Global Partnership on AI
Future of Work Survey Report 2022 in Japan

GPAI Future of Work 2022

October 2023

Preface

Artificial intelligence (AI), a concept that was born over half a century ago, has gained significant attention in recent years and has been implemented in society through the establishment of the AI foundation following several major technological innovations. The emergence of generative AI has changed the perception of AI, which was previously a domain of specialists, into a tool that ordinary people can use independently. However, while people realize the convenience of AI, they are beginning to hear about its risks.

As the impact of AI on society increases, it will become necessary for companies to discuss issues beyond the conventional framework of management decisions, where cost and performance, benefits, and risks are evaluated, and decisions are made by introducing various technologies. Additionally, governments are required to create rules based on the overall view of society.

In the 2010s, AI was positioned as an emerging technology, and various policies were implemented to encourage R&D investment in terms of technological competitiveness. In 2019, the Organization for Economic Cooperation and Development (OECD) compiled a set of AI principles with "human-centered" as its main focus, without waiting for the rise of generative AI.

Considering the discussions at the OECD, the G7 contributed to the launch of an international framework. The genesis of this framework were the summits "Enabling the responsible adoption of AI" and "Tech for Humanity Meeting" hosted by Canada and the French Presidency in 2018 and 2019, respectively, which led to the launch of a new international framework on AI at the G7 Science and Technology Ministers' Meeting in 2020. The Global Partnership on AI (GPAI) was launched in June of the same year. Japan has been deeply involved in the GPAI as the founding country and as a member of the Steering Committee from the beginning and is fulfilling its responsibilities as a chairing country in 2023.

The main mission of the GPAI is to "bridge the gap between theory and practice on AI," indicating that it is a diverse group of experts and that the subcommittees comprising these experts are the driving forces behind its activities.

The GPAI comprises four Working Groups: Responsible AI, Data Governance, Future of Work, and Innovation and Commercialization. This report summarizes the results of the activities promoted in Japan in FY 2022 as part of the "Observation Platform of AI at the Workplace" project of the "Future of Work" Working Group.

This project is based on the concept of "bridging the gap between theory and practice on AI," and aims to collect real voices from companies that have introduced AI, such as its effect on workers and the working environment. The project uses a method wherein students interested in AI are recruited and asked to identify and interview companies on their own. The Japanese team has participated in this project since 2021, and following the first year's report, we compiled the report for 2022. We would like to express our respect for the contributions of the participating students and wish them all the best in their future endeavors.

September 2023

Professor Emeritus, Tohoku University
GPAI "The Future of Work" 2020-2021 Co-Chairs

Yuko Harayama

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1. About the GPAI "Future of Work" working group

1-1   About the GPAI "Future of Work" working group

The Global Partnership on AI (GPAI) is an international framework that aims to develop and use "responsible AI" based on human-centered approaches and principles, such as transparency and respect for human rights [1]. The GPAI comprises multiple stakeholder groups, including governments, international organizations, industry, and experts, who comply with OECD AI principles and close the gap between theory and practice of AI. Under this concept, the four main drivers of substantive activities are "Responsible AI", "Data Governance", "the Future of Work", and "Innovation and Commercialization".

One of the working groups, "Future of Work," discusses how AI will affect workers and the working environment, that is, how the quality, inclusiveness, health, and safety of work can be protected, and how better work can be designed between workers and employers. The discussion is conducted from the perspective of designing better work in the relationship between workers and employers. Current priority projects include Observation Platform of AI at the Workplace, a project to collect case studies, and the AI Living Laboratory to experiment with use cases in the workplace.

1-2   GPAI Japan team activities

In Japan, the "Future of Work" program has been conducted since 2021. In 2022, the second year of participation, in addition to the University of Tokyo and Doshisha University, the scope of activities will expand to include Tohoku University and Toyo University, as well as Hong Kong University of Science and Technology. These participating universities are taking the lead in collecting AI application case studies in Japan and submitting them as materials for international discussions at the GPAI.

1-3   Purpose of this report

This report presents the research activities and results of a survey conducted in 2022 by a Japanese team within the international framework of the GPAI. The "Observation Platform of AI at the Workplace" aims to continuously collect more case studies in participating countries and reflect on the situation on the ground in international discussions while considering different backgrounds such as the purpose of AI introduction and industrial structure. Furthermore, this report presents the status of AI in Japanese workplaces by emphasizing the introduction of specific cases surveyed by each university (team) in a manner that reflects the expansion of participating universities (teams) in Japan.

The activities of the GPAI are supported by companies and organizations that cooperate with us, as well as by the students who participate in our activities. We hope this report will help promote an understanding of GPAI activities among those who have been and will be involved in GPAI activities and that many people gain interest in GPAI activities.

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[1] GPAI website, https://gpai.ai/

2. Overall summary of the GPAI Japan team's study

2-1   Survey structure and method of proceeding

A total of 45 students from four universities (Doshisha University, Tohoku University, Toyo University, and Hong Kong University of Science and Technology) participated in the Japan team for the "Future of Work" 2022 survey, with support from their respective faculty advisors. Two GPAI "Future of Work" committee members and a steering team from the University of Tokyo's Institute for Future Initiatives were responsible for overall supervision and coordination with the GPAI.

Each survey team selected survey sites based on their respective research subjects, and the participants took the initiative to carry out the work from the interview survey approach for implementation and reporting. Regular joint meetings were held between the management and survey teams to confirm progress and coordinate common issues.

The survey was conducted from August 2022 to January 2023.

Figure 1: Japan Team Structure and Roles (2022)

Management Team	Survey Team (Participating Universities)
GPAI's "Future of Work" Working Group Experts: Yuko Harayama (Professor Emeritus, Tohoku University) Arisa Ema (Associate Professor, Institute for Future Initiatives, The University of Tokyo) **Secretariat (Institute for Future Initiatives, The University of Tokyo):** Takashi Matsumoto (Institute for Future Initiatives, The University of Tokyo) Naoko Ikeda (Institute for Future Initiatives, The University of Tokyo) **Research Advisor:** Kosei Miyazaki (Professor, Hyogo University) **Role:** • Overall supervision and progress management • Communication with GPAI • Coordination of interview • Output management • Event management	**Department of Sociology, Faculty of Social Studies, Doshisha University:** Masayo Fujimoto (Professor), 17 students **Department of Media Studies, Faculty of Social Studies, Doshisha University:** Hirofumi Katsuno (Associate Professor), 17 students **School of Engineering, Tohoku University:** Makoto Takahashi (Professor), 2 students **Faculty of Information Sciences and Arts, Toyo University:** Max Nakano (Professor), 2 students **Division of Public Policy, The Hong Kong University of Science and Technology:** Masaru Yarime (Associate Professor), 7 students **Role:** • Team organization • Selection of research cases • Conducting the survey • Collecting survey results • Reporting survey results

2-2   Overview of Questions in the Interview Survey

Questions for the interview survey were selected from common GPAI items prepared from the following perspectives according to the selected research sites and interests. Additionally, questions not included in the common items of the GPAI but related to their research themes and their understanding of background industrial and social issues were added to their initiative.

