FSR – A

Financial System Report Annex

Use and Risk Management of Generative AI by Japanese Financial Institutions

-Based on the results of questionnaire survey-

Background

The Bank of Japan's *Financial System Report* has two main objectives: to assess the stability of Japan's financial system from a macroprudential perspective and to communicate with all relevant parties on any tasks and challenges ahead in order to ensure the system's stability.

The *Financial System Report* provides a comprehensive assessment of the financial system twice a year and is occasionally supplemented by *Financial System Report Annex Series* papers, which provide more detailed analyses and insights on specific topics. This paper introduces the results of the "Questionnaire on AI (artificial intelligence) usage" conducted from April to May 2024.

Abstract

According to the results of this survey, the use of generative AI (GenAI) is spreading rapidly, with about 30% of the financial institutions already using GenAI, about 60% including those currently on trialing, and about 80% including those considering trial or use.

Regarding the purpose of introducing GenAI, almost all the financial institutions using or trialing it answered that it was "improving operational efficiency/reducing costs." The main areas of use include assisting document preparations such as "summarizing documents", "proofreading, editing, and evaluation of documents", and "translation", as well as engaging in "system development and operation management". GenAI is generally regarded to have strengths in fields such as document creation and system development, and since it is considered to have a high affinity with the operations of financial institutions, it is presumed that they expect to improve labor productivity by introducing GenAI. Regarding the evaluation after adopting GenAI, the respondents gave reasonably positive feedback, such as "exceeded expectations" or "mostly met expectations".

GenAI has its own unique risks, such as unintentional information leakage and "hallucination" (in which GenAI plausibly responds with something non-factual). When financial institutions try to promote GenAI in their business, they need to recognize these risks and build up appropriate governance structures. About 70% of the financial institutions responded to questions on the status of their management of GenAI by saying that they use their own virtually isolated areas in cloud services, introduce mechanisms to prevent both the reuse of input content by GenAI and the leakage of products to the Internet, and set restrictions on what kind of data is input. On the other hand, on topics such as the clarification of the policy for the use of GenAI, the development of practical rules, and the verification and evaluation of output data, about 50% of the financial institutions answered that they found room for improvement or that they were considering appropriate measures. As technological innovation in GenAI progresses rapidly, financial institutions are required to continuously review their operating rules in accordance with changes in risk.

I. Introduction

In recent years, there has been growing interest in GenAI, which can create new content such as text and images using large language models.[1] GenAI technology has been advancing at a remarkable pace, and it has rapidly been penetrating society as a whole. Against this backdrop, Japanese financial institutions' interest in GenAI has also grown, and they have started adopting it in such areas as automated document creation and system development.

On the other hand, financial institutions also need to be fully aware of the specific risks posed by GenAI. For instance, it is not easy to ensure explainability of prediction outputs by large language models because the models are so large and complex. It is also known that there is a risk that GenAI may respond with some kind of bias or "hallucinate" -- i.e., provide non-factual responses to users' questions -- as the prediction depends on the content of the databases used to build the model and the characteristics of deep learning methods. As a countermeasure to such risk, financial institutions need to involve human judgment in evaluating the answers generated by GenAI, instead of blindly relying on them. Financial institutions often handle highly confidential information, such as personal information and credit information, so they need to control these risks when introducing GenAI.

With these issues in mind, the Bank of Japan conducted a survey from April to May 2024 on the use of AI, etc., targeting 155 financial institutions.[2] In addition, we exchanged views with some IT vendors and financial institutions on the use of GenAI. Based on these contents, this paper describes the current status, challenges, and issues related to risk management in the use of GenAI in the financial industry.

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[1] A large language model is a representation of relationships between words and phrases that uses deep learning of a large database of text. As with ordinary numerical computation, the model can quantify and compute the relationships between words and phrases. GenAI uses large language models to generate texts and images that are predicted to be most relevant to the input texts.

[2] The breakdown of the survey by business type is as follows: Major Banks (10 banks): Mizuho, Mitsubishi UFJ, Sumitomo Mitsui, Resona, Saitama Resona, Mitsubishi UFJ Trust, Mizuho Trust, Sumitomo Mitsui Trust, SBI Shinsei, and Aozora. Regional banks and *Shinkin* banks: 62 member banks of the Regional Banks Association of Japan, 37 member banks of the Second Association of Regional Banks, and 19 *Shinkin* banks excluding the menbers of Shinkin Kyodo Center. "Other": Japan Post, PayPay, Seven, Sony, Rakuten, Sumishin SBI Net, au Jibun, Aeon, Daiwa Next, Lawson, Minnano, UI, ORIX, GMO Aozora Net, Japan Master Trust, SMBC Trust, Nomura Trust, Nochu Trust, Shinsei Trust, Nippon Securities Trust, Japan Custody, SBJ, Shinkin Central Bank, Chamber of Commerce and Industry, National Federation of Credit Cooperatives, Federation of Labor Banks, Norinchukin Bank (27 banks). The survey response rate was 100%.

