

The Prioritization of Evaluation Indications for Artificial Intelligence (AI) Business Capabilities in the Financial Sector: Focusing on the Global AI Index

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ABSTRACT

The financial sector is actively considering the adoption of artificial intelligence (AI) in various areas. AI technologies are being introduced not only in key areas of finance, such as marketing, product development, credit evaluation, and risk management, but also in human resources and performance management. As a result, the need to understand business capabilities to achieve successful investment outcomes, including evaluating investment effects and strategies, is increasing. From this perspective, this study aims to identify the capabilities that should be prioritized when investing in AI businesses in the financial sector, based on the Global AI Index, which is a benchmark used for evaluating AI capabilities in 62 countries worldwide. By applying the Analytic Hierarchy Process (AHP) to a group of financial sector experts, the study selected priority rankings for each specific indicator and ultimately identified the priorities for capabilities across seven areas. This study is expected to contribute to minimizing errors and preventing risks when investing in AI within the financial industry.

 keyword : Artificial Intelligent, Financial IT Investment, AHP, Competency Evaluation index, Global AI Index

1. Introduction

The use of artificial intelligence (AI) in the financial sector has been steadily increasing. According to a global survey conducted by NVIDIA on the adoption of AI in the financial industry, the utilization rate of AI in this sector reached 78% in 2021, significantly higher than the average across all industries. This trend is expected to maintain its growth trajectory in the future. A similar growth trend is observed in the domestic financial AI market. The market size increased from 300 billion KRW in 2019 to 600 billion KRW in 2021, reflecting a 100.0% increase. Furthermore, it is projected to expand at an average annual growth rate of 38.2%, reaching a market size of 3.2 trillion KRW by 2026. These figures underscore the rapid adoption and growing importance of AI technologies in the financial sector, both globally and domestically.[24]

The majority of financial institutions have completed the digital transformation of their value chains, and various approaches are being considered for the integration of AI technology. In South Korea, the primary applications of AI are being explored in marketing, product development, credit rating, risk management, human resources, and performance evaluation. Additionally, the scope of machine learning

is being expanded. The construction of data platforms and the implementation of machine learning algorithms serve as the foundation for process automation, enhancement of customer experiences, detection of fraudulent transactions, management of insurance contracts, assessment of creditworthiness, asset management and trading.[2] Consequently, investment in financial AI is on the rise. According to a KPMG economic research report, the number of the world's top 50 banks investing in AI-related fields has grown exponentially since 2016, driven by the acceleration of digital transformation. This growth has resulted in a substantial shift in the investment landscape, with the proportion of investments in this sector reaching 4% in 2023, a remarkable increase from just 0.2% a decade ago. Among them, venture capital investments accounted for 90.6% of the total investments, as reported in a study.[25] In Korea, there are efforts to customize existing services through prompt engineering or fine-tuning for independent development or to train models using domain-specific data. However, significant challenges arise in applying these to actual business operations.

These various attempts to adopt AI in the financial sector appear to be driven by market demands. In response, the Financial Services Commission (FSC)

introduced the "AI Guidelines for the Financial Sector" in July 2021, requiring financial institutions to develop their own capabilities for operating AI systems.

According to the guidelines, financial institutions are required to enhance organizational value and develop their own capabilities by considering AI utilization scenarios. The guidelines emphasize the need for ensuring reliability throughout the entire lifecycle of AI systems, including planning/design, evaluation/validation, deployment/operation, and monitoring, in the context of development, commercialization, and application of AI systems. Similarly, the European Central Bank (ECB) has established a dedicated unit to oversee data and AI initiatives and is working to introduce separate processes to evaluate these efforts.[26]

Such capabilities are being developed gradually and are recognized as essential for establishing evaluation criteria and fostering competencies for the internal utilization of AI. These include tasks such as operating systems to protect consumer rights, managing AI models and training data, communicating with regulatory authorities in the event of issues related to AI systems, and promoting a culture of accountability for AI within organizations.[2]

The purpose of my study is to identify the competency indicators required for AI-related projects in the financial sector and to prioritize them. Identifying and prioritizing these indicators aims to accelerate the adoption of artificial intelligence in the financial sector and strengthen the operational capabilities needed to support it effectively.

This study is expected to help financial institutions achieve effective investment outcomes in AI-related investments by identifying the key competencies they should prioritize.