Detailed questions for the common GPAI items are presented in the appendix of this report. The major items are as follows:

- AI system definition
- The ethical factors/Fairness/Equity/Bias of the organizations
- Process of planning
- Employees' personal data
- Human Machine Interaction
- The ethical factors considered while designing the AI system
- Impact assessment: Ex Ante Analysis
- Implementation
- Reviews and adjustments (Ex Post Evaluation)

2-3 Summary of Survey Results

The 2022 survey examined 45 AI applications in 18 industrial sectors, including energy, environment, agriculture, food, construction, automotive, logistics, hospitality, medicine, nursing care, finance, education, advertising, government, telecommunications, web services, IT, and auditing.
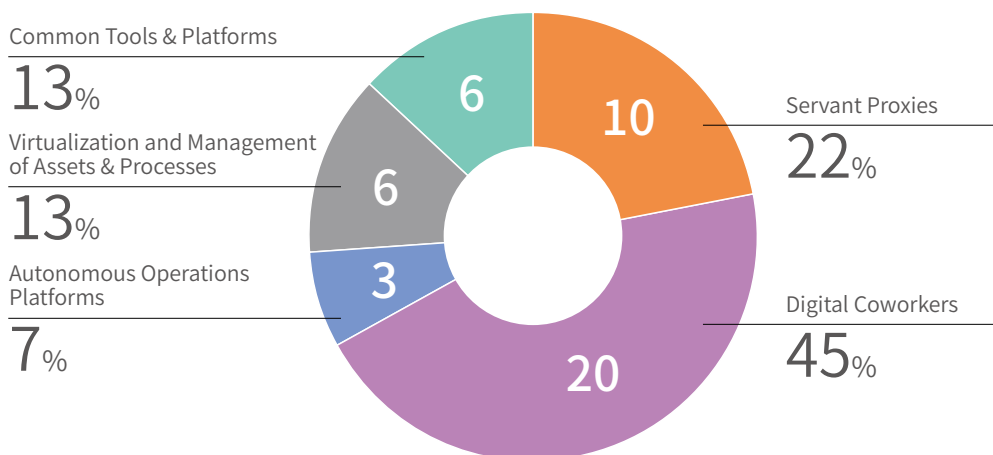
When these use cases are divided by the analysis axes set by the GPAI: "human replacement," "digital co-workers (in conjunction with workers)," "autonomous services," "simulation visualization," and "standard development tools/ platforms," the majority of the cases fall into the "human replacement" and "digital co-workers (in conjunction with workers)" categories. Conversely, in the Chinese cases surveyed by the Hong Kong University of Science and Technology, some cases in the infrastructure sector fell under "autonomous services."

Specific case studies and discussions by each team will be reported in Section 3.

Table 1: Categories of AI systems in the GPAI survey

Servant proxies	Solutions that replace the cognitive work of people in service relationships with other people, machines, or infrastructure (for instance: smart home hubs, autonomous vehicles, and digital assistants in the areas of sales and customer service, care robots, and concierge robots).
Digital coworkers	Solutions that expand/support people's cognitive work by providing knowledge and information supporting decision-making, solving non-trivial problems, etc.
Autonomous operations platforms	Autonomous cyber-physical platforms offering technological and business services (automated factories and warehouses, and autonomous transport systems).
Virtualization and management of assets and processes	Solutions enabling the creation of digital images/simulations (digital twins) of various assets (tangible - buildings, machines, cities, and intangible, processes, and systems) to perform various types of operations on them (event prediction, configuration optimization, etc.).
Common tools and platforms	Horizontal tools and platforms facilitating the creation of solutions from other application classes (machine learning components, low-code environments focused AI solutions, etc.).

Figure 2: Percentage of each category of cases studied

Common Tools & Platforms
13%

Virtualization and Management of Assets & Processes
13%

Autonomous Operations Platforms
7%

Servant Proxies
22%

Digital Coworkers
45%

3. Case Studies and Discussion

Although there were common questions regarding the GPAI survey, the academic backgrounds and grades of the participating students, as well as the purpose of their participation in the survey varied for each team. Therefore, this report introduces each of the 45 case studies identified in 18 industry sectors by faculty advisors from each university that participated in the survey. In their introductions, they were asked to describe the following six items:

1. What field/industry use cases did you research, and why did you choose that field/industry?
2. What AI systems are used in that field/industry?
3. Who is involved in the implementation and use of the system?
4. What ethical perspectives are being discussed and what concerns arise when designing AI systems?
5. How can future work change with the introduction of these AI systems?
6. Is there any training or user follow-up at the workplace when implementing an AI system?

3-1   Prof. Masayo Fujimoto, Department of Sociology, Faculty of Social Studies, Doshisha University

[1] What field/industry use cases did you research and why did you choose that field/industry?

1. Welfare industry (systems for social welfare facilities)
2. Local government (systems for social welfare departments)
3. General Incorporated Association (DX user support)
4. Insurance industry (sales staff and underwriting systems)
5. Construction industry (systems for construction sites)
6. Construction industry (system for design department)
7. Construction industry (systems for construction sites)
8. Automotive industry (sales support systems)
9. Communication industry (communication tools)
10. Telecommunications industry (telecommunications data analysis systems)
11. Financial industry (AI system for office work)
12. Advertising agency (system for creating advertisements)
13. Accommodation industry (robot users)
14. Accommodation business (chatbot)
15. Fisheries processing industry (harvest calculation and sorting system)
16. Manufacturing (medical imaging systems)
17. Welfare industry (systems for social welfare facilities)

These industry sectors were chosen for the following reasons
(1) Based on the Japanese Standard Industrial Classification and Medium Classification, the students selected fields in which they were independently interested.
(2) We selected organizations that are likely to be surveyed in FY 2021; more detailed information is available for the same.

[2] What AI systems are used in that field/industry?

We could not conduct an exhaustive survey, but a wide variety of AIs are being developed within a single company; for example, we interviewed developers in the welfare industry in FY 2021 and found that Internet of Things and AI were being used to prevent night shifts, incontinence, and night wandering among care workers, which lead to labor shortage and overwork. We investigated care recipient's how this had been a major support. In FY 2022, interviews were conducted with users (care managers) of an AI system to help care managers create care plans. The system was evaluated as effective by professionals who had to make solitary decisions about whether a care plan was correct, especially newcomers, small offices with no colleagues, and individual self-employed care managers. However, owing to its high cost, establishments that have colleagues and do not need AI, while individual self-employed care managers who need it cannot use it because it is too expensive, and the information of the AI developed in urban areas is learned from supervised data that assume facilities and care personnel are located nearby. Overlearning occurred, with some suggestions being inappropriate for underpopulated areas.

The use of AI in the financial and insurance industries involves digitizing paper information to create data that can be read by AI in the financial industry. The process required an enormous amount of time, with multiple layers of human checks to ensure there were no reading errors and that no single digit or sheet of paper information was out of place. This study was conducted on women who were employed on a part-time basis. Additionally, the banking industry is closing branches because the number of seller jobs is decreasing significantly. Furthermore, seller jobs will presumably disappear or be greatly reduced. As DX and AI advance, jobs that have mostly been filled by women will become unnecessary, and employment will still be withheld. Therefore, the occupational structure is expected to change significantly. In the insurance industry, information about a company is gathered from the Web, and the company's risk and insurance products can be proposed before a visit to determine if the company can underwrite insurance. In this case, small and medium-sized enterprises that did not have sufficient information on the web were considered high risk and were expected to be at risk of not being insured.