II. Use of GenAI

Our survey result shows that about 30% of the financial institutions are already using GenAI, and that about 30% are conducting trials, meaning that about 60% of the institutions are using GenAI in some way. The proportion rises to about 80% when the financial institutions that are considering future trials or use of GenAI are included. The use of GenAI by financial institutions is spreading rapidly (Chart 1).

Sorting by financial institutions' business type, all major banks have either tried or have already started using GenAI. About 50% of regional banks and *shinkin* banks have started using GenAI on a trial basis or have already started using it (Chart 2).
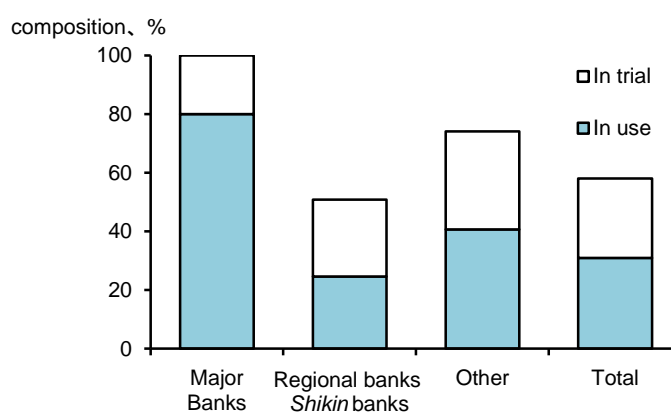
Chart 1: Use of GenAI
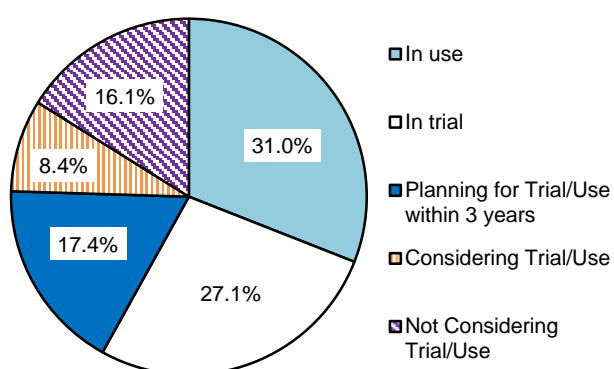
Note: Planning for Trial/Use within 3 years: financial institutions that plan to try or use within 3 years.
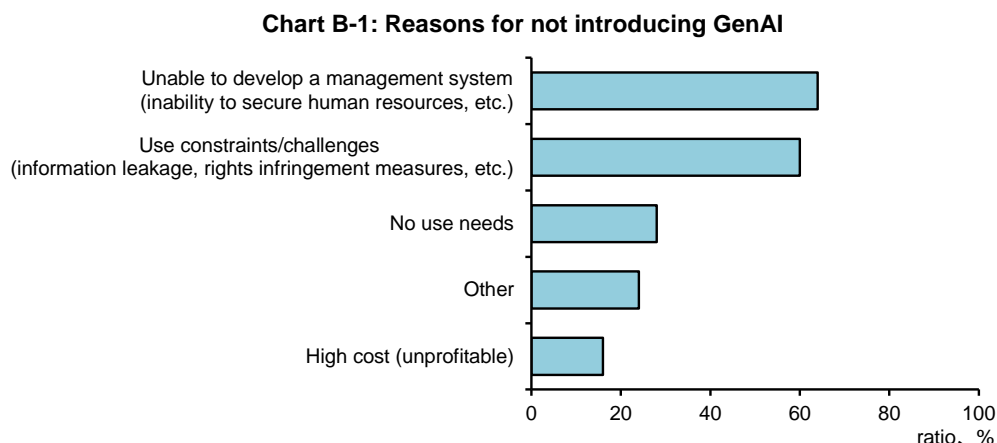   Considering Trial/Use: financial institutions that do not have plans to try or use within three years, but are considering future try or use.