The structure of the study is as follows: Chapter 2 reviews the literature on AI risks and related indices. Chapter 3 outlines the research methodology and presents the results of the Analytic Hierarchy Process (AHP). Chapter 4 provides the conclusion, implications and the limitations of this study.

2. Literature Review

This chapter examines key literature related to AI index in the financial sector. Through a review of

relevant studies on index for assessing the business capabilities of AI in the financial sector, a set of baseline index was selected, and further literature was explored to define these index in detail. The literature review was conducted in two directions: Selection of Capability index: Identifying relevant index to evaluate AI capabilities in the financial sector. Definition of Detailed index: Exploring related literature to establish precise definitions of the selected index. The results of this literature review were utilized in Chapter 3 to conduct an AHP (Analytic Hierarchy Process) study aimed at determining priority rankings.

2.1 Indicator Literature Review

2.1.1 Global AI Index

Since 2019, the UK-based Tortoise Media has utilized the Global AI Index to evaluate the AI capabilities of countries. By 2023, the index had been applied to assess AI competencies across 62 countries. The Global AI Index categorizes AI capabilities into three main areas: implementation, innovation, and investment, which are further divided into subcategories such as talent, infrastructure, operating environment, research, development, government strategy, and commercial investment.

This index is recognized as a key benchmark for comparing and assessing the progress of AI technologies across nations. It provides a comprehensive analysis of various aspects of AI, including research, development, commercialization, infrastructure, and government strategies, to evaluate the AI competencies of individual countries.

The Global AI Index plays a significant role in identifying the AI capabilities of countries and comparing their global competitiveness in this rapidly evolving field.[8]

2.1.2 AI Vibrancy Tool

The Global AI Vibrancy Tool is a metric developed by Stanford University's Human-Centered AI Institute (HAI). This tool focuses on studying the impact of AI technologies on humanity and analyzing the social, economic, and ethical aspects of human-centered AI.

Based on these analyses, the tool provides recommendations for AI policies to ensure that the technology aligns with human values and serves societal interests. Designed as an advanced framework to evaluate and compare the development and adoption of artificial intelligence technologies across various countries and regions, this tool utilizes diverse index such as research, talent, infrastructure, industrial applications, policy and regulation, and social impact to assess AI capabilities.

The development of this tool involves the collaboration of experts from various universities, research institutions, and companies, who work together to establish methodologies for data collection, analysis, and evaluation. Additionally, several international organizations, government agencies and non-profit entities contribute to its development and implementation. These organizations support the initiative by shaping AI policies, providing research assistance and offering data to enhance the tool's effectiveness.

This tool was developed to comprehensively evaluate the development and adoption of AI technologies, aiming to provide objective and reliable data through the participation of various stakeholders.

Based on this foundation, the Global AI Vibrancy Tool plays a crucial role in understanding and comparing global AI trends. It provides essential insights for formulating AI strategies and is used to evaluate the AI capabilities of various countries and regions.[9]

2.1.3 Evident AI Index

To assess the AI capabilities within the banking sector, this index evaluates AI competencies using publicly available external data. As of November 2023, the initiative is led by the UK-based fintech company 'EvidentInsight.com' and focuses on key metrics such as talent, innovation, and leadership to gauge the business capabilities of banks.

The index evaluates the AI commercialization capabilities of the top 50 global banks, in collaboration with experts from the banking, technology, and benchmarking sectors. This joint effort offers a comparative overview of the AI competencies of these leading financial institutions.[27]

2.1.4 AWS AI Adoption framework

The AWS (Amazon Web Services) framework proposes a methodology for the successful adoption of AI, taking into account the diverse organizational and cultural contexts that influence the adoption process. Cloud-based AI technology adoption

This framework presents a set of decision-making criteria for the adoption of AI technology in business contexts, with a particular focus on the outcomes and inter-organizational implications of such adoption.[10]

As a result of a literature review on related index, the Global AI Index was chosen as the benchmark capability indicator for evaluating AI in the financial sector (Table 1). The rationale for this selection is as follows: The financial sector is increasingly required to ensure responsible AI service operations to address risks such as data bias, discrimination, and data breaches.[28] European financial institutions are adapting to AI governance adoption by fostering collaboration between academia and industry partners. Efforts include enhancing sustainability through interactions among environment, organizations, and systems, as well as forming executive teams, securing organizational structures, and developing specialized talent.[29] Third, the domestic financial sector is also taking steps to prepare for more comprehensive management of AI competency index to support the commercialization of AI initiatives.[25] Considering these factors, along with expert opinions, the Global AI Index—a comprehensive and widely recognized indicator for evaluating AI capabilities across nations—was selected as the benchmark capability indices.