Regarding the use of facial recognition systems, the Chinese system is said to be the most developed in the world; its use was approved in Japan in 2017, providing non-personally identifiable data. This is recommended for use in management strategies such as using in-store security cameras to aggregate customer information, which can then be used to effectively provide targeted customer service. However, because facial data are loaded into the original facial recognition system, even if the provided data are not personally identifiable, the concern that personal information will remain in the original system has not yet been addressed. The United Kingdom has banned the use of this system, and several other countries have banned its use.

[3] Who is involved in the implementation and use of the system?

For example, AI is being developed for people tuning in the field; users include simple workers as well as paraprofessionals in the welfare sector, those requiring advanced skills such as translators and interpreters, and medical professionals, such as research assistance AI for researchers and diagnostic imaging AI for clinicians. These tasks are replacing those performed once by technicians and paraprofessionals. However, there is also a demand from the field to prevent "near-misses" due to overwork and labor shortages in various areas, This indicates that while some people are losing their jobs, AI is needed to assist with labor shortages and validity to decisions.

[4] What ethical perspectives are being discussed or concerns are being raised when designing AI systems?

Many places have an ethics committee in place, but few have yet to consider this a practical matter.

[5] How the future of work may or may not change with the introduction of these AI systems

The occupational structure will change dramatically. Therefore, we cannot say that jobs will not be taken away from workers. However, according to the four requirements for layoffs in Japan, regular workers will be assigned to other departments when their work is no longer available and will not be laid off immediately, whereas nonregular workers are likely to be out of jobs. However, it is a phenomenon that extends not only to unskilled workers but also to highly skilled professionals. On the other hand, it has also been surveyed that AI is effective in assisting people who work long hours due to labor shortages and are at risk of death from overwork or depression. In the future, AI is expected to replace simple labor as well as white-collar and professional jobs because it is better at replacing and assisting brain labor than physical and complex labor. There is also a possibility that AI will be used without human understanding of its mistakes, and it will be necessary to consider its appropriateness and "labor alienation" such as "loss of job satisfaction" from simply "monitoring" it.

[6] Is there training and user follow-up in the workplace when implementing an AI system?

In many places, training on operations was provided in the workplace, but in some regions, there are many high school graduates, and it is important to recognize that in disseminating AI, many operators are unfamiliar with using computers.

Column: Surveyed Case   **Takahiro Saito (Doshisha University)**

Industry / type of work	Care
Eligible departments and services	Business support AI (care plan creation support AI)
Interviewee sector	The end users of the AI system (not in use at the time of the interview)
Purpose of AI implementation	Improvement and optimization of service quality
Functions of AI systems and products	When a user's information is entered, the AI, which has learned from actual past care plans that showed improvement in the user's conditions, proposes services tailored to the user and displays predictions of the user's conditions after using the services.
Main users	Care manager (nursing care profession)
Features and initiatives that are considered important concerning the GPAI questionnaire items	• Input items to the AI are the same as usual, but the number of inputs increases when working side-by-side with existing systems. • Sometimes services do not take into account local circumstances when proposed, which makes the services unavailable. • AI is an entity that can "answer" and "confirm" users' perspectives and ideas. • There was an opportunity for FB to the developer (a simple form of feedback on the use and after-use of the product).
Other impressive features and challenges perceived	• AI in 2019 was unable to reflect the thought process of care managers who consider the condition and wishes of each individual user, and as a result, it could not propose services that matched the user's needs. • The intentions of the developers of this system interviewed in the 2021 survey were not conveyed to the users in the field, and it seemed that there was not enough communication.

3-2 Associate Prof. Hirofumi Katsuno, Department of Media Studies, Faculty of Social Studies, Doshisha University

[1] What field/industry use cases did you research and why did you choose that field/industry?

1. Education (AI Development)
2. Advertising (AI use)
3. Entertainment (AI Development)
4. Medical Equipment (Robotic Use)
5. Medical devices (AI development)
6. Logistics (AI and robot development)

Our seminar students who participated in the project, consisting of 16 third-year undergrade students [divided into 4 groups] and one graduate student, specialized in media studies. As such, the initial focus was on the development and use of AI in the media and entertainment industry, particularly how AI is involved in the creative process. However, due to challenges in securing interviews in this field, and the broadening interests of the students towards other areas, the final subject covered was the aforementioned case study.

[2] In that field/industry, what kind of AI systems are being used?

1. Development of AI-type teaching materials for elementary and junior high school students (a system that automatically asks the most appropriate questions based on the user's proficiency level and learning history).
2. Generation of digital ad copies and prediction of ad performance.
3. AI conversational service (chatbot)
4. Therapy Robot
5. Medical image extraction AI (a tool that allows researchers in the medical field to develop AI for domain extraction easily, even if they can't write programs, as long as they have data).
6. Autonomous robots for logistics (automated driving and towing vehicles in restricted areas of airports, autonomous robots operating in the city, and robots for transport operations in logistics warehouses and factories)

[3] Who is involved in the implementation and use of the system?

1. Elementary and junior high school educational sites
2. General user
3. Rehabilitation hospital (used in rehabilitation centers for convalescent patients)
4. Researchers in university laboratories and hospitals
5. Inventory sites in transport and warehouses

［4］ What ethical perspectives are being discussed or concerns are being raised when designing AI systems?

Of the companies surveyed, only one had an ethics committee or a similar specialized committee (emphasizing entertainment chatbot development and review with diverse membership). The impression regarding other companies was that discussions from an ethical perspective were very limited. As an exception, regarding companies using AI for the automatic generation of ad copies, ethical issues are being considered, such as checking the data to be learned. Furthermore, there is a risk that the AI may write down events that are not true, and it is difficult to determine whether the AI-selected training data is plagiarized. Currently, these ethical issues are addressed by trial and error.

［5］ How the future of work may or may not change with the introduction of these AI systems

At present, it seems that two major trends are forming:

1. 1.In the collaborative process between AI and humans, both entities' actions are closely intertwined, blurring the boundaries between them.
2. 2.Distinct tasks are clearly allocated between the two.

The creative industry appears to be gradually moving towards the first trend. For example, in the advertising copy production process, there is an emerging workflow where AI generates a vast number of copies, from which humans draw inspiration to finalize the copy. As of now, since humans select from the plethora of copy suggestions provided by AI, the workload hasn't drastically decreased, and it seems that humans maintain their agency. However, as AI's accuracy improves, the creative process may evolve into a complex interplay between humans and AI.

Regarding the second trend, automated transport robots in logistics fit this description. Humans primarily serve as a backup for when errors occur. The medical image extraction AI also falls into this category. However, in this context, Japan's Medical Practitioners' Act delineates the roles of both entities. While AI-based medical diagnosis is accepted in the United States, in Japan, AI's role in diagnosis and treatment is strictly as a support tool, and doctors ultimately make the final decisions. Even if the AI provides an incorrect prediction, the doctor evaluates its reliability based on their extensive experience. There are also research reports suggesting that hybrid diagnosis yields more accurate results, further supporting this approach.

［6］ Is there training and user follow-up in the workplace when implementing an AI system?

It varies from industry to industry and workplace to workplace.