Chart 2: Use of GenAI by business type

Box1: Reasons for not introducing GenAI

Currently, 16% of the financial institutions said they were not considering trial or use GenAI (Chart 1 on the previous page). The reasons for not introducing GenAI are the various restrictions and problems over the use of AI, such as the possibility of information leakage, infringement of third-party rights, ethical issues, and the inability to build governance structures to manage these problems (Chart B-1).

Chart B-1: Reasons for not introducing GenAI

Reason	ratio, %
Unable to develop a management system (inability to secure human resources, etc.)	~64
Use constraints/challenges (information leakage, rights infringement measures, etc.)	~60
No use needs	~28
Other	~23
High cost (unprofitable)	~16

III. Purpose and application of GenAI

Regarding the purpose of introducing GenAI, almost all the financial institutions already using or trying it responded that they aimed at "improving operational efficiency and reducing costs". Main areas of use included document creation assistance, system development and operation management. As specific examples, in assistance with document creation, applications included "summarizing documents" such as records of customer interviews, specialized books on banking business, market information, etc.; "proofreading, editing, and evaluation of documents", such as checking accuracy or editing typographical errors of created reports and legal checking of documents; and "translation" of documents related to overseas regulations. As specific examples in system development and operation management, applications included coding, creating test items, and extraction of similar cases in the past when a failure occurred (Charts 3 and 4).

Due to the nature of their business, financial institutions often handle documents related to requests for approvals, contracts, internal rules and manuals, and use a wide range of systems in the performance of their daily tasks. In this regard, GenAI is generally regarded to have strengths in fields such as document creation and system development, and since it is considered to have a high affinity with the operations of financial institutions, it is presumed that they expect to improve labor productivity by introducing GenAI.

Chart 3: Purpose of Introducing GenAI

Category	number of banks
Operational Efficiency/Cost Reduction	~89
Information gathering/Advanced analytics	~28
Risk Management	~6
Improving customer service	~6
Increasing Revenue (new financial services, etc.)	~3

Chart 4: Applications of GenAI

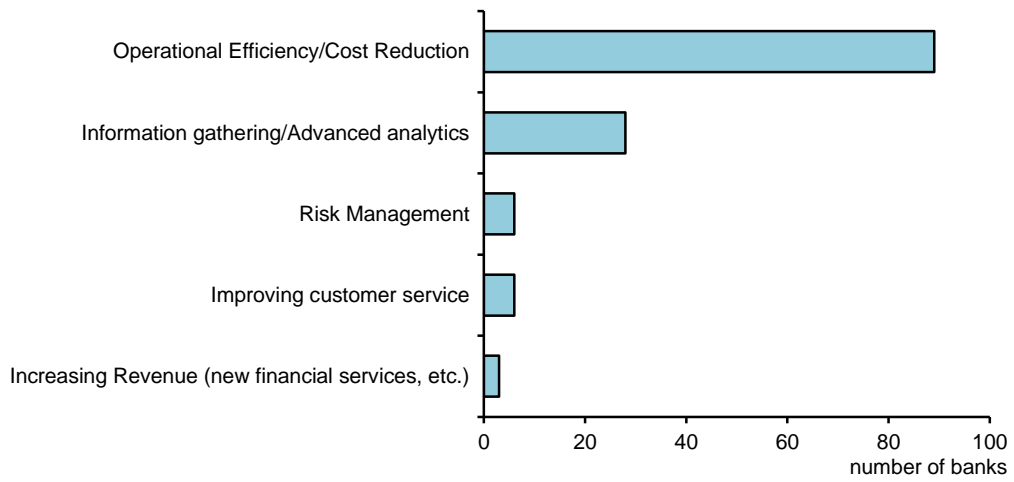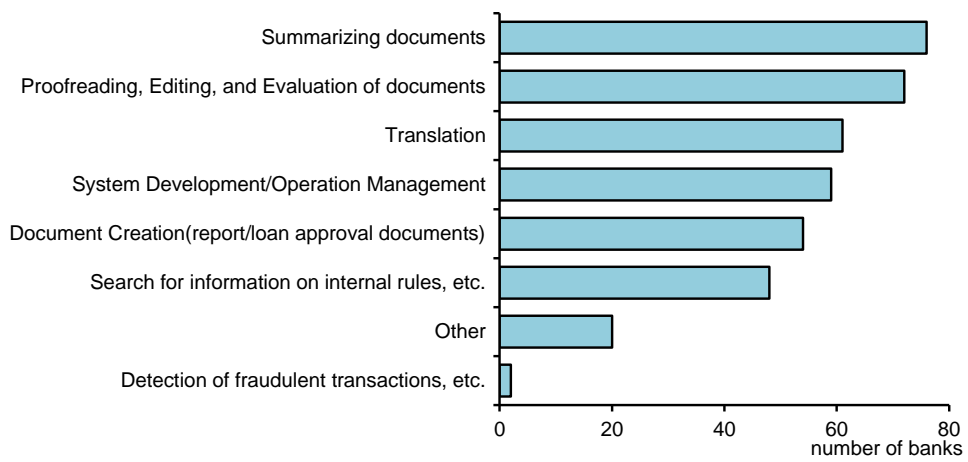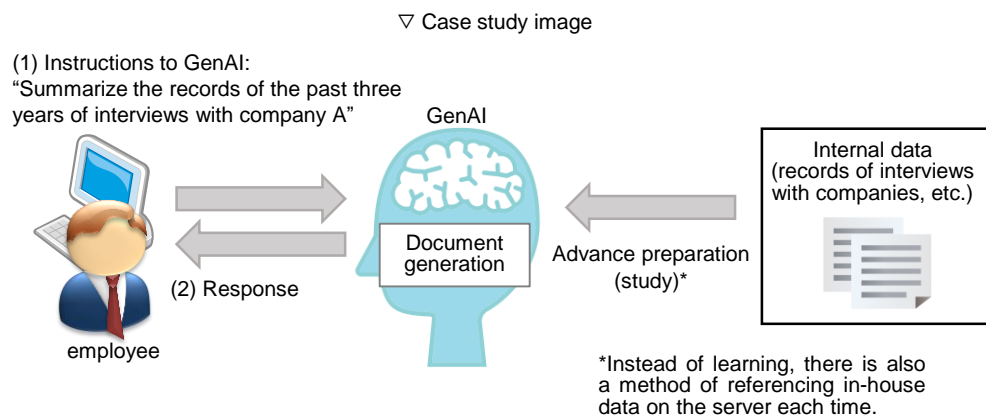| Category	number of banks
Summarizing documents	~76
Proofreading, Editing, and Evaluation of documents	~73
Translation	~62
System Development/Operation Management	~60
Document Creation(report/loan approval documents)	~55
Search for information on internal rules, etc.	~49
Other	~21
Detection of fraudulent transactions, etc.	~2

