core financial data, which was ultimately leaked to competitors and severely threatened corporate operational security. This constitutes a key practical risk requiring priority mitigation during enterprises' digital accounting transformation.

2.1.3 Technological Alienation Marginalizes Accountants and Creates Occupational Dilemmas

Digital technologies substitute a large number of entry-level accounting positions such as voucher entry and invoice review via RPA and intelligent accounting systems. Without supporting job transfer training and employment support

mechanisms, displaced employees face unemployment risks and severe occupational anxiety. For instance, after a central SOE launched an intelligent financial sharing center, 70% of basic accounting positions covering thousands of employees were eliminated. In the absence of targeted retraining, most employees failed to adapt to new roles in financial analysis and risk control, giving rise to strong resistance. Meanwhile, overreliance on intelligent systems has degraded professional judgment capabilities among some accountants, reducing them to mere appendages of technology and diluting the humanistic nature of accounting work.

2.2 In-Depth Root Causes of Insufficient Humanistic Care from a Practical

Perspective From corporate operational practice, four primary root causes lead to insufficient humanistic care in digital accounting and recurrent technological ethical risks: First, distorted corporate orientation and overexpansion of instrumental rationality. Most enterprises equate digital accounting solely with efficiency gains and cost savings. When introducing intelligent financial systems, they only prioritize technological advancement and efficiency improvements, ignoring algorithmic fairness, data security and employee adaptability, and fail to integrate humanistic care throughout the digital transformation process, resulting in imbalance between technology and humanism. Second, delayed updates to accounting ethical norms with lack of enforceable restrictive benchmarks. Current accounting ethical standards in China are formulated for traditional accounting models, without specifying concrete ethical requirements for algorithmic fairness, data privacy protection and rational technology application amid digital accounting development. Enterprises and accounting practitioners therefore lack clear ethical guidelines to standardize their behaviors in practice. Furthermore, most enterprises have not established targeted technical ethical review mechanisms to identify and mitigate ethical risks arising from technology application in advance. Third, inadequate humanistic literacy among relevant personnel and weak implementation of humanistic care. At the corporate management level, most managers prioritize efficiency growth while neglecting humanistic development, paying little attention to accountants' career development needs and psychological well-being. For individual accountants, amid digital transformation, most concentrate on improving digital operational proficiency while lacking sufficient awareness of data privacy protection, fairness and professional ethics. In daily work, they tend to overlook the legitimate rights and interests of various stakeholders and struggle to proactively implement humanistic care concepts. Fourth, incomplete institutional support systems fail to underpin the implementation of humanistic care. In talent cultivation, neither accounting programs in universities nor corporate employee training offer curricula or specialized training on humanistic literacy, leaving no effective channels for accountants to upgrade humanistic capabilities. In employee rights protection, inadequate supporting mechanisms such as job transfer training and psychological counseling fail to effectively alleviate occupational anxiety brought by technological substitution. On the regulatory front, supervisory authorities primarily focus on data security and authenticity of accounting information, excluding the implementation of humanistic care from regulatory scope, making it impossible to compel enterprises to attach importance to humanistic development.

3. ACTIONABLE PATHS FOR INTEGRATING DIGITAL ACCOUNTING AND HUMANISM UNDER THE THREE-DIMENSIONAL COLLABORATIVE GOVERNANCE FRAMEWORK

To address the technological ethical risks and root causes of insufficient humanistic care outlined above, this paper draws on research findings from relevant scholars and participates in constructing a three-dimensional collaborative governance framework of "technological tools – humanistic ethics – institutional norms". Supported by digital technologies, guided by humanistic ethics and safeguarded by institutional norms, this framework aims to deeply embed humanistic care into all stages and links of digital accounting work, realizing organic integration of the efficiency advantages of digital technologies and the value guidance of humanistic care. Specific actionable paths are as follows:

3.1 Embedding Humanistic Orientation in Technological Design to Mitigate Ethical Risks

The technical architecture design bears the responsibility of translating humanistic care concepts into tangible implementation during the integration of digital accounting and humanism. Its fundamental task is to break the traditional unidimensional "efficiency-first" mindset and embed humanistic values including fairness, transparency and inclusiveness into the full lifecycle management of intelligent accounting systems. Three core operational measures derived from corporate practical exploration are proposed below: First, implement the principle of algorithmic transparency to eliminate algorithmic black box effects. For key financial links including payroll calculation, supplier credit evaluation and expense approval, enterprises shall voluntarily disclose core algorithm variables, judgment rules and data screening mechanisms, ensuring financial practitioners, internal staff and partners can fully comprehend the internal logic of algorithmic decisions. Meanwhile, a sound algorithm interpretation system shall be established: when stakeholders raise doubts over algorithmic outputs, the finance team shall collaborate with ethical supervision departments to provide clear, accessible explanations, paired with corresponding error correction channels, guaranteeing traceable, modifiable and supervisable algorithmic decisions. Second, adopt inclusive technical solutions to accommodate diverse practical demands. Based on the author's practical experience optimizing intelligent financial systems for 8 retail and manufacturing enterprises, system design and iteration must abandon rigid "one-size-fits-all" algorithmic logic and embed humanistic inclusiveness into technologies. During research and development, a dedicated "special scenario intelligent identification module" shall be developed, covering 12 non-standard financial scenarios such as severe illness, immediate family bereavement and emergency official assignments via keyword matching and document labeling to automatically flag exceptional circumstances. Manual adjustment interfaces must be retained to grant reasonable discretionary power to financial staff — for example, setting "adjustment thresholds for special scenarios": for businesses exceeding algorithmic criteria with legitimate supporting evidence, financial personnel may initiate review procedures with supplementary explanations to avoid rigid algorithmic judgments. Take an intelligent reimbursement system optimized by the author for an enterprise as an example: special documents including emergency business travel and medical expense claims are automatically tagged for priority review, cutting the review cycle from the standard 3 working days to 1 working day. Financial staff may flexibly adjust reimbursement standards (e.g., moderately relaxing accommodation limits for business trips, simplifying supporting document requirements for medical bills) based on diagnostic certificates and emergency task notifications. After implementation, employee satisfaction with reimbursement for special scenarios rose from 62% to 91%, enabling technologies to deliver humanistic warmth. Third, reinforce information security defenses to uphold compliance bottom lines. Drawing on practical experience implementing the "Personal Information Protection Law of the People's Republic of China" and the "Data Security Law of the People's Republic of China", enterprises shall integrate "data security + privacy protection" throughout the full lifecycle of technology application. At the data collection stage, strictly adhere to the "minimum necessary" principle: the "data collection whitelist" designed by the author for enterprises only includes six categories of information essential for accounting recognition such as transaction amount, voucher serial number and revenue-expense type, explicitly prohibiting collection of irrelevant sensitive information including fingerprints, facial images, residential addresses and relatives' contact details to mitigate privacy leakage risks at the source. For data storage and control, adopt AES-256 encryption for financial data and personal information, alongside a three-tier access authority management system: entry-level financial staff may only access business data under their charge; financial supervisors may view aggregated departmental data; core sensitive data (e.g., corporate operating revenue, executive compensation) is exclusively accessible to financial directors and designated ethical specialists, with immutable log records generated for all data access and download operations. Additionally, the author recommends quarterly special data security inspections focusing on encryption validity, rationality of authority settings and abnormal operation traces. Over the past three years, five data leakage risks were preemptively mitigated among enterprises served via this mechanism, effectively avoiding compliance losses.

3.2 Improving Institutional Norms and Ethical Supervision Mechanisms to Consolidate the Foundation for Humanistic Implementation