Column: Surveyed Case   Jingyu Wang (Doshisha University)

Industry / type of work	Service Industry, Entertainment
Eligible departments and services	AI Dialogue Service
Interviewee sector	Responsible for AI system research, development, implementation, and solution provision
Purpose of AI implementation	• Conversation with AI • Reduction of manpower burden by AI
Functions of AI systems and products	• Conversation with AI • Reduction of manpower burden by AI
Main users	All general users
Features and initiatives that are considered important concerning the GPAI questionnaire items	• AI guidelines are shared within the company. • The development of the product was conducted with full consideration of personal information from the design stage.
Other impressive features and challenges perceived	• Possibility of technological collaboration across different industries and sectors • A vision of blurring the lines between work and entertainment concerning the application of AI technology. • I felt that AI can develop into an entity that can give humans new ideas and perspectives, rather than simply replacing human labor.

3-3 Prof. Makoto Takahashi, Graduate School of Engineering, Tohoku University

[1] What field/industry use cases did you research and why did you choose that field/industry?

Education field, especially science (mathematics and science) in junior high schools

The education sector is an area where AI technology is expected to be introduced amid the problem of overworked teachers. While major tutoring schools seem to have introduced systems that claim to provide AI materials, we thought it would be important to know the current status of AI introduction in general schools to understand the impact of AI on the way of work of education.

[2] What AI systems are used in that field/industry?

The AI materials that were introduced are said to have the following features

"AI teaching materials refer to software that analyzes and estimates the causes of student mistakes, and provides teaching materials according to students' proficiency levels, regardless of their grade or age. In a typical classroom setting, the teacher communicates the same content to all students using a blackboard; however, in a class using AI materials, the content is communicated through a terminal in a manner that matches the learning status of each student." (Comments by faculty members who responded to the interview; the same applies hereafter in quotation marks)

In this case, we were more impressed by the fact that the AI materials were used as part of the school's overall DX than by their characteristics as AI materials. The school does not force students to use AI materials, and only approximately 20% of the students use them.

As users of such AI materials, it is necessary to consider the different perspectives of the teacher, who is the main

user of the AI materials, and the students who benefit from them. For teachers, the use of AI materials would simply lead to a significant reduction in their workload, as the AI materials would provide them with questions that they had been asking their students on their own, and the AI would evaluate their level of understanding to some extent. This means that more detailed care can be provided to students during their free time. The introduction of AI teaching materials has clear advantages in terms of reducing the labor burden. However, it should be noted that much of the workload reduction was due to the DX of student management.

In general, the government invests a large amount of money in junior high schools. At the junior high school we interviewed, all students were using tablets, Wi-Fi was available everywhere in the school, and each classroom was equipped with a large movable display and a terminal connected to it. This is a departure from the old teaching style, which used blackboards and handwritten notes.

Thus " the preparation of teaching materials has become easier. AI materials, with individually optimized questions, have reduced the burden on teachers in supporting their self-study."

［3］ Who is involved in the implementation and use of the system?

The junior high school we interviewed was a model school that introduced AI materials on a trial basis and had a key person in charge of introducing the AI materials. The teacher we interviewed (the head teacher in charge of mathematics) has been using AI materials together with the key person since its introduction and is considered the most knowledgeable person in the school.

［4］ What ethical perspectives are being discussed or concerns are being raised when designing AI systems?

The policy for utilization was updated and decided each year in each subject area. The people involved in subject instruction discussed and decided how to handle the materials in class and how not consider them for grading. In this process, the use of AI-type teaching materials is not a goal but only a means for students to learn by themselves.

There is no general policy or regulation within the school, as AI-type materials are treated only as an alternative to drills and are treated like any other supplementary materials or reference books.

［5］ How the future of work may or may not change with the introduction of these AI systems

Changes in faculty standing
Before its introduction, the job of a "good teacher" was to have subject matter expertise and to teach interesting classes, but now it will be the teacher's job to teach how to learn, how to adjust oneself, and the meaning of learning. As an increasing number of things are being done for us by AI without learning, I think schools will change into places where we learn how to deal with and control this technology. In fact, with translation apps allowing students to communicate with those who do not speak Japanese in near real-time, it is necessary to convey the meaning of learning a language and motivate them to do so.

Role of the Teacher. Therefore, the role of coaching has become increasingly important. Coaching is the process of communicating learning strategies, motivational concepts, and self-regulation resulting in the recognition of students' abilities, confidence, and motivation. This role can only be performed by the teacher, and cannot be entrusted to the AI.

[6] Is there training and user follow-up in the workplace when implementing an AI system?

At the beginning of the school year, training is held to teach students how to use AI-type workbooks and how to check their progress. Other activities include personal information sharing among faculty members, and proposals for new methods of utilization are discussed at bimonthly evaluation subcommittee meetings.

Other items of note, especially in that area

We would like to point out that a desirable symbiosis between AI and humans has been achieved in the sense that AI is responsible for the parts that can be left to AI and human teachers are responsible for the essential aspects of education. It is interesting to note from the interviews that the following job satisfaction levels increased:

"My satisfaction with the job description has gone up. I feel that I can spend more time on things that I think are very important, such as teaching skills that can be applied outside mathematics, to help students understand their situations. For example, I would talk to students who seem to be losing focus, and give them detailed instructions on how to control them. This is difficult to accomplish in self-study using problem sets because students have to choose questions and read explanations on their own, and there is not enough time to do so."

Column: Surveyed Case   Nao Shiino (Tohoku University)

Industry / type of work	Education
Eligible departments and services	Middle school education
Interviewee sector	Junior high school teacher (Mathematics)
Purpose of AI implementation	Curriculum reorganization and changes in standard hours of study guidelines through demonstrating the effectiveness of AI teaching materials in the demonstration project
Functions of AI systems and products	Exercise application (for 5 subjects) AI analyzes the causes of wrong answers, and questions are individually optimized.
Main users	Junior high school student
Features and initiatives that are considered important concerning the GPAI questionnaire items	The change from the old style of teaching, which mainly involved writing on the board, to a teaching style centered on self-study using assignment printouts and AI materials has increased satisfaction, as it has allowed us to devote more time to what we think is important as teachers, such as teaching skills to control concentration.
Other impressive features and challenges perceived	In the future, what will be required of teachers will change from "a bushy attitude that can guide people's lives" and "giving interesting lessons" to "communicating how to learn and the significance of learning." As AI technology increases the range of responses, such as translation apps, children's personalities will grow in various directions. Based on the above two points, diversity will be required of the faculty in the future.

3-4 Prof. Masafumi Nakano, Faculty of Information Sciences and Arts, Toyo University

[1] What field/industry use cases did you research and why did you choose that field/industry?

As a use case, we targeted the audit industry and surveyed the four largest audit firms (the Big 4) in Japan.

We surveyed the audit industry because AI and other digital innovations disrupt the accounting profession and education, and this disruption is expected to continue and grow. [2]

In particular, the possibility of accounting professionals being replaced by computers, owing to the impact of computer automation, was 99.8% for accounting clerks in the Japanese labor market, according to the results published in.[3] The more sensational a figure, the more media coverage it is likely to receive in Japan.[4]

[2] What AI systems are used in that field/industry?

In auditing, AI is used in accounting journal verification systems and anomaly-detection systems for financial analysis.

[3] Who is involved in the implementation and use of the system?

On-site audit teams are the main users of AI. Auditing services, especially financial statement audits, are conducted by client companies' on-site audit teams. Aiming at innovation for these onsite audit teams, there is a specialized department for AI development, operation, and AI business management.

[4] What ethical perspectives are being discussed or concerns are being raised when designing AI systems?

AI does not raise issues related to ethics, bias, impartiality, etc. because machine learning is used as the main ancillary tool.