Note: Chart 3 and Chart 4 cover the financial institutions that answered either "In use" or "In trial" In Chart 1.

Box2: Example of GenAI Use Case

1. Assistance in document creation

Chart B-2: "Summary" and "Proofreading, Editing, and Evaluation" of Documents

• "Summary" of customer interview records, specialized books on banking business, market information, etc.

• "Proofreading, Editing, and Evaluation", namely checking the accuracy of created reports, editing typographical errors, and legal checking of documents.
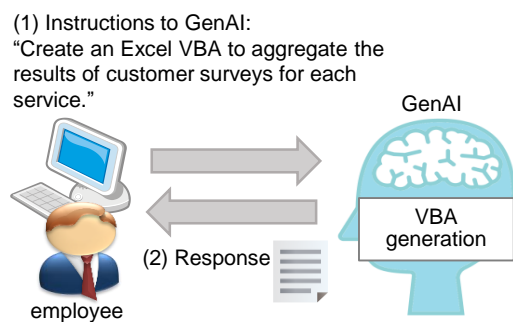
• "Creation" of loan approval documents, etc.

▽ Case study image

(1) Instructions to GenAI:
"Summarize the records of the past three years of interviews with company A"

GenAI

Document generation

(2) Response

employee

Advance preparation (study)*

Internal data
(records of interviews with companies, etc.)

*Instead of learning, there is also a method of referencing in-house data on the server each time.
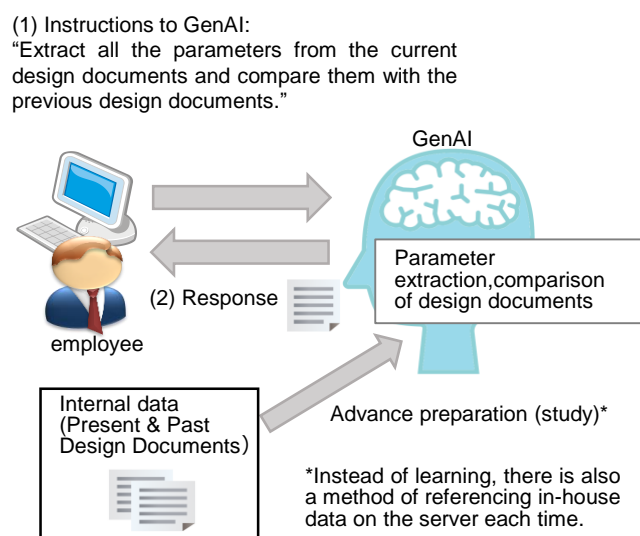
2. System development and Operation management

Chart B-3: System Development and Operation Management

• Automatic generation of source code (Excel VBA, Python, etc.), confirmation of consistency of system design documents created by IT vendors (automatic detection of errors and omissions in design documents), and assistance in responding to system failures (extraction of similar cases in the past, etc.).