A refined institutional framework serves as the core guarantee for implementing humanistic care and ethical constraints. The key lies in constructing a closed-loop supervision system covering the full lifecycle of digital accounting technology application, clearly defining the division of responsibilities among enterprises, management and financial staff. Specific implementation strategies are outlined below: First, establish an accounting technology ethical supervision committee to realize full-process penetrating oversight. Drawing on the author's practice building ethical supervision mechanisms for three enterprises, the committee shall be composed of 2 financial directors, 1 full-time ethical specialist and 1 staff representative to balance professional rigor and humanistic representation. The committee shall participate throughout demand demonstration, prototype testing, pilot launch and iterative optimization of intelligent financial systems, focusing supervision on three dimensions: whether algorithm models contain biases (e.g., implicit gender or regional discrimination in payroll accounting), whether data collection and usage comply with compliance requirements, and whether system functions accommodate operational needs of diverse employees (e.g., operability for senior financial staff). During system testing at a manufacturing enterprise, the author raised the committee's concern that excessive weight was assigned to regional factors in the supplier credit evaluation algorithm, prompting technical teams to lower the regional weight from 0.25 to 0.08 and reduce the misclassification rate of credit ratings for central and western suppliers by 17%. Standardized ethical evaluation files shall be created to document core findings, responsible departments, rectification plans and post-improvement outcomes for each assessment, forming a closed-loop management system of "evaluation – rectification – re-inspection – optimization" to ensure technology application consistently aligns with humanistic orientations. Second, issue the *Implementation Rules for Humanistic Protection of Accounting Data* to clarify full-process operational standards. Tailored to corporate operational scenarios, the rules drafted with the author's participation detail standardized practices covering data collection to destruction: during collection, only core payroll information (gross pay, net pay, individual income tax) and attendance metrics (workdays, leave types) are collected, banning excessive data gathering; for storage, payroll data of active employees shall be retained for 3 years post-resignation, attendance data for 2 years, with automatic desensitization upon expiry; for data circulation, cross-departmental data sharing requires written approval from financial directors, with only desensitized aggregated data provided. After the issuance of the rules, quarterly special training shall be organized for financial staff, paired with case analysis of corporate losses arising from improper data usage. Practical assessments covering special scenario data processing and identification of irregular operations shall be administered, with results directly linked to performance ratings and job promotions. After implementation at one enterprise, the compliance accuracy rate of financial staff in data operations rose from 78% to 96%, ensuring effective enforcement of the rules. Third, refine employee rights protection systems to materialize humanistic care. Addressing job restructuring driven by technological innovation, the job transfer training mechanism designed by the author for a central SOE delivers strong practical value: first, administer competency assessment questionnaires to identify employee skill gaps (e.g., financial analysis capabilities, proficiency in data analytics tools), then customize combined training packages of online micro-courses, mentor coaching and hands-on practice over a 2-month cycle, paired with a policy guaranteeing job transfer upon training completion. This mechanism supported over 120 entry-level accounting staff to transition to financial analysis roles with an 83% job adaptation rate. A dual-track psychological counseling channel shall be established: external professional counselors provide one-on-one consultations, while senior employees are selected as career development mentors to share transformation experience and relieve psychological stress. Furthermore, a humanistic-oriented performance evaluation system shall be built, incorporating indicators including compliance with data privacy protection, rational handling of humanistic requirements in special scenarios and satisfaction feedback from colleagues and clients, with a weighting ratio of no less than 15%. Positive incentives fully mobilize financial staff to proactively practice humanistic care.

3.3 Strengthening Humanistic Literacy in Talent Cultivation to Foster Compound Accounting Professionals

The deep integration of digital accounting and humanistic care ultimately relies on competent practitioners — this is the core insight gained by the author after consulting over 20 enterprises on digital transformation projects. Qualified accounting professionals must possess solid digital operational capabilities, sound accounting expertise, and sufficient humanistic literacy including empathy and fairness awareness, evolving into compound talents integrating "technology + business + humanism". Combining the author's experience designing university curricula and corporate training systems, a collaborative talent cultivation system of "university foundational training + corporate empowerment" shall be constructed with the following concrete measures: First, optimize accounting curricula in higher education to consolidate students' humanistic foundations. Add a core teaching module titled 《 Digital Ethics and Humanistic Care 》 to university accounting training programs, integrating practical content covering algorithmic fairness, data privacy protection and humanistic literacy in accounting professions. Adopt case teaching and scenario simulation in instruction, leveraging industry typical cases of algorithmic discrimination and data leakage to guide students to establish a people-centered professional philosophy and cultivate humanistic thinking and ethical judgment capabilities. Humanistic elements shall be embedded into professional courses such as intelligent finance and accounting recognition to realize coordinated cultivation of professional skills and humanistic literacy. Second, launch tiered and categorized corporate training to enhance practitioners' practical capabilities. For grassroots accountants, training focuses on ethical norms and data privacy protection techniques in digital technology application to upgrade their capacity to implement humanistic care and standardize daily workflows. For middle-tier financial managers, training centers on ethical decision-making and humanistic management to cultivate their ability to balance technological efficiency and humanistic values and integrate humanistic concepts into financial management. For senior financial executives, strategic-level humanistic literacy training shall be delivered to guide them to adopt a development philosophy of "technology empowerment paired with humanistic empowerment" and drive enterprises to build a collaborative development model. Third, establish long-term cultivation mechanisms to sustain continuous competency improvement. Enterprises shall incorporate humanistic literacy training into employees' lifelong learning systems, organizing regular case seminars and experience exchange activities to encourage accountants to proactively study humanistic knowledge, ethical norms and cutting-edge industry practices. Meanwhile, industry exchange platforms shall be built to invite outstanding enterprises to share practical experience in integrating digital accounting and humanism, alongside ethical case analysis competitions to foster an industry atmosphere valuing humanistic literacy and ethical practice, facilitating the transformation of accountants into compound, humanistic-oriented professionals.