[5] How the future of work may or may not change with the introduction of these AI systems

The main objectives of AI implementation are to improve the efficiency of audit work and expand human skills and the ability of humans to handle audit work by scaling up and upgrading audit work using AI. The key findings of the survey indicate that (i) AI has led to more sophisticated and efficient auditing by performing data analysis and confirmation tasks in audits. (ii) As to the extent to which AI can replace human work, at present, AI is only a supplementary tool whose main purpose is to improve the operational efficiency of audit work performed by humans. Ultimately, the output produced by AI must always be checked by humans to make judgments and decisions. Thus, the output from AI alone cannot constitute audit evidence, and human intervention is required.

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[2] Ignou, A. J., D. J. Power, S. Brosnan, and C. Heavin.(2023). Digital Futures for Accountants, Journal of Emerging Technologies in Accounting, 20(1),39-57. Holmes, A. F. and A. Douglass, (2022). Artificial Intelligence: Reshaping the Accounting Profession and the Disruption to Accounting Education, Journal of Emerging Technologies in Accounting, 19(1), 53-68.

[3] Frey, C. B. and M. A. Osborne. (2015) Computerization and the Future of Work in Japan.

[4] RIKEN Center for Advanced Intelligence Project (AIP). (2022) Impact of AI and other technological advancements on the CPA business.

［6］Is there training and user follow-up in the workplace when implementing an AI system?

Although each audit firm varies, some types of workplace training and follow-up with users are in place.

Other items of note, especially in that area

The overall survey of the Big 4 revealed the following points.

(1) Regarding the possibility of AI replacing accounting and auditing work and organizational reform, accountant work, which requires advanced judgment and decision-making, is not expected to undergo organizational restructuring because of the simple loss of work to AI. Rather, AI amplifies and enhances accountants' capabilities, such as enabling them to process large volumes of data, which is difficult for humans to process and improves operational efficiency by shortening the time required for existing work and enabling scale-up through the replacement of conventional work with AI.

(2) Different audit firms have different views on the suitability of AI by accountants. Thus, even if an individual accountant does not fully understand AI, AI itself is sufficiently auditable if the audit firm as an organization understands AI, or understands AI through procedures such as "use of AI experts" or XAI (explainable AI).

(3) The possibility of auditing using AI varies among firms. (1) "Advanced AI" that can be used for auditing accounting estimates, communicating with clients, and disseminating information externally, and (2) "Simple AI" that can be used for cross-checking uncomplicated facts and accounting procedures, have different usability. Naturally, the AI alone for "advanced AI" is unlikely to be usable, and human intervention is required.

Finally, the spread of AI and other digital technologies to clients and audit firms is accelerating through digital transformation (DX) due to the Covid-19 disaster. In response to this wave of change, the GPAI survey revealed that practitioners, regulators, researchers, and others need to further strengthen their collaboration toward the ideal image of the accounting profession in digital society.

Column: Surveyed Case   **Mami Nakada (International Christian University)**

Industry / type of work	Auditor
Eligible departments and services	AI/Innovation department, audit services
Interviewee sector	AI Development and operations division
Purpose of AI implementation	Improve the efficiency of audit operations Scale-up and sophistication of audit services (expansion of people skills/responsiveness)
Functions of AI systems and products	• Fraud detection • Analysis using journal level and financial statements • Automatic disclosure check • Visualization of workflow
Main users	Internal (audit team)
Features and initiatives that are considered important concerning the GPAI questionnaire items	AI is making audits more sophisticated and efficient by analyzing and verifying data in audits. AI systems are used mainly as a supplementary tool with machine learning as the main tool, so questions on ethics/bias/impartiality, etc., were not applicable.
Other impressive features and challenges perceived	AI systems are only a supplementary tool for human operations (the main purpose is to improve operational efficiency), and humans will ultimately check the output of AI and make judgments and decisions.

3-5 Associate Prof, Masaru Yarime, Division of Public Policy, The Hong Kong University of Science and Technology

[1] What field/industry use cases did you research and why did you choose that field/industry?

A team from the Division of Public Policy at the Hong Kong University of Science and Technology conducted a study on how companies and organizations in Hong Kong and mainland China use AI. The focus was on use cases in fields related to sustainability, particularly in sustainable energy and environmental protection. While AI has recently been developed and applied in a wide range of fields, its application in sustainability areas would be more time-consuming and costly than in fields related directly to commercial products and services. There is still a high degree of uncertainty regarding the use of AI in this field, and it is not well understood what activities are currently taking place on the ground. Hence, we aimed to explore the actual applications of AI in this field by conducting interviews. As integrating digital transformation (DX) and green transformation (GX) has become a significant policy challenge, we hope to obtain valuable findings to draw implications for public policy and institutional design in the future.

[2] What AI systems are used in that field/industry?

As fields related to sustainability, we identified a variety of use cases concerning sustainable energy and environmental protection. A start-up company based in Hong Kong developed a boat to remove wastes and pollutants from rivers and oceans by using AI for image processing to recognize trash and other debris floating on the water's surface. A Chinese subsidiary headquartered in France uses AI to perform real-time big data analysis in the management of solar energy systems to optimize equipment efficiency. At an oil drilling site in western China, AI is applied to work process monitoring and warning systems to manage the safety of the workers. A start-up company in Beijing also uses AI to analyze data, such as images and vibrations, during the inspection and maintenance of offshore wind turbine facilities. A factory manufacturing electrical and electronic products uses AI systems for process control and inspection to streamline manufacturing processes and reduce waste. A start-up company in the Guangdong province uses AI to automate operations, digitize geographic information, and process images in the agricultural sector to improve the efficiency of fertilizer and pesticide use and reduce the workforce. In addition, an international environmental group is working with a large Chinese company that developed advanced AI technology to use image-processing technology to monitor products made from endangered species to prevent illegal trade.

[3] Who is involved in the implementation and use of the system?

Various actors are involved in the implementation and use of AI. In the public sector, policies introduced by the government at the provincial and municipal levels, along with those introduced by the central government, influence the development and deployment of AI systems. In the private sector, there are companies that develop AI systems, whereas other companies and organizations apply such technology in specific sectors. Cooperation between universities and research institutions is crucial for developing robust and reliable AI systems. Several challenges have been identified for these actors in utilizing AI systems effectively. For example, the interests of the public and private sectors regarding the use of AI systems are not always aligned with each other. Moreover, users who have never used AI systems do not trust new technologies. Furthermore, the lack of skills and human resources to integrate AI technologies with expertise in various domains hinders the use of AI.

[4] What ethical perspectives are being discussed or concerns are being raised when designing AI systems?

As far as the information was gathered through interviews during this survey, we did not find any indication that ethical considerations were discussed seriously in the design or development of AI systems. These companies and organizations were simply trying to follow the regulations introduced by the government.

[5] How the future of work may or may not change with the introduction of these AI systems

Implementing AI systems for sustainability can create new jobs in various fields related to sustainable energy and environmental protection. However, several challenges must be addressed to achieve this goal. First, the availability and access to actual data for training AI are still limited. Restrictions on the transfer of data across borders, especially for multinational companies, are becoming very strict, affecting the development and deployment of AI systems. Furthermore, data governance systems are fragmented among stakeholders, which hinders data exchange and sharing.

[6] Is there training and user follow-up in the workplace when implementing an AI system?