▽ Case Study Image1

(1) Instructions to GenAI:
"Create an Excel VBA to aggregate the results of customer surveys for each service."

GenAI

VBA generation

(2) Response

employee

▽ Case Study Image2

(1) Instructions to GenAI:
"Extract all the parameters from the current design documents and compare them with the previous design documents."

GenAI

Parameter extraction, comparison of design documents

(2) Response

employee

Internal data
(Present & Past Design Documents)

Advance preparation (study)*

*Instead of learning, there is also a method of referencing in-house data on the server each time.

IV. Evaluations after adopting GenAI

Regarding their evaluations after adopting GenAI, the financial institutions gave reasonably positive feedback, namely "exceeded expectations" or "mostly met expectations", in all the business fields except "search for information on internal rules, etc." (Chart 5).

In particular, more respondents evaluated "system development and operation management" as "exceed expectations" than other business areas, indicating that GenAI can be a useful tool in this area.

On the other hand, many respondents evaluated "search for information on internal rules, etc." as "fell below expectations." In general, internal rules tend to be strongly connected to laws and regulations or other related rules and manuals, and full descriptions are often omitted by applying mutatis mutandis or referencing. Under these circumstances, GenAI can not understand the whole picture of the rules if they are put into it without alignment, which may lead to less-than-expected accuracy of generated answers.[3]

Chart 5: Evaluations after adopting GenAI (operational efficiency/cost reduction)

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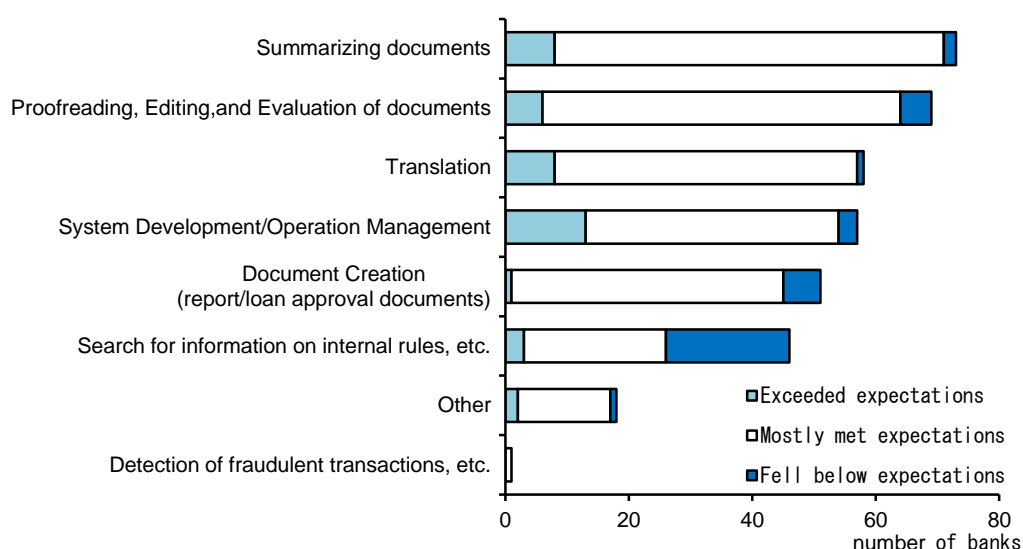
[3] In this regard, the performance of Gen AI has been rapidly improving recently, and the quality of its products has improved accordingly, so it is possible that the current evaluation of financial institutions has improved compared with the time of the survey response.

V. GenAI Risks and Governance

While the use of GenAI is expanding, financial institutions need to be fully aware of the attendant risks. For example, since GenAI services are generally provided in the cloud, information entered by financial institutions could be reused for GenAI training, which may lead to unintentional information leakage. In order to avoid such risks, financial institutions are required to take measures such as developing rules not to enter confidential information into GenAI and requesting service providers and service developers not to reuse entered information.