2.2 Index Definition

2.2.1 Implementation

When seeking investments for the commercialization of artificial intelligence, the foremost critical factor is the extent to which an organization possesses skilled personnel and has well-established structures to nurture and manage them. It is essential to cultivate internal teams capable of mastering AI technologies or to

effectively leverage external expertise. Organizations must ensure they retain skilled professionals by implementing regular training programs, conducting evaluations, and facilitating role transitions based on performance and evolving business needs.[8] In the financial sector, as investments in digital transformation accelerate, workforce restructuring and organizational changes are intensifying, resulting in shifts in personnel composition. Automated algorithm-based trading introduces new types of risks, while competition and collaboration between financial and non-financial industries are becoming increasingly dynamic.

In the financial sector, investments in digital transformation are accelerating, leading to intensified workforce restructuring and organizational changes, which are beginning to alter personnel composition. Automated algorithm-based trading introduces new risks, while competition and collaboration between financial and non-financial industries are becoming increasingly dynamic.

Services such as robo-advisors provide customer support without the need for specialized personnel. However, internal organizational limitations often hinder their widespread adoption. To enhance the utilization of artificial intelligence, high-quality datasets are essential. Yet, regulatory restrictions and limitations on data usage exacerbate the shortage of skilled professionals capable of effectively leveraging these resources.

Moreover, there is an even greater scarcity of personnel proficient in handling big data or working with AI algorithms, a challenge that is particularly severe for regional banks compared to major commercial banks.[2] Secondly, infrastructure serves as a critical criterion, as establishing an adequate infrastructure environment is essential for promoting development. In financial operations, the primary areas where AI is utilized include enhancing call center efficiency, streamlining internal workflows, automating responses, improving customer interactions, managing investments and assets, evaluating credit, and ensuring compliance.

When considering the process of identifying areas for improvement and driving performance outcomes through investments, there is a concern that overly optimistic expectations or improper utilization may result in excessively high infrastructure investment costs.

Therefore, a balanced approach is necessary to ensure that investments are both efficient and aligned with achievable outcomes.

Thirdly, it is essential to determine whether there is a well-defined process for workforce transition in response to changes in the work environment related to artificial intelligence. This includes assessing whether HR and organizational structures support such transitions and whether short-term and long-term programs are in place to cultivate talent and facilitate workforce adjustments. It also involves examining the existence of specific KPIs (Key Performance index) for workforce transitions or processes that enable these transitions effectively.

In particular, applying AI to financial sector operations requires an understanding of appropriate regulations and the ability to translate them into actionable and compliant workflows. Regulatory compliance and financial services are key requirements, making it necessary to consider specific legal frameworks alongside technological development. Policymakers in the financial industry must comprehend both technical and regulatory aspects to develop and expand services that align with these considerations.

An approach that fails to comply with regulations could expose critical financial systems to significant risks and uncertainties. Conversely, excessive regulation may stifle innovation and hinder the potential for AI technology adoption in the financial sector. Striking a balance between these diverse interests and considerations is essential, necessitating a careful integration of multiple perspectives and existing domain expertise to effectively promote the adoption of AI technologies.

It is crucial to ensure that all stakeholders in the financial sector possess a consistent understanding of AI and its applications. This allows for efficient integration of AI into their respective functions. Continuous innovation is required to bridge knowledge gaps and ensure that AI technologies are implemented effectively, driving both compliance and progress in the financial industry.[14]

2.2.2 Innovation

When making investment decisions in artificial intelligence, it is important to distinguish between

research and development as key innovative factors.

Research involves identifying and nurturing future technologies while establishing a foundation for strategic planning and investment decisions. To achieve this, it is essential to have specialized organizations, such as dedicated research laboratories, to carry out research activities. Currently, most financial organizations focus on applying artificial intelligence (AI) technologies, with an emphasis on the following areas: targeting customers for marketing purposes, analyzing customer profiles, enhancing customer engagement through chatbots, conducting credit checks, evaluations, and rating adjustments in investment transactions, and detecting anomalies for risk management.