As noted above, our study found various challenges in implementing AI systems with respect to the key stakeholders involved, including developers and users of the technology, in both the public and private sectors. We were not able to find detailed information on what kinds of training and support are actually provided.

Column: Surveyed Case   **Haiyu Li (The Hong Kong University of Science and Technology)**

Industry / type of work	Renewable energy industry
Eligible departments and services	Intelligent inspection platform for solar panel and offshore wind power generation facilities
Interviewee sector	AI system developer (CEO)
Purpose of AI implementation	• To automate and streamline equipment inspections at power generation facilities • To ensure manpower and safety at work sites
Functions of AI systems and products	• Data collection and modeling of wind turbines • Planning the route of the drone inspection • Vibration sensor monitoring and diagnostics
Main users	Staff involved in the maintenance of the solar and wind power generation facilities
Features and initiatives that are considered important concerning the GPAI questionnaire items	• The complexity of operations in the energy industry and the many regulations governing it make it important to equip people with robust knowledge and experience in the industry. The integration of their domain expertise with AI technologies is crucial to successfully match the needs of the field with the capabilities that AI can provide.
Other impressive features and challenges perceived	• In developing the AI-based systems, the company collaborates with universities and public research institutions and uses open source to update the algorithm. • Although a regulation has been introduced in China that require disclosure of algorithms, it is more important to ensure adequate data for training and optimization than complying with the requirement of the regulation.

4. Participation in the GPAI Survey - Perspectives from Faculty Advisors at Participating Universities

The following is a list of opinions received from faculty advisors from each university that participated in this year's survey regarding (1) their objectives for participating in the GPA survey, (2) what they actually learned and the issues they faced as a result of their participation, and (3) what they wanted to do in their future GPAI activities. Regarding (2), we received opinions from two perspectives: "research" and "student education."

Professor Kosei Miyazaki, who participated in the survey as an advisor, also provided input.

4-1 Prof. Masayo Fujimoto, Department of Sociology, Faculty of Social Studies, Doshisha University

［1］Purpose of participating in the GPAI survey

We expected that the development and diffusion of AI would spread rapidly over the next few years, so we wanted to preserve this as a record of social phenomena and allow the younger generation to experience them in real-time (an important practical examination for those who plan to become certified and professional social investigators). In particular, as a social phenomenon, I participated in the survey at the GPAI because I believe that if we focus too much on economic rationality, things may go on without being followed regarding social ethics or unexpected results and we should analyze the determinants of these factors.

［2］Gains and challenges of participating in the GPAI survey

-From a research perspective

We encountered interesting case studies that provided valuable opportunities. However, the survey design makes it difficult to dig deeper, making it difficult to use for research purposes. However, I am glad that students have a valuable opportunity to learn about the relationship between society and AI.

-From a student's educational perspective

It was useful for the students to participate in a world-class project and investigate AI in a familiar environment. In addition, the students reported that the GPAI attracted much attention in their job-hunting activities and that they had lively conversations with the interviewers.

In 2021, the third-year students who participated in the program became fourth-year students and led the following third-year students, allowing them to share their knowledge. The year 2023 saw the continuation of a good chain of events, with new fourth-year students becoming leaders and leading third-year students.

However, unlike graduate students, undergraduates find it difficult to conduct an actual survey of a large outside firm and prepare a report that meets the qualifications of a social researcher. Therefore, it is difficult to incorporate it into a fully-fledged specialized course, and it would be better to make it a lighter activity, such as part of a liberal arts course or seminar, to reduce the burden on faculty and continue the program. Nevertheless, because the faculty's focus on these specialized courses will result in the growth of new fourth-year students in the 2022 and 2023 academic years, it can be said that the educational burden is important to some extent.

［3］What we would like to do in the future with GPAI activities

We would like to analyze the social phenomena caused by AI, which is spreading rapidly, by examining the social structure at the macro and micro levels by conducting surveys and analyzing events in the workplace. For this purpose,

not only use cases but also quantitative surveys and appropriate fieldwork should be conducted. However, we believe that the OECD plays a major role in collecting a large number of cases and that other research should be conducted separately by each research organization. We would also like to hear the opinions of researchers from other countries through the GPAI activities and hope that exchanges among students will develop.

4-2 Associate Prof. Hirofumi Katsuno, Department of Media Studies, Faculty of Social Studies, Doshisha University

［1］Purpose of participating in the GPAI survey

This year's participants were third-year student seminars held in the Department of Media Studies. The main theme of the seminar was the creation of culture and the transformation of human physicality in a society where digital media technology has become an environment. AI and robots are also major research subjects. Students participated in the conference for educational purposes.

［2］Gains and challenges of participating in the GPAI survey

-From a research perspective
Although it is difficult to pursue events related to one's own research theme in depth, I think that some feedback on the research could be expected in terms of understanding the current status of the subject area.

-From a student's educational perspective
I think that the educational effect on the students was very high. Especially for liberal arts students, it is a valuable opportunity to hear directly from the field of technology, and they were proactive in acquiring technical knowledge during the interview preparation stage.

［3］What we would like to do in the future with GPAI activities
I would like to conduct a survey focusing on the media and entertainment industry, which is directly related to my research and the theme of the seminar.

4-3 Prof. Makoto Takahashi, Graduate School of Engineering, Tohoku University

［1］Purpose of participating in the GPAI survey

This laboratory conducted research on the symbiosis between AI and humans from the perspective of a desirable relationship between humans and machines in sociotechnical systems. However, as the intellectual capabilities of AI on the machine side have improved, the transfer of authority from humans to AI has begun. The situation of having AI performs tasks that can be performed by AI, and humans performing tasks that AI cannot perform is fraught with the same problems as the relationship between automated systems and humans, and is an important issue, especially in the area of safety.

We thought that there would be many difficulties in applying AI technology to real problems, although AI technology has been overhyped in the media, and only its bright side has been emphasized. We decided to participate in the GPAI survey to understand the situation and problems associated with the penetration of AI technology into society.

［2］Gains and challenges of participating in the GPAI survey

-From a research perspective

We investigated the application of AI technology to website operations on educational and gourmet food websites. Although neither field is directly related to safety, it is a significant achievement to confirm the appropriate use of AI by humans. In the field of middle school education, in particular, we were able to learn that a situation that had been negatively perceived as one in which AI performs tasks that AI can perform and humans take on tasks that AI cannot perform is, on the contrary, functioning in a very positive way. We gained knowledge that will greatly contribute to our laboratory's research on the division of roles between humans and AI. This is a significant contribution to our laboratory research on the division of roles between humans and AI.

-From a student's educational perspective

It was a very good experience for the students to participate in the GPAI project and to have the opportunity to investigate how AI is used by the general public. In particular, it was a great achievement for the students to learn what AI can and cannot do in environments where realistic applications are used.

［3］What we would like to do in the future with GPAI activities

There is a lot of information out there, such as ChaptGPT, from the viewpoint of "AI can do this," but it is also necessary to recognize that "AI cannot do this" at the same time. In particular, we examine the current technological level and applications of communication and the causal understanding required for AI-based systems, which will be required in the future.

4-4 Prof. Masafumi Nakano, Faculty of Information Sciences and Arts, Toyo University

［1］Purpose of participating in the GPAI survey

Toyo University has "proactively tackled social issues" as its educational philosophy because the activities of the GPAI research project are the very practice of "fostering people who can tackle social issues independently and proactively and build good human relations."