In addition, GenAI is known to have the risk of plausibly answering a user's question with something non-factual (hallucination). As a countermeasure, financial institutions must not take the generated answers at face value but rely on human judgment.

In this way, for financial institutions to promote the use of GenAI, it is necessary to develop an appropriate governance structure based on the risks specific to GenAI (Chart 6 and 7).

Chart 6: Key risks specific to GenAI[4]

Hallucination	Risk of GenAI plausibly answering things that are not true
Leakage of confidential information	Risk of unintentional leakage of information input to GenAI as a result of being used as training data
Infringement of copyrights, etc.	Risk of GenAI outputs causing infringement of intellectual property rights, such as copyrights
Occurrence of bias	Risk of unintended bias in responses due to bias in the training data of GenAI
Lack of accuracy or reliability	Risk of not being able to obtain sufficient response accuracy due to outdated versions and training data of GenAI
Security Threats	Risk of malfunction due to malicious instructions given to GenAI (prompt injection)
Accountability for products	Risk of unreliability due to the "black box" nature of the output process and the reasons for the decisions made by GenAI.

**Chart 7: Example of Applicability and Risks of GenAI use among financial institutions**

	Data handling	Operation
Example of Applicability	Text analysis (Search for information on internal rules, etc.) Preparation/review of loan approval documents Customer relations	Summarizing/Proofreading documents Translation System Development/Operation Management
Example of Risk	Hallucination Occurrence of bias Lack of accuracy or reliability Accountability for products	Security Threats Leakage of confidential information Infringement of copyrights, etc. Occurrence of bias

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[4] Compiled with reference to the following guidelines: Ministry of Internal Affairs and Communications and Ministry of Economy, Trade and Industry, "AI Guidelines for Business Ver1.0," April 19, 2024. Financial Data Utilizing Association, "Practical Handbook of Generative AI in Financial Institutions Ver1.1," July 23, 2024.

Regarding the status of their management of GenAI, about 70% of the financial institutions responded that they have implemented a system environment that allows them to appropriately manage input/output information (using their own virtually isolated areas in cloud services, and introducing mechanisms to prevent the reuse of input content and the leakage of products to the Internet), and they have set restrictions on the kinds of data to be input (Chart 8). Since financial institutions handle a large amount of important information, such as confidential information, it can be assumed that they are paying attention to the risk of information leakage.

On the other hand, in response to questions such as "Do you clearly state your organization's policy on the use of GenAI in internal rules?", "Have you developed practical rules (manuals, etc.) regarding the use of GenAI?", and "Do you verify and evaluate the output data from the viewpoint of ensuring accuracy, copyright, etc.?", about 50% of the respondents answered "There is room for improvement" or "Under consideration". Since GenAI technology is advancing day by day, it seems that financial institutions are trying to develop their operational rules while promoting the use and development of GenAI.

As technological innovation in GenAI progresses rapidly, financial institutions are expected to follow the latest research findings and practical issues related to threats and vulnerabilities specific to GenAI, and to continually revise their operational guidelines in response to changes in the risks of GenAI.

Chart 8: Management status of GenAI
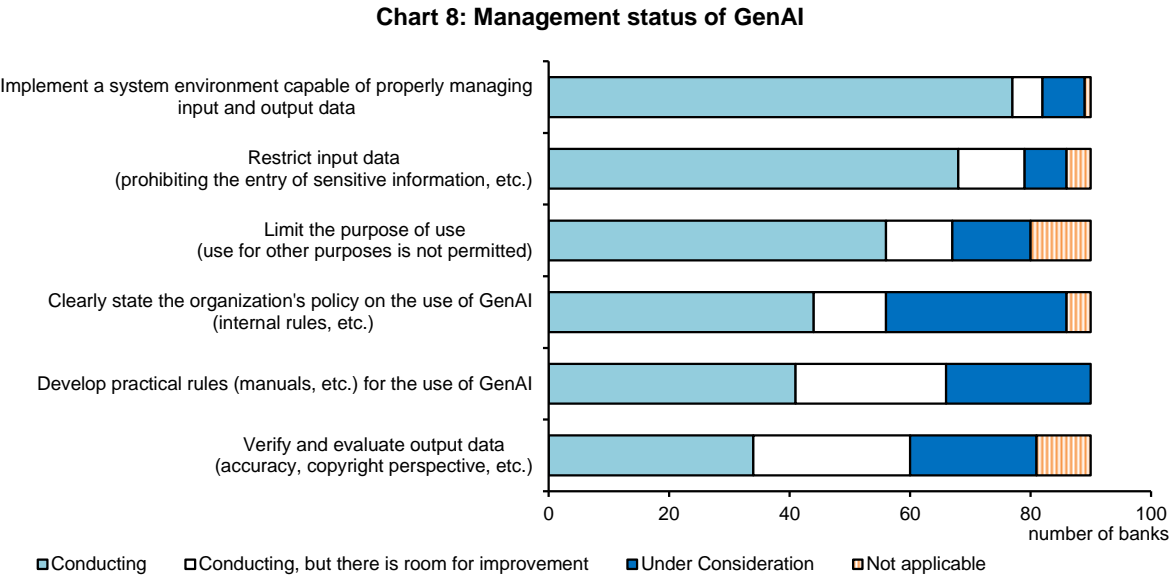
VI. Conclusion