To support these applications and advance future innovations, research labs need to focus on developing future technologies. These labs can explore and expand AI capabilities in fields such as Real-time predictive analytics, Identifying patterns and predicting outcomes in real-time.

Machine learning and deep learning are advancing the capabilities of AI models. Vision technologies for video analysis utilize AI to provide video-based insights. Graph analysis employs AI for data visualization and to illustrate complex graphical relationships. Natural Language Processing (NLP) involves the development of systems capable of understanding and generating human language.

By investing in these research areas, organizations can establish a robust foundation for future AI applications, ensuring continuous innovation and maintaining competitiveness in the financial sector.[15]

Development focuses on activities and proposals aimed at applying and implementing new AI technologies in real-world operations. This field promotes the adoption of innovative technologies and identifies effective applications within business contexts. The primary emphasis is on creating applied services and conducting development activities that facilitate their practical use.

A key element in development is data. Creating proprietary AI models can be challenging, making it essential to effectively utilize data while adhering to regulatory compliance. Preparing for development requires identifying applicable services and ensuring that they are built on a solid data foundation.

Development efforts should be approached from both short-term and long-term perspectives, with strategies tailored to address immediate needs as well as future goals. Additionally, fostering an organizational culture that adapts to and supports development practices is crucial. Encouraging teams to embrace and align with a development-focused culture will be essential for the successful integration of AI technologies.[17] In particular, Article 15, Paragraph 1 of the Financial Electronic Supervision Regulations stipulates that information processing systems located within data centers, as well as terminals that directly access these systems for purposes such as operation, development, and security, must be physically separated from external communication networks, such as the internet. This network separation policy presents significant challenges in utilizing data effectively, highlighting a real obstacle for AI development and application in the financial sector.[18]

Such a research environment highlights the need for clear guidelines on the role it plays within the realms of social responsibility, ethical conduct, and sustainability. The ethical necessity of responsibly utilizing sensitive data in AI applications is widely acknowledged, emphasizing that research and implementation must be conducted with greater care to support the universal management principle of sustainability.

Specific issues such as algorithmic bias, facial recognition, and monitoring decision-making processes on critical matters are recognized as challenges that must be addressed to develop ethically sound applications. By adhering to ethical standards, companies not only comply with these recommendations but also build higher levels of trust and gain a competitive edge, ensuring that sustainable management practices are maintained.[19]

2.2.3 Investment

In implementing artificial intelligence, AI-related strategies or plans, along with an adequate level of investment, are critically important.

Regarding AI-driven business models, Peter Weill and Stephanie Woerner, professors at the MIT Sloan School of Management, introduced the concept of Digital

Business Models in the AI era. Their framework emphasizes the strategic integration of AI technologies into business operations to enable transformation and value creation in a digital landscape. This concept serves as a guide for aligning investment decisions with AI strategies to maximize business impact.[20] The Digital Business Model combines three key elements—content, customer experience, and platform—to create customer value. In this context, Content (Data) encompasses not only digitalized products but also information about these products. Data is recognized as the most critical resource in the AI era.

A platform refers to the foundation for delivering services, serving as a space where customers can analyze and utilize data, thereby creating a pathway for generating new value.

Customer experience focuses on how customers interact with the content and platform, shaping their overall perception and engagement.

To implement and deliver these three elements, significant investment in infrastructure, skilled personnel, and a supportive organizational culture is essential. In the AI business landscape, the platform plays a pivotal role as the venue for creating and delivering value. For example, AI technologies such as image processing, voice recognition, natural language processing, and recommendation systems are utilized to develop services that meet customer demands and provide tailored products.

Online reviews and customer experiences generated on such platforms become sources of competitive advantage, enabling the business model to focus on value creation and profitability. This process demonstrates how businesses can leverage big data, select appropriate platforms, determine pricing models, and seek innovative ways to materialize profits.

These activities not only enhance the competitive edge but also contribute to building a new business ecosystem, where strategic investments in AI technologies, data utilization, and platform development are indispensable for sustainable success.[21]

According to a survey conducted by the Korea Institute of Finance targeting domestic commercial banks, the key areas of AI adoption in the financial sector include "credit evaluation and loan screening" and "risk

monitoring," with utilization rates reaching 87.5%. The adoption of chatbots was also significant, at 75%.