［2］Gains and challenges of participating in the GPAI survey

-From a research perspective

The GPAI, an open survey, has promoted research. We would also like to consider negotiating and coordinating with the GPAI Secretariat (within the OECD) to renew (improve) the survey items in the GPAI questionnaire.

-From a student's educational perspective

The process of the GPAI research project, in which companies and local governments are surveyed about the future of work with AI and their future work styles with a view to the future global digital society, and the results are compiled into a report, is a process that promotes growth from students to working adults.

Specifically, by contacting and managing the schedules of companies and local governments; conducting interviews;

reporting the results of actual surveys; and building good relationships with companies, local governments, and faculty members, students can learn the manners and attitudes of a working member of society and how to approach their work.

This process also allows each university to be represented and achieve greater growth by having the opportunity to participate in meetings and international conferences such as the GPAI Summit on progress management with students from other universities without having to be close to each university.

In addition, a network of GPAI alumni connections is currently considered to have evolved the project into one that encourages lifelong growth.

［3］ What we would like to do in the future with GPAI activities

Through the GPAI research project, we would like to contribute to the development of human resources that will contribute to the international community and Japan as well as to the development of a network of such human resources.

4-5 Associate Prof. Masaru Yarime, Division of Public Policy, The Hong Kong University of Science and Technology

［1］ Purpose of participating in the GPAI survey

The Division of Public Policy (PPOL) at the Hong Kong University of Science and Technology (HKUST) offers a Master of Public Policy (MPP) program and a Master of Public Management (MPM) program with specializations in science, technology, and innovation policy and energy, environmental, and sustainability policy. Exploring the impact of AI on various sectors of society is an exciting topic for our students studying these areas. We recognize that the GPAI project provides them with a precious opportunity to obtain international experience of collaborating with other students in different countries.

［2］ Gains and challenges of participating in the GPAI survey

-From a research perspective

We surveyed companies and organizations operating in Hong Kong and mainland China. As there are still very few empirical studies on how AI is actually used on the ground, we expect that this study provides valuable findings for academic research and policy making, although the number of our cases is limited. We found that it is particularly difficult to approach large firms in conducting interviews. Start-up companies responded more positively to our survey, as they would be keen to advertise their activities widely to society; however, it was a challenge to receive responses from large companies.

-From a student's educational perspective

The students benefited significantly from the experience of contacting private companies and non-governmental organizations, conducting interviews, and compiling reports. We also recognize that the opportunity to participate in international initiatives such as the GPAI project is particularly important for their career development in the future.

［3］ What we would like to do in the future with GPAI activities

In this study, we were not able to conduct in-depth preliminary research on the target companies and organizations. In the future, we would like to enhance reviewing previous studies to select companies that are specifically suitable

for our research. We also would like to refine the questions to obtain detailed information, incorporating the characteristics of the sectors and other factors. It would be useful for researchers and policymakers to actively interact with similar studies conducted by groups in other countries, deepen comparative studies, and present the results proactively to contribute to establishing global governance of AI in the future.

4-6 Prof. Kosei Miyazaki, Faculty of Contemporary Economic Studies, Hyogo University

［1］Purpose of participating in the GPAI survey

I have been working in the digital industry (web search and search advertising services) for decades. As a product manager, My work had been influenced by the success or failure of machine learning models, but now that I have left that position, I am surprised by the impact that AI has had on people's work. What will happen if AI becomes more common? I realized that the question of GPAI is an issue that society needs to address with the highest priority, and I wanted to contribute by connecting this research project to the industries trying to utilize AI.

［2］Gains and challenges of participating in the GPAI survey

It is really meaningful to know the current status of AI utilization in each industry through real voices rather than advertisements. In coordinating with potential survey companies, there is much to be sensed, even in the case of refusal. Another benefit was that we could learn what the students wanted to know and what they were interested in. One challenge is that jobs that have already been replaced by AI at the time of the survey (e.g., lots of manual work in advertising management that used to exist) and examples of failed introductions are difficult targets because there is no one to talk about them.

［3］What we would like to do in the future with GPAI activities

I would like to pay attention to the impact of generative AI and the progress of DX in the public sector. Recently, I participated in a hackathon by the local government that focused on "Enjoying local life sustainably". The teams had a lot of fun, as they attempted to use data sharing platforms and generative AI to respond to the participants' desire to understand more about the local communities and to sustain the traditional culture being lost. In this way, generative AI is easy to implement, and I think it will accelerate the spread of AI. I would like to contribute toward increasing the diversity of our survey targets by gathering information to gain a broader and deeper understanding of the changes in the way people work. In particular, we capture the changes and their impact on public administration and local governments, which have been considered to lag behind in terms of digitization and AI applications.

5. Feedback from participating students

Students who participated in the survey were asked to complete the questionnaire. The main feedback obtained from the students was as follows:

What I enjoyed and learned from participating in GPAI activities

Through this survey experience of directly interviewing companies and listening to their views on the front, many participants commented that they were able to "gain knowledge and insights that are difficult to access in daily research," and "hear actual AI perspectives from major Japanese companies." Many participants commented that it was valuable to gain information and experience that cannot be obtained in regular classes, such as "It was good to know the latest AI situation."

In addition, based on experiences with people in various positions involved in AI technology and services, the following comments were made: "It was good to hear the actual voices of people from companies promoting the development of AI technology and what they are doing and thinking about AI technology for people who do not know about AI technology." "It was good that I could understand both positive and negative views of AI, including their rationale, as my knowledge of AI increased." The participants also mentioned that they were able to gain a broader and more multifaceted perspective on the field of AI application, such as "I was able to gain a deeper understanding of the benefits and risks of AI through real voices from the field."

As a more specific insight, one participant commented, "As the shift to AI and DX progresses, I learned that it is very important to minimize the gap between the people who work there, the on-site situation, and the image assumed by the development side."

Others commented that they gained valuable social experience by independently conducting survey requests and coordination and liaison work with companies, even though it was difficult.

Difficulties with interview methods and items that could be improved

Some respondents commented on the actual interview process, saying that the amount of information available for preliminary research was not very large and that it was difficult to deepen their understanding of the target service before the interview. There was also a comment that it was difficult for interviewees to understand what they wanted to investigate according to the common questions of the GPAI.

One respondent commented, "There were many situations where there were companies I wanted to interview, but in reality, it was difficult to contact or request them without a personal network." Related to this point, another respondent felt that more interactions and activities related to the GPAI in the target region are required to spread the word.

Expectations or suggestions for future GPAI or student community activities

Regarding the future activities of the student community at the GPAI, many commented that they looked forward to more opportunities to interact with students from other universities and countries. One student-exchange meeting within the Japanese team was held online this year, but there were comments that more opportunities, including offline meetings, would be good for creating a sense of unity.

Regarding the specialties of the participating students, one commented that the activity would be even more meaningful if teams from other academic disciplines such as law and policy participated.

Some commented that they would like to continue their involvement in the future, such as their interest in connecting to and managing the program in a way that allows the entire student body to interact.

6. Future Development

The insights into the use of AI revealed through this survey are instructive for the future social implementation of AI in Japan and abroad. The AI Strategy Council of the Cabinet Office has emphasized the importance of both the promotion of AI utilization and risk management. To this end, it is essential to continue investigating AI implementation in companies and local governments, considering the legal, ethical, and social aspects.