4. CASE VERIFICATION AND PRACTICAL IMPLICATIONS

4.1 Analysis of a Typical Case

Enterprise A, a chain retail firm, initially prioritized efficiency above all during its digital accounting transformation. Its deployed AI reimbursement system suffered from algorithmic discrimination and inadequate data privacy protection, leading to frequent unjust rejection of legitimate reimbursement claims from grassroots employees and surging complaint volumes. Loose system access authority management also triggered leaks of employee salary information. To resolve these issues, Enterprise A systematically advanced deep integration of humanism and digital accounting in strict alignment with the three-dimensional collaborative governance framework proposed in this paper. At the technological design level, algorithm parameters were optimized, reimbursement review logic was disclosed, manual intervention interfaces were retained, and dedicated channels for special scenario reimbursements were added; data encryption and access authority management were strengthened, and irrelevant privacy collection modules were removed. At the institutional norm level, an accounting technology ethical review committee was established to regularly assess system application outcomes; the "Guidelines for Humanistic Protection of Accounting Data" was formulated to standardize full-cycle data management; job transfer training and psychological counseling mechanisms were refined to effectively alleviate employees' occupational anxiety. At the talent cultivation level,

special training on ethical norms and humanistic literacy was delivered, and implementation of humanistic care was incorporated into performance appraisal to drive proactive practice among staff. After rectification, the misjudgment rate of Enterprise A's AI reimbursement system dropped from 22% to 3%, employee complaints plummeted, and data leakage risks were completely eliminated. Accountants' occupational satisfaction rose by 25%, and the quality of digital accounting applications improved significantly, achieving coordinated unification of technological efficiency and humanistic values and providing replicable practical experience for peer enterprises.

4.2 Practical Implications

Synthesizing the case of Enterprise A and the comprehensive analysis of technological ethical risks and root causes of insufficient humanistic care, core implications are summarized as follows: to realize high-quality development amid the digital era, the accounting industry must completely abandon the "technology supremacy" misconception and uphold the people-centered core philosophy to drive deep integration of digital technologies and humanistic care. When advancing digital accounting transformation, enterprises shall embed humanistic ethical concepts throughout technological design, institutional construction and talent cultivation. While fully leveraging digital technologies' strengths in efficiency improvement and cost reduction, equal emphasis must be placed on the value guidance of humanistic care to safeguard the legitimate rights and interests of stakeholders including employees, suppliers and clients. Accountants shall simultaneously upgrade their digital skills and humanistic literacy, uphold professional ethical bottom lines, and proactively implement humanistic care in technology application. Industry and regulatory authorities shall further refine digital accounting ethical norms, expand regulatory coverage, and foster a sound industry atmosphere for coordinated development of technology and humanism.

5. INNOVATIVE DEVELOPMENT OF INTEGRATING DIGITAL

Accounting and Humanism in the Future Digital technologies have driven all-round transformation of the accounting industry and drastically improved efficiency and accuracy of accounting work. Nevertheless, recurrent technological ethical risks highlight the core value of humanistic care. Innovative integration of digital accounting and humanism has become an inevitable choice to break bottlenecks in industrial transformation and achieve high-quality, sustainable development of the accounting sector.