However, the survey identified several challenges hindering AI implementation. Data-related issues, Cited by 75% of respondents. Shortage of skilled professionals, Highlighted by 62.5%. Regulatory constraints, Identified as a challenge by 75%. These findings underline the need for strategic investments in data infrastructure, workforce development, and regulatory reforms to enhance AI adoption in the financial sector.

In the areas of credit evaluation and loan screening, AI recommendations are being implemented the most rapidly in South Korea. AI is widely utilized for tasks such as calculating credit scores, approving interest rates, adjusting credit limits, and performing error analysis.

In the field of risk monitoring, AI plays a significant role in applications such as anti-money laundering, credit limit adjustments, and error analysis. For chatbots, their primary use cases are in customer and employee interactions, where they are extensively deployed to enhance responsiveness and streamline communication processes. These applications demonstrate the growing role of AI in optimizing operational efficiency and decision-making in the financial sector.[1]

In conclusion, a literature review was conducted to identify key index for securing business capabilities in the financial sector (Table 1). Existing studies primarily focus on index research for evaluating artificial intelligence, frameworks for its application, and policy research addressing overall governance or cases of AI implementation in the financial sector.

However, the review highlights a significant gap: there is a lack of detailed definitions for specific capability indices related to AI-driven business initiatives in the financial sector, as well as concrete studies that prioritize these indices or provide case studies based on them. This underscores the necessity for further research to effectively establish and apply such indices.

3. Research Method and AHP Analysis

This chapter outlines the process of constructing the research model and methodology to identify the priorities of AI business capabilities in the financial

(Table 1) Global Index Definition of Key Items

Lv1	Lv2	Definitions	Ref.
Implementaion	Operational Workforce	An operational team to manage AI technologies, supported by skilled personnel, along with the provision of relevant training programs and the availability of qualified staff.	[2]
	Infrastructure	Possession of AI-related infrastructure and large-scale data storage systems, status of internal/external data utilization, and the establishment of AI-related information systems(e.g., GPU, foundational models)	[3]
	Environment	Plans for AI-related task transitions, short-term and long-term workforce development programs to facilitate role transitions, establishment of dedicated KPIs for AI-based task transitions, and possession of procedures for task transitions.	[14]
Innovation	Research	Possession of a dedicated research lab for future technology exploration, supported by specialized research personnel, including dedicated executives or team members.	[19]
	Development	Status of adoption of new AI technologies and related activities, including the introduction or commercialization readiness of technologies such as Foundational Models (FM), Prompt Engineering, Large Language Models (LLM), and Retrieval-Augmented Generation (RAG).	[17]
Investment	Strategy	Establishing strategies based on data, platforms, and customer experience, which are the core components of the business model, through AI strategies or planning.	[21]
	Commercialization	Determining the scale of investment in AI and establishing investment criteria to enable new business opportunities.	[1]

sector.

3.1 Research Method

3.1.1 Construction of the Research Model

To evaluate the importance and priorities of assessment index for investments in AI business initiatives in the financial sector, an AHP analysis was conducted using an Excel VBA-based program.

AHP (Analytic Hierarchy Process) is a multi-criteria decision-making (MCDM) methodology developed by T. Saaty in the early 1970s. It is widely recognized for its ability to handle qualitative MCDM problems. AHP represents decision-making problems hierarchically, clustering evaluation elements into homogeneous groups and organizing them into multiple levels. Based on the judgments of decision-makers, AHP assigns priorities to alternatives and synthesizes the results at each level to reach a final decision. Given its systematic structure, AHP was deemed suitable for determining the priority

of assessment index in this analysis.

AHP operates on a set of principles that define the scope of decision-making problems and analyze the factors that influence them. The methodology is grounded in the mathematical structure of eigenvectors and matrices, which are used to calculate weights for each factor. Through pairwise comparisons, AHP evaluates the relative importance of two factors or alternatives, calculating their priority scores and providing a robust framework for decision-making.[22] AHP can be applied regardless of whether the data used to evaluate alternatives is quantitative or qualitative. It is particularly valuable as it quantitatively analyzes the qualitative opinions of expert groups involved in the evaluation. This capability makes AHP highly versatile and widely recognized for its usefulness in various decision-making scenarios.

This study aims to identify the key investment factors that carry the highest weights and priorities influencing the decision to adopt artificial intelligence (AI).