As GenAI permeates the entire world, the use of GenAI is expanding in Japanese financial institutions. Due to the nature of the business of financial institutions, they handle large amounts of information and documents, so the use of GenAI is considered to have great merits such as improving operational efficiency and labor productivity. The results of this survey show that the use of GenAI is progressing among financial institutions in the fields of document creation, such as reports, proofreading and summarizing documents, system development and operation management. Financial institutions are also exploring further use cases to promote new services, and it is expected that the use of GenAI will continue to expand in the future.

On the other hand, GenAI also has its own unique risks such as hallucination, leakage of confidential information, infringement of rights, and generation of ethically questionable information. Financial institutions handling customer information need to be fully aware of these risks when using GenAI.
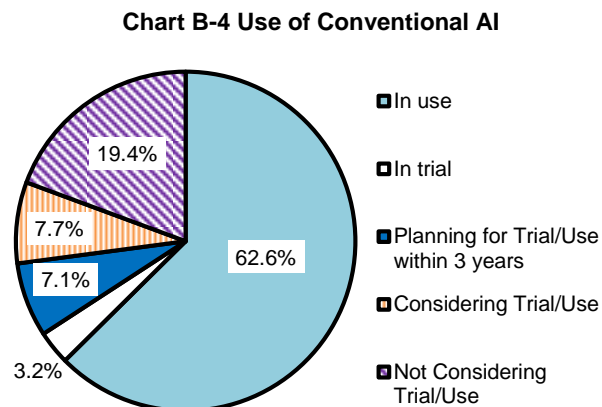
In order to avoid such risks, it is necessary to develop operational rules, such as not taking generated answers at face value and not entering confidential information. Financial institutions need to take appropriate security measures such as their own virtually isolated areas in cloud services for GenAI systems. Moreover, as GenAI becomes more widespread, attention should be paid to an increase in new types of cyberattacks, such as using prompt injections (methods that cause malfunctions in the system by giving malicious instructions and commands to GenAI). From the perspective of risk management, it is important to disseminate operational rules among users through regular training, etc., and to regularly monitor the use status of GenAI to confirm whether the users are complying with the rules.

The Bank of Japan will continue to engage in dialogue with financial institutions on the use of GenAI and on risk management through on-site examinations, monitoring, and seminars.

Box3: Current status of conventional AI use[5]

1. Use of Conventional AI

In this survey, we also investigated the use of conventional AI in addition to GenAI. According to the responses, about 60% of the financial institutions are already using conventional AI. The proportion rises to about 80 percent when those financial institutions that are considering future trials or use of conventional AI are included (Chart B-4).

Chart B-4 Use of Conventional AI

- In use
- In trial
- Planning for Trial/Use within 3 years
- Considering Trial/Use
- Not Considering Trial/Use

62.6%
19.4%
7.7%
7.1%
3.2%

2. Purpose of introducing and application of conventional AI

Regarding the purpose of introducing conventional AI, as with GenAI, many respondents cited "operational efficiency/cost reduction". On the other hand, many respondents typically expect to increase profits by "improving customer service" and "targeting customers" with conventional AI (Chart B-5). The main areas of use are "customer relations and records (chatbots, etc.)", "texting documents (OCR)", and "customer targeting" (Chart B-6).

Conventional AI is said to have strengths in routine tasks and data analysis, and is becoming technologically stable. For this reason, there is a view that the need for the use of conventional AI will further increase in the future in such areas as targeting, textualization (OCR), demand forecasting, and fraud detection, where conventional AI excels and is regarded as more useful than GenAI. In addition, it is conceivable that there will be a growing movement to not only use conventional AI alone, but also to combine GenAI and conventional AI in order to reform business processes and create services.