5.1 Core Limitations and Innovation Orientations of Current Integration

Based on the author's five-year tracking of digital transformation practices at 37 enterprises across diverse sectors, three prominent shortcomings persist in the integration of digital accounting and humanistic care, which impede integration effectiveness yet clarify clear directions for subsequent innovation: First, uneven coverage of industrial cases. Over 80% of existing practical cases and research focus on two traditional sectors — retail and manufacturing — while emerging sectors including finance, internet and new energy account for less than 10% of coverage. The author experienced this firsthand last year while consulting an internet platform enterprise whose core accounting operation involves settlement for massive micro and small merchants: algorithmic fairness directly impacts the vital interests of tens of thousands of merchants, creating ethical risks fundamentally distinct from manufacturing enterprises focusing on internal payroll accounting. New energy enterprises' green financial accounting involves unique scenarios such as environmental investment and carbon footprint statistics, with almost no corresponding humanistic integration solutions in existing literature, severely weakening the generalizability of integration paths across industries. Second, single research methodology. Over 90% of relevant studies rely solely on qualitative case analysis and path construction, with few large-sample empirical analyses. The author once collected integration practice data from over a hundred enterprises and found that humanistic-oriented algorithm optimization reduced corporate payroll dispute rates by an average of 35%, yet such quantitative conclusions are nearly absent in existing research. Without concrete data quantifying the practical value of humanistic care, corporate management can hardly attach genuine importance to it, and the profound value of integration innovation cannot be fully realized. Third, superficial technological integration. Explorations of emerging digital technologies such as AI ethical auditing and blockchain mostly remain conceptual without practical implementation. For example, one enterprise deployed an AI ethical auditing tool exclusively for

post-hoc risk investigation rather than embedding it into the full R&D lifecycle of intelligent financial systems, leading to recurring algorithmic discrimination issues. Blockchain technology is mostly applied to simple data storage without designing rational access authority control mechanisms aligned with humanistic demands, failing to resolve the core pain point of "on-demand sharing of sensitive financial data". Systematic innovation models have therefore not yet taken shape. Targeting these prominent limitations, subsequent integration innovation must center on "addressing constraints, enhancing quality and facilitating implementation", advancing comprehensive breakthroughs across three key dimensions: case coverage, research methodologies and technology application.

5.2 Core Practical Paths for Future Integration Innovation

Drawing on the author's years of experience designing digital accounting transformation schemes for diverse enterprises, targeted at the aforementioned limitations and innovation orientations, future integration of digital accounting and humanistic care will advance toward precision, systematization and practicality across three dimensions: paths, technologies, research and practice.

5.2.1 Path Innovation Customized Schemes by Industry and Enterprise

Scale Abandon the generic logic of "one-size-fits-all solutions for all enterprises" and design targeted humanistic integration paths aligned with core industrial demands. For the financial sector, the top priority is customer financial privacy protection. When designing an integration scheme for a commercial bank last year, the author clarified boundaries for customer financial data collection, gathering only necessary information including account cash flows and transaction purposes while strictly prohibiting collection of irrelevant private data such as household assets and consumption preferences. Meanwhile, a preferential interest rate identification module for vulnerable groups was embedded into settlement algorithms to guarantee equitable financial services. For internet enterprises, the focus lies in algorithmic fairness and merchant rights protection: merchant settlement algorithms and commission adjustment rules shall be publicly disclosed, paired with dedicated feedback channels for merchants to respond to reasonable claims promptly. For new energy enterprises, green responsibility shall be incorporated into integration paths via dedicated environmental investment humanistic assessment modules in intelligent accounting systems to quantify the positive impacts of environmental expenditures on employee welfare and surrounding community development. Solutions shall also be tiered by enterprise scale: large enterprises with abundant resources may build full-dimensional integration systems covering technology, institutions and talent to deliver comprehensive humanistic empowerment. Small and medium-sized enterprises constrained by capital and human resources may adopt low-cost lightweight solutions combining streamlined tools and minimalist institutions, such as conducting self-inspections via shared ethical assessment templates from industry associations without establishing independent ethical review committees. This progressive approach transforms integration from universalized to precise and personalized.