The research model was developed based on the Global AI Index, dividing it into upper-level and lower-level index within a hierarchical structure. The definitions of these index were established through an extensive review of relevant literature.

3.1.2 Sample Selection and Data Collection Method

For this study, a survey was conducted with 62 experts in the financial industry who are either currently involved in AI-related investments or actively engaged in specific tasks related to AI projects. The occupational characteristics of the participants are as follows:

Banking and Finance (including Fintech): 30 participants (29.6%). Capital/Loans: 4 participants (3.8%); Securities/Credit Cards: 6 participants (6.4%); Insurance: 22 participants (21.9%). In terms of general characteristics, the gender distribution is as follows: Male: 44 participants (71.0%); Female: 18 participants (29.0%).

Age Distribution: 20s: 3 participants (4.8%), 30s: 19 participants (30.6%), 40s: 24 participants (38.7%), 50s: 11 participants (17.7%), 60s: 5 participants (8.1%). This demographic data offers a comprehensive overview of the participants, reflecting a diverse range of roles and sectors within the financial industry.

The survey was conducted online from June 10 to June 19, 2024, involving a total of 62 participants. Respondents provided their opinions through pairwise comparisons of major categories (Lv1) and subcategories (Lv2). The survey included explanatory materials about the pairwise comparison method and descriptions of the evaluation criteria to ensure clarity and consistency.

The 9-point scale proposed by the AHP methodology was used for the pairwise comparisons of the evaluation criteria, enabling participants to assess the relative importance of each item effectively.[22]

When the number of comparison targets exceeds three, the Consistency Ratio (CR) is calculated to verify the logical consistency of the survey results. This is done by dividing the Consistency Index (CI) by the Random Index (RI).

In AHP, the pairwise comparison matrix A is a square

matrix of size $n \times n$ where each element a_{ij} indicates the relative importance of i compared to j. The maximum eigenvalue(λ_{max}) is derived from the matrix using the characteristic equation $\det(A - \lambda I) = 0$, and the largest eigenvalue is used to calculate the CI using the following formula. Subsequently, the CR is calculated by dividing the CI by the RI (the predefined random index corresponding to the size of the matrix). According to standard practice, a CR value of 0.1 or less is considered acceptable for reasonable evaluations. However, prior studies suggest that CR values below 0.2 may also be acceptable. For this study, data with CR values exceeding 0.2 were excluded to maintain logical consistency. As a result, the analysis focused on the responses from 19 participants with CR values below 0.2, ensuring the reliability and consistency of the evaluation results.

$$CI = \frac{\lambda_{max} - n}{n - 1}, \quad CR = \frac{CI}{RI} \quad (1)$$

The Consistency Ratio (CR) for the higher-level factors was calculated as 0.154, which is below the threshold of 20%. This indicates that the logical consistency of the respondents' evaluations was sufficiently ensured.[23]

3.2 AHP Analysis

3.2.1 Importance and Priorities of Higher-Level Factors (Lv1)

The AHP analysis results indicate (Table 2) that among the higher-level factors (Lv1) for evaluating AI investments in the financial sector, Investment was identified as the most critical factor with a weight of 0.451. This was followed by Innovation with a weight of 0.300, and Implementation with a weight of 0.249. The findings highlight that the financial sector prioritizes strategic planning and investment direction when adopting AI technologies. This indicates that investment decisions are made based on well-defined strategies and investment plans.

The second most important factor, Innovation, reflects the emphasis on whether the organization possesses

(Table 2) AHP Comprehensive Analysis

Lv1	Weights	Lv2	Weights	Total Weights	Rankings
Implementaion	0.249	Operational Workforce	0.382	0.095	5
		Infrastructure	0.253	0.063	7
		Environment	0.366	0.091	6
Innovation	0.300	Research	0.499	0.135	4
		Development	0.551	0.165	3
Investment	0.451	Strategy	0.461	0.208	2
		Commercialization	0.539	0.243	1

specialized research labs or facilities for AI research and development. The results suggest that once the investment direction is determined, efforts are directed toward advancing future research and service development.

Finally, Implementation was ranked as the lowest priority among the factors. This category evaluates whether organizations are assembling teams with skilled personnel in artificial intelligence (AI) and investing in the necessary infrastructure. The relatively low priority assigned to this factor suggests that, at present, financial institutions are more focused on investment planning and organizational development rather than on the immediate recruitment of skilled personnel for Implementation.

