

Research on the Application of AI Agents in Corporate Financial Budget Management

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Abstract. After the rapid rise of the large language models (LLMs) represented by ChatGPT and Claude, AI Agent (intelligent agent) with autonomous perception, planning, and execution ability is becoming a key technical force driving the digital transformation of enterprises. Financial management, one of the core function of enterprises, is data-intensive, involves complex processes, and has high requirements for real-time decision-making; these characteristics make it an important scenario for the practical deployment of AI Agent. This article combines the literature review method with the case analysis method, and tries to examine the specific application and implementation of AI Agent technology in the three core scenarios of enterprise budget management, financial risk identification and early warning, and financial information disclosure. At the same time, it analyses the realistic challenges it faces in terms of data security, regulatory compliance, model interpretability, and other aspects. The research conclusion of this article shows that AI Agent has the ability to significantly improve the efficiency and accuracy of financial management through the three mechanisms of automated execution, intelligent analysis and real-time early warning. However, to achieve deep application, it is necessary to build a perfect data governance system, manual audit mechanism and supporting regulatory the framework.

Keywords: AI Agent, Enterprise Finance, Financial Management, Intelligent Automation, Digital Transformation

1. Introduction

In recent years, Large Language Models (LLMs) represented by GPT-4 and Claude have developed rapidly, giving rise to a new generation of artificial intelligence application paradigm — the AI Agent. The concept of AI Agent comes from the "intelligent agent" in computer science, which refers to a software entity that can autonomously perceive the environment and take actions to achieve the goal. Modern AI Agent takes LLM as the core, with natural language understanding, task decomposition, tool calling and dynamic adjustment. The ability to carry out strategies [1, 2] can complete the closed-loop operation of "perception-planning-execution-reflection".

Its core architecture is roughly composed of four parts: a large language model reasoning engine, Tool Use, a RAG-based memory module, and orchestration platforms such as AutGPT, LangChain, and Dify [2] This architecture gives AI Agent obvious advantages in complex multi-system collaboration scenarios, which has attracted wide attention from academia and industry.

2. Application of AI Agent in the core scenario of financial management

Under the background of the continuous integration of artificial intelligence technology and enterprise financial systems, AI Agent has been gradually applied to core financial scenarios such as budgeting, risk identification and information disclosure, and has promoted the transformation of financial management from traditional manual processing to intelligent and automated processes; the following will focus on budget management, financial risk identification and early warning, and financial information disclosure assistance, discussing the specific application mode of AI Agent in financial management and its practical value in these three aspects.

2.1. Budget management scenario

Budget management is one of the most mature scenarios for AI Agent to be applied in the financial field. Its standard application process can be summarised as follows: after AI Agent connects to the enterprise ERP system, it first extracts historical financial data, and then calls the multi-dimensional forecast model to generate a rolling budget draft. After benchmarking and analysing against strategic goals and industry benchmarks, it automatically marks abnormal deviations and submits them for manual review. This process changes the subject of budgeting from "manual filling" to "intelligent generation + manual audit", which greatly compresses the mechanical data processing steps [3].

In typical practice, enterprises have achieved financial process optimisation through AI Agent or Agent-like intelligent systems.

Take financial process automation as an example, IBM's financial team has built an intelligent automation system on watsonx Orchestrate to optimise the generation of account entries and the accounting process. According to the information disclosed by IBM's official case (2024), under specific application scenarios, this system is expected to shorten the financial closure cycle by more than 90% and save about \$600,000 per year. Of course, these figures come from the manufacturer's case study, and the actual effect will vary depending on the enterprise situation [4].

In the field of budget management, Rinnai Australia, an Australian company, introduced the IBM Planning Analytics system to digitise the budgeting process. According to the introduction of IBM's official case (2024), the budgeting cycle, which originally took about three months, has been greatly compressed, and about 40 hours of manual work can be saved each week in operations [5].

The above system is not an AI Agent in the strict sense, but it has the ability of data integration, automatic analysis and process execution, and can be regarded as an "agent-like intelligent system". This kind of practice verifies the practical value of intelligent automation technology in improving efficiency at the two levels of financial execution and budget management. The efficiency improvement presented in the above cases is highly consistent with findings from existing research. Relevant literature shows that AI-assisted financial planning can shorten the process cycle by 60% to 80% by systematically eliminating anchoring biases and spreadsheet errors in manual processing, thereby improving budget quality [3]. From a technical architecture perspective, the above applications usually adopt multi-agent collaborative design: a data retrieval Agent is responsible for docking with the ERP and external databases; a prediction Agent is responsible for running statistical and machine learning models; a draft generation Agent structures the output into standard budget templates; and an audit Agent automatically marks abnormal items. This division of labour and collaboration model is highly compatible with the collaborative architecture advocated in the research on multi-agent systems [2].