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[5] Conventional AI is a system which provides answers to input data, based on the "features and trends" learned from data given in advance. It excels in the automation of routine tasks and specific actions.
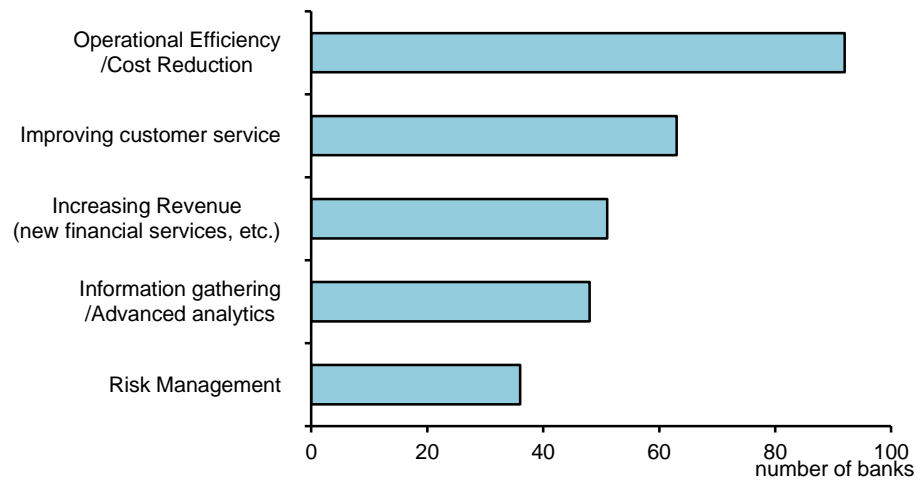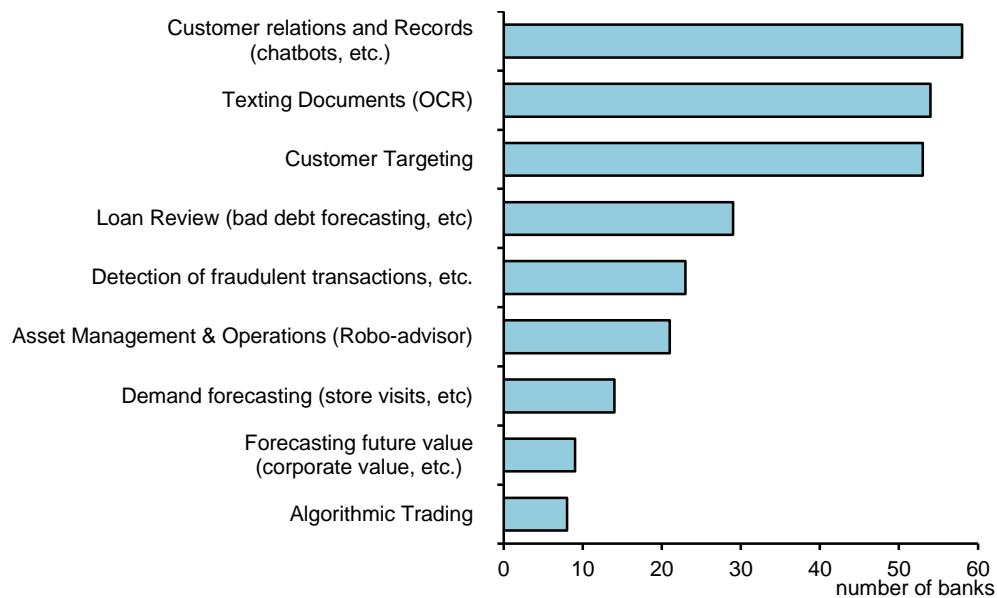
Chart B-5: Purpose of Introducing Conventional AI

Category	Number of banks
Operational Efficiency /Cost Reduction	~92
Improving customer service	~63
Increasing Revenue (new financial services, etc.)	~51
Information gathering /Advanced analytics	~48
Risk Management	~36

number of banks

Chart B-6: Applications of conventional AI

Category	Number of banks
Customer relations and Records (chatbots, etc.)	~58
Texting Documents (OCR)	~55
Customer Targeting	~54
Loan Review (bad debt forecasting, etc)	~29
Detection of fraudulent transactions, etc.	~24
Asset Management & Operations (Robo-advisor)	~22
Demand forecasting (store visits, etc)	~14
Forecasting future value (corporate value, etc.)	~8
Algorithmic Trading	~7

number of banks

Note: Chart B-5 and B-6 cover the financial institutions that answered either "In use" or "In trial" in Chart B-4.