These results demonstrate that the financial sector's approach to AI adoption emphasizes investment and innovation as foundational elements, with Implementation regarded as a subsequent step in the process. This reflects a focus on long-term planning and development prior to operational deployment.

3.2.2 Importance and Priorities of Implementation Factors

The Consistency Ratio (CR) for Implementation factors was calculated as 0.196, which is below the threshold of 20%. This indicates that the logical consistency of respondents' evaluations was adequately ensured. Among the Implementation factors, operational workforce emerged as the most critical factor with a weight of 0.382, followed by infrastructure with 0.366, and environment with 0.253.

The highest priority among Implementation factors is assigned to the operational workforce. This underscores the importance of organizing skilled teams to support AI technologies, providing training to develop relevant expertise, and ensuring the availability of specialists. Various initiatives are actively underway to cultivate and retain professionals with the necessary skill sets to successfully implement AI initiatives. Infrastructure was identified as the second most critical factor. This includes the presence of systems such as GPUs, foundational models (FM), and data storage facilities required to support AI-related services. The availability of robust infrastructure is deemed a crucial prerequisite for successful AI implementation. The environment which pertains to an organization's ability to facilitate job transitions and implement relevant procedures for AI-related workflows, ranked the lowest in priority. This index that preparations for transitioning tasks and processes to align with AI technologies are still in the early stages within most financial institutions.

The analysis reveals that the financial sector places the highest emphasis on building and maintaining a skilled operational workforce and establishing a strong infrastructure to support AI initiatives. However, creating an organizational environment that enables seamless job transitions and process adaptation for AI-related tasks is still at an early stage. These findings suggest a need for further focus on developing procedural frameworks and fostering adaptability within organizations to fully realize the potential of AI in the financial sector.

3.2.3 Importance and Priorities of Innovation

Factors

An analysis of the innovation factors in AI investment for the financial sector revealed that development is a more critical factor, with an importance weight of 0.551, compared to research, which has a weight of 0.449.

In the context of innovation, the factors were categorized into research and development, focusing on advancing AI technologies and preparing for future tasks.

Research involves securing specialized research facilities and skilled personnel to explore and develop new AI technologies. However, research was ranked lower compared to development, indicating that its priority is considered less immediate.

Development encompasses activities aimed at enhancing ongoing services and adopting new technologies. It emphasizes the introduction of new services and the establishment of robust development environments. Development was identified as more important than research, reflecting its immediate relevance to the current implementation and application of AI technologies.

The findings emphasize that within the realm of innovation, development activities are more significant than exploratory research. This highlights the financial sector's emphasis on implementing practical advancements in AI capabilities to address current business needs while research is viewed as a longer-term priority.

3.2.4 Importance and Priorities of Investment Factors

The analysis of investment factors in AI business initiatives within the financial sector revealed that commercialization is the most important factor with a weight of 0.539, compared to strategy, which has a weight of 0.461. Commercialization has been identified as the most critical investment factor, underscoring the priority placed on establishing a solid investment framework and developing comprehensive plans for the commercialization of AI technologies in the financial sector. The significant emphasis on commercialization underscores its crucial role in ensuring that AI

technologies are effectively integrated into business operations and yield measurable results. Strategy ranked as the second most important factor, highlighting the need for well-defined strategic plans to support and guide the implementation of AI business initiatives. Strategic planning is essential for aligning AI investments with organizational goals and ensuring their effective Implementation. The results indicate that commercialization efforts, supported by precise investment planning, are the top priority in AI business initiatives for the financial sector. Strategic planning, while critical, follows as a secondary priority, serving as a foundational framework for achieving successful commercialization. These findings indicate the financial sector's focus on transforming AI technologies into tangible business value through structured investment and strategy development.

3.2.5 Comprehensive Importance and Priorities of Evaluation index for AI Business Capabilities in the Financial Sector

The analysis of the comprehensive importance and priorities of capability index for AI business in the financial sector revealed that, among investment index, commercialization was evaluated as the most critical factor, with a weight of 0.243. This was followed by strategy at 0.208, development at 0.165, research at 0.135, operational workforce at 0.095, infrastructure at 0.091, and environment at 0.063.