2.2. Financial risk identification and early warning scenarios

In the field of financial risk management, the core value of AI Agent is to promote the fundamental transformation of the risk identification mechanism from "after-the-fact review" to "real-time early warning". Through deep integration with the enterprise financial system, AI Agent can continuously monitor key risk indicators such as accounts receivable aging, cash flow coverage, inventory turnover abnormality, counter party credit signal, etc., and automatically generate early warnings when the indicator triggers the preset threshold or the pattern recognition model detects abnormal characteristics. See [6].

The core technologies involved in this scenario include anomaly detection algorithms and knowledge graph association analysis. By building an association network among legal entities, financial accounts and transaction records, knowledge atlas technology can identify abnormal transaction patterns under complex association structures and provide technical support for the early identification of financial fraud of listed companies [6].

Academic research has proved that AI-based early warning model has shown obvious advance advantages in identifying financial fraud of listed companies. An empirical study of Chinese A-share listed companies shows that machine learning models trained on financial statement data and auxiliary characteristic variables can identify potential signs of earnings manipulation one to two years before the regulatory authorities officially take action, [6] and the detection time frame is significantly better than that of traditional audit procedures.

The differentiated value of AI Agent in this scenario is further reflected in the ability to interpret risk signals contextually. Unlike traditional anomaly detection models that generate binary warnings, AI Agent can understand abnormal signals within a broader business narrative framework: distinguish between accounts receivable fluctuations consistent with the historical seasonal model and the accumulation of accounts receivable with structural abnormalities, so as to greatly reduce the false alarm rate and improve the early warning system. The actual use value for financial personnel is thus enhanced.

2.3. Financial information disclosure auxiliary scenario

Financial information disclosure is a core financial function with high compliance requirements and high time limit pressure. AI Agent is being used more and more widely in the preparation of annual reports, ESG reports and regulatory declaration documents. Through automated data extraction, standardised template mapping and disclosure draft generation, it has systematically reduced the burden of manual processing and the probability of human error [4, 7].

In typical deployment scenarios, AI Agent can automatically retrieve the latest regulatory requirements issued by the China Securities Regulatory Commission database or the International Financial Reporting Standards Foundation, extract relevant financial data from the enterprise consolidated statement system, generate structured narrative text for the management discussion and analysis (MD&A) chapter, and automatically mark the parts of the draft that may have insufficient data support or require legal review [7].

One point needs to be emphasised: the application of AI Agent in information disclosure scenarios must be based on a strict manual audit mechanism. The accuracy of the disclosure text generated by AI fundamentally depends on the integrity and consistency of the source data; and the professional judgements required for core disclosure elements-such as forward-looking statements and the identification of material information-cannot be made by the AI system at present. Therefore, the more reasonable practice model should be the collaborative framework of "AI

generation + professional audit and confirmation", which clearly assigns final disclosure responsibility to the signing financial officer and legal consultant, not to the AI system itself..

3. Challenges and risks of AI Agent applied to financial management

3.1. Data security and privacy risks

Financial data is the most sensitive category of enterprise information assets, covering core business performance indicators, customer financial portraits and strategically sensitive forecast data. Under the AI Agent deployment architectures that rely on public cloud hosting of LLMs, financial data will face major risks such as data interception, unauthorised model training, and cross-border data access compliance that conflicts with enterprise confidentiality policies when transmitted to external modal service providers [8].

At present, the industry's mainstream response to the above risks is Private Deployment—hosting LLM in an exclusive cloud environment with the enterprise's own infrastructure or contractual data isolation guarantees. Privatised deployment minimises the risk of external data exposure, but also introduces new challenges: higher infrastructure investment, more complex model maintenance and update mechanisms, and possible performance gaps compared with cutting-edge models that are only accessible through public APIs. When formulating AI Agent deployment strategies, enterprises must carefully weigh security compliance against technical performance.

3.2. Challenges of regulatory compliance

The regulatory framework governing the application of AI in the financial field is evolving rapidly in China and internationally. In China, the Interim Measures for the Management of Generative Artificial Intelligence Services promulgated by the Cyberspace Administration of China in 2023, clearly stipulates the accuracy of AI-generated content, the labelling requirements for AI output, and the content compliance responsibility of service providers [9]. These regulations put forward direct compliance requirements for enterprises that use generative AI in financial information disclosure scenarios.

At the international level, whether AI-assisted financial decision-making complies with the principle of audit independence is still controversial. The China Institute of Certified Public Accountants and other professional institutions have begun to issue guidelines for the practical application of AI [10]. However, if the analysis conclusion of AI Agent supports an audit opinion or financial disclosure that has been recognised as substantially misleading after the fact, it has not been decided who should bear the relevant legal responsibility. It is urgent for regulatory departments and professional institutions to work together to advance the development of relevant systems.