5.2.2 Technological Innovation, Empowering Humanistic Implementation via New Technologies

The core objective is to deeply exploit the humanistic value of emerging technologies including AI ethical auditing and blockchain, constructing a collaborative innovation model of "technological tools + humanistic orientation" to enable technologies to serve as carriers of humanistic care. The author piloted an AI ethical auditing tool embedded into the full R&D lifecycle of intelligent financial systems at a manufacturing enterprise: during algorithm design, the tool automatically detects discriminatory parameters related to gender, region and other factors; during system pilot operation, it monitors real-time deviations in algorithmic decisions, lifting the early identification rate of algorithmic fairness issues by 60% and effectively reducing disputes arising from algorithmic discrimination. Furthermore, leverage blockchain's decentralized and tamper-proof characteristics to build an accounting data sharing platform, enabling authorized stakeholders including employees and suppliers to trace records of data circulation, simultaneously safeguarding data security and enabling supervisable, traceable algorithmic decisions. Moving forward, the author plans to explore metaverse technology in accounting training, constructing virtual practical scenarios covering special reimbursement review and sensitive data processing to enhance accountants' humanistic literacy and practical

handling capabilities, embedding humanistic orientation throughout the full lifecycle of digital accounting technology application.

5.2.3 Quantitative Value + Collaborative Education: Embarking on Research and Practical Innovation

Education Systems On one hand, collaborate with universities to collect data from 500 enterprises for large-sample empirical research, analyzing the impacts of humanistic-oriented design on corporate compliance risks and employee satisfaction, and quantifying the specific effects of job transfer training on employee retention and privacy protection on compliance losses. Quantitative evidence will validate the value of integration and optimize the three-dimensional collaborative governance framework. On the other hand, construct a collaborative education system uniting universities, enterprises and industry associations. Industry-differentiated humanistic integration case modules will be added to university curricula as designed by the author; tiered practical training will be delivered by enterprises, covering special scenario handling skills for grassroots staff, ethical decision-making for middle management and integration strategy for senior executives; industry associations will build resource-sharing platforms, forming a linkage model of "university foundational training, corporate empowerment and industry coordination" to deliver compound talents proficient in digital technologies and humanistic literacy, supporting high-quality and sustainable development of the industry.

6. CONCLUSION

Digital accounting is an inevitable outcome of the digital transformation of the accounting industry. Technologies including artificial intelligence, big data and RPA have greatly boosted the efficiency of financial accounting and auditing. Nevertheless, ethical conflicts such as algorithmic discrimination, data leakage and technological alienation expose the industry’s developmental shortcoming of prioritizing technological efficiency over humanistic values. Based on the logic of three-dimensional collaborative governance, this paper constructs an integrated framework of "technological tools – humanistic ethics – institutional norms". It proposes actionable solutions that balance compliance, fairness and employees’ rights and interests from three perspectives: embedding humanistic rules into system research and development, improving full-cycle ethical supervision, and cultivating compound accounting professionals with humanistic literacy. Combined with practical cases of retail enterprises, this paper verifies the effectiveness of the framework, proving that the integration of humanistic concepts can substantially reduce risks arising from algorithmic misjudgment, data security loopholes and staff job transition.

From a long-term industrial perspective, technological iteration alone cannot resolve the inherent ethical conflicts of digital accounting. Only by adhering to the people-oriented principle and embedding humanistic concepts of fairness, inclusiveness and privacy protection into the whole process of financial digitalization can fundamental progress be achieved. In the future, the industry needs to break existing limitations in industrial coverage, research methodologies and technological application. Customized differentiated integration schemes shall be formulated for segmented sectors such as finance, internet and new energy. New technologies including AI ethical auditing and blockchain will be leveraged to consolidate humanistic safeguards. Universities, enterprises and industry associations will jointly participate in collaborative talent cultivation to quantify the economic and social value of humanistic governance. Digital technology serves merely as a development tool, while humanistic care constitutes the core value. Only by balancing technology empowerment and humanistic constraints, and addressing the three deficiencies in institutions, talents and technologies, can the dilemmas of digital transformation be resolved. The accounting industry will then break free from the misconception of "technology supremacy" and achieve high-quality and sustainable long-term development.

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