Overall, the findings indicate a focus on the investment domain, with significant attention to evaluating strategies and formulating detailed Implementation plans. These efforts can be interpreted as part of an organizational improvement process aimed at supporting research and development as well as business operations.

This trend indicates that AI-based **businesses in** the financial sector are still in their early stages, with gradual progress anticipated toward more robust research, development, and operational capabilities in the future. This progression reflects a maturing landscape in which foundational investments and strategies will ultimately evolve into long-term operational and technological advancements.

3.3 Discussion

Current executives in the financial sector emphasize the necessity for increased investments in hardware and software to advance artificial intelligence (AI) initiatives. According to the NVIDIA Financial AI Analysis Report, only 34% of respondents agreed with the statement, "Our company invests adequately in AI." In contrast, 28% were neutral or uncertain, while 39% believed that their company's investment in AI was inadequate. Nevertheless, 97% of respondents indicated that they plan to increase their spending on AI infrastructure this year.[30]

In a similar survey, 56% of customers identified AI investment as a primary focus area for the financial industry. [25] The findings support the results of this study, where investment ranked as the highest priority among AI capability index in the financial sector. Strengthening investment capabilities highlights the importance of aligning investment priorities with market trends and maximizing investment efficiency.

As significant investments are anticipated, it is essential to establish guidelines for business investments and prepare decision-making criteria during the review process. This preparation will ensure that investments are well-targeted and strategically aligned to achieve maximum impact.

Global top 50 banks are increasingly investing in and acquiring AI and technology-focused companies through venture and partner investments. To accelerate digital transformation initiatives, they are also expanding their partnerships with universities/academic institutions and suppliers.

For example, Morgan Stanley has commercialized the AI @ Morgan Stanley Assistant service by integrating OpenAI, while 29 banks have formed partnerships with universities to accelerate research activities. Additionally, 12 banks are operating dedicated AI code repositories on GitHub to foster innovation and collaboration.[27]

4. Conclusion

This study aimed to identify priority areas for enhancing AI business capabilities within the financial sector. This need arises from evolving market conditions that necessitate responsibility and accountability in AI adoption, driven by trends such as the increasing utilization of AI, modifications in existing workflows,

rising investments and the introduction of financial AI guidelines. Acknowledging these dynamics, the study sought to establish the priorities essential for developing AI business capabilities.

The main index were categorized into three primary factors: Implementation, Innovation, and Investment, with detailed subcategories defined through a literature review. Implementation includes talent, environment, and infrastructure; Innovation encompasses research and development. Investment focuses on strategy and commercialization.

The priority analysis revealed the following order of importance: Commercialization > Strategy > Development > Research > Operational Workforce > Infrastructure > Environment. Among these, commercialization was identified as the most critical capability.

The study offers a framework for organizations in the financial sector to evaluate their existing capabilities and identify the necessary steps to develop and enhance their AI business capabilities. Even organizations lacking specific plans or capabilities for AI commercialization can utilize the capability index to assess their current status and determine the appropriate sequence of actions for improvement.

The significance of this research lies in its ability to facilitate discussions on concrete preparations for the future through self-assessment. By focusing on the prioritized key capabilities, fostering necessary skills, and pursuing gradual development, it is expected to accelerate business outcomes and maximize the effectiveness of investments.

According to guidelines in the financial sector, individual financial institutions are required to develop their own capabilities for utilizing artificial intelligence (AI) with a strong emphasis on the importance of formulating effective strategies. Reports indicate that companies prioritizing enterprise-wide AI strategies have achieved over a 20% improvement in Earnings Before Interest, Taxes, and Amortization (EBITA) compared to those that have not. This finding underscores that organizations that identify and nurture the core capability index necessary for strategy formulation are better positioned to gain a competitive advantage in an AI-driven business landscape.

Lastly, the limitations of this study are as follows: this study relied on the Global AI Index as foundation for designing survey questions and conducting research on capability index for artificial intelligence in the financial sector. While this approach provides valuable insights, it underscores the necessity for future research to represent the domestic financial sector and develop more localized index tailored to the unique characteristics of the Korean financial industry. Additionally, there is a need for domain-specific analysis to explore granular index based on specific areas within the financial sector. As expertise in the field continues to advance, it will also be important to conduct research on index that focus on specialized groups, such as prompt engineers and model trainers. This suggests a broader scope for future research on financial AI capability index.

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