3.3. AI illusion and decision-making reliability

AI Agent based on large language models has a fundamental technical limitation - the phenomenon of "hallucination" [2] — that is, the model generates output content that sounds reasonable but is actually inaccurate. In general application scenarios, occasional hallucinations may be within the acceptable range; however, in financial management scenarios, digital accuracy must meet the legal accuracy requirements, document records must be legally defensible, and the fault tolerance of the system must be extremely low. Once the AI Agent generates incorrect income data, incorrectly

accounts for liabilities, or incorrectly cites regulatory provisions the consequences will lead to substantial misstatement of the financial statements; if the consequences are serious, the enterprise will face legal penalties.

The main technical means to deal with hallucinations is retrieval-enhanced generation (RAG) - by requiring the model to trace each factual statement from the verified retrieval document, instead of relying on the parameterised memory of the model, the incidence of passive fabrication can be greatly reduced. However, the RAG architecture itself also has limitations: retrieval errors, outdated document libraries, and context window restrictions may affect the accuracy of reasoning results. Therefore, a sound enterprise-level deployment plan must combine RAG technology with the mandatory manual audit layer to ensure that all output contents that will appear in external documents or official financial records are manually verified and signed for confirmation.

3.4. Personnel restructuring and organisational change

The large-scale deployment of AI Agent in the financial workflow has a profound impact on the personnel structure and capability requirements of the financial team. Conventional functions such as transaction reconciliation, standard statement generation, invoice processing and basic difference analysis are highly suitable for AI Agent automation because they are heavily dependent on structured data processing. With the increase in the adoption rate, the demand for financial positions to undertake the above functions is expected to continue to decline [7, 11].

From a forward-looking perspective, AI will promote the structural shift of the value contribution of financial functions — from high-quantity, low-judgement data processing to high-judgement, high-value analysis and supervision activities [11]. In the future, financial professionals will more often take on the roles of "AI supervisors" and "business strategic partners", and the core competitiveness will also be transferred to emerging skill dimensions such as prompt engineering, model output evaluation, data governance and strategic financial interpretation.

To promote effective organisational transformation, technology investment and personnel development must be promoted simultaneously, and three actions are indispensable: first, systematic retraining of the financial team; second, restructuring the performance management system to reward high-level analysis contributions; and third, establishing a governance mechanism that can clearly allocate human responsibility for AI-assisted output.

4. Discussion

Based on the above analysis, there is a core question that needs to be answered: does AI Agent fundamentally change the essential logic of financial management, or only improve the efficiency of execution? From the author's observation, the AI Agent at this stage mainly changes the execution efficiency of financial operations. It has significantly improved operational efficiency by compressing the process cycle, expanding the scale of data processing and realising real-time monitoring [3], but it has not fundamentally changed the financial judgement itself nor the logic of strategic value creation.

Judging from the medium-term development trend, with the enhancement of AI Agent's reasoning ability, context memory and enterprise knowledge atlas integration ability, its auxiliary role in strategic financial judgement is expected to be further improved toward the kind that can integrate market information, internal performance data, and regulatory signals to generate financial strategies. The proposed "autonomous CFO assistant" has gradually acquired technical feasibility [1,

2], but the real implementation still depends on the further improvement in model reliability, explainability and responsibility framework.

For enterprises, the financial implementation of AI Agent should take a phased path: initially, it will be prioritised for high-work and low-risk scenarios such as accounts payable automation, standard report generation and budget data integration. After accumulating certain technical capabilities and governance experience, it will gradually expand to risk assessment and information disclosure, as well as other areas with higher requirements for judgement [3].

At the policy level, it is also urgent to establish a compliance framework for AI financial applications, including clarifying the disclosure requirements when AI participates in financial reports, clarifying the responsibility boundaries between enterprises and auditors, standardising financial data governance, and formulating audit standards suitable for AI-assisted processes [9].

5. Conclusion

The research results show that AI Agent shows verifiable value in the three scenarios of budget management, risk management, and information disclosure by integrating an LLM reasoning engine, tool calling, a memory module and autonomous execution ability: it not only improves the efficiency and accuracy of budget forecasting, but also pushes risk management from the original after-the-fact review to real-time early warning. In addition, under the premise of retaining manual supervision, the time cost and error rate of compliance disclosure have decreased significantly.

However, the realisation of the above improvements cannot be separated from a robust technical and organisational guarantee system, including privatised deployment and access control, a fact-verification and manual audit mechanism based on RAG, and an AI governance system adapted to domestic and foreign regulatory frameworks. Enterprises also need to simultaneously promote the retraining of financial personnel and organisational transformation.

At the same time, there are also some limitations in the research. It mainly relies on literature review and case analysis, and lacks of empirical data from large samples to support its findings, so the universality of the conclusion needs to be further verified.

Future research can focus on the following four directions: first, conducting large-scale empirical research on cross-industry and cross-scale enterprises to quantify the impact of AI Agent on financial performance; second, analysing the attribution of legal responsibility in AI-assisted financial decision-making; third, tracking the long-term impact of AI automation on financial professionals' career development; Fourth, exploring a multi-agent collaborative framework that can be applied to complex financial audit processes [2].

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