Regarding the survey domain, the rapid spread of generative AI in recent years is expected to lead to an increase in areas related to "human replacement" in the future. While new possibilities will be created by the intervention of generative AI in customer service and dialogue, "visualization and simulation" through its appropriate persona setting may increase. Conversely, traditional reasoning and cognitive AI will also create new value through integration with generative AI. ai may combine advanced information processing with creativity and can be applied to a wide variety of tasks.

In this situation of rapid technological progress and social movement, the GPAI's "Future of Work" Survey will continue to seek new developments while maintaining its position as a fixed-point survey. The restrictions imposed by the COVID-19 Pandemic are expected to ease in stages, and richer data will be collected as face-to-face interviews and company visits become possible.

Furthermore, the surveys conducted by students, a distinctive feature of GPAI, will furnish crucial insights into the role of AI in the workplace. Simultaneously, we aim to foster interactions among students from different backgrounds and promote knowledge exchange between them. The survey is now in its third year and cooperation between senior and junior team members is steadily increasing. We intend to continue incorporating diverse perspectives through a flexible network of domestic and international teams.

Column: GPAI Event Report

GPAI SUMMIT 2022 "The Future of Work" Side Event - Dialogue with the Student Community

During a side event of the GPAI Summit (Annual Meeting) held in Tokyo on November 21 and 22, 2022, student members from Europe, India, and Japan participating in the research projects of the "Future of Work" subcommittee gathered for a joint briefing session. Representatives from each student team (Europe, Japan, and India) presented an overview of the research activities conducted in their respective regions, shared their experiences, exchanged views on issues specific to their countries/regions, and what they learned from the GPAI activities.[5]

GPAI SUMMIT 2022 "The Future of Work" Side Event

GPAI Future of Work Japan Team Student Exchange 2022

On January 27, 2023, an internal exchange meeting was held for the participating students of the Japanese team. Students from various academic institutions, including the Department of Sociology of Doshisha University, the Department of Media Studies of the Faculty of Sociology of Doshisha University, the Graduate School of Engineering of Tohoku University, the Faculty of Information Science and Technology of Toyo University, and the School of Public Policy of Hong Kong University of Science and Technology, gathered to discuss their research conducted in FY 2022. Each student had conducted a survey, and during the meeting, they actively engaged in discussions covering various topics, including industry-specific challenges and expectations for AI (approaches of companies that deserve attention), what they learned by participating in GPAI activities, expectations of the GPAI student community, and suggestions for future activities. Faculty advisors from each university also participated and shared their comments on the activities. At the end of the meeting, Mr. Yoichi Iida of the International Strategy Bureau, Ministry of Internal Affairs and Communications (MIC) gave his greeting and encouragement for the activities, saying that the students' efforts were meaningful in light of the purpose of the GPAI.

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[5] GPAI SUMMIT 2022 "The Future of Work" Side Event - Dialogue with the Student Community, organized by the Future Vision Research Center, University of Tokyo, https://ifi.u-tokyo.ac.jp/en/event/10831/

GPAI Future of Work: Future of Work Survey Report 2022

On March 16, 2023, a public event was held to summarize the survey conducted in 2022. Student representatives and faculty who participated in the interviews took the stage for a panel discussion on the "future of the work" found in the survey and the possibilities and challenges associated with the survey methodology. At the outset of the panel, Yuko Harayama of Tohoku University, co-chair of the GPAI "Future of Work" 2020-2021, introduced the overall framework of the GPAI. Jan Ferguson of Toulouse University of Technology, who coordinates the GPAI Future of Work Working Group, elucidated the purpose of promoting this working group and outlined its future initiatives.[6]

The Future of GPAI Work: Future of Work Survey Report 2022

Special thanks

This report has been compiled and made publicly available thanks to the thought-provoking input and opinions of the companies, organizations, and municipalities that graciously agreed to be interviewed. Because of the nature of the GPAI survey, we were unable to specifically name the companies and organizations that responded to our survey, but we would like to thank those who did so.

We also obtained advice from GPAI experts and other experts from Japan and abroad through the GPAI Summit and related events held during fall. We would like to take this opportunity to thank the Ministry of Internal Affairs and Communications and the Ministry of Economy, Trade and Industry for providing us with this opportunity. In addition to the support of GPAI staff overseas, the survey was also supported by Mr. Yann Ferguson (Toulouse Institute of Technology, France), who has led case studies internationally since the first generation.

The smooth operation of this research project was made possible in large part by Mr. Takashi Matsumoto, who was in charge of project management as a visiting researcher at the University of Tokyo's Institute for Future Initiatives. This report was also supported by Jun Kuribayashi, a master's student at the University of Tokyo's Graduate School of Public Policy. We would like to thank them for this opportunity.

Additionally, we received organizational support from the University of Tokyo's Institute for Future Initiatives and Doshisha University's Work Environment and Science/Technology Research Center. The Toyota Foundation D18-ST-0008, "Formation of a Platform for Ethics and Governance of Artificial Intelligence," also provided support for conducting this survey. The survey conducted at the Hong Kong University of Science and Technology was supported by the HKUST Academy of Interdisciplinary Studies.

We hope that this report will serve as a starting point for discussions with companies and organizations that have been and will be involved in GPAI activities, as well as with the next generation of young people, including students.

GPAI "Future of Work" Japan Team Member List (2022)

Management Team

- Yuko Harayama, GPAI Future of Work Committee 2020-2021 Co-Chair / Professor Emeritus, Tohoku University
- Arisa Ema, GPAI Future of Work Committee Member / Associate Professor, Institute for Future Initiatives, The University of Tokyo
- Takashi Matsumoto, Visiting Researcher, Institute for Future Initiatives, The University of Tokyo
- Kosei Miyazaki, Professor, Faculty of Contemporary Economic Studies, Hyogo Universit

Research team

- Masayo Fujimoto, Professor, Faculty of Social Studies, Doshisha University
- Hirofumi Katsuno, Associate Professor, Faculty of Social Studies, Doshisha University
- Makoto Takahashi, Professor, School of Engineering, Tohoku University
- Max(Masafumi) Nakano, Professor, Faculty of Information Sciences and Arts, Toyo University
- Masaru Yarime, Associate Professor, Division of Public Policy, The Hong Kong University of Science and Technology

Participating students * Affiliation is at the time of the 2022 survey

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Appendix: Questionnaire

<u>AI system definition:</u>

1. (All) What sort of AI system is used? (if you don't know, please write "Unknown")

2. (All) According to the taxonomy of use cases (see at the end of the document for an explanation1): in which category the AI system could be categorized:
   - Servant Proxies
   - Digital Coworkers
   - Autonomous Operation Platform
   - Virtualization and Management of Assets and Processes
   - Common Tools and Platforms

<u>The ethical factors/Fairness/Equity/Bias of the organization:</u>

3. (All) Does your organization has a working definition of fairness and, if so, what is it?

4. (All) Does your organization has a working definition of bias and, if so, what is it?

   Potential follow-up questions:
   a. (Management, Social Partner) If the answer to either is yes:Was it used in the evaluation of the AI system?
   b. (Management, Social Partner) If the answer to either is no:Does the development/implementation of the IA system brings out such a need?

<u>Process of planning:</u>

Process of planning existence (yes/no)? If yes:

5. (Management, Developer, User) What are the purpose and goals of an AI application in the company? (Process or product optimization, new business model, automation, substitution of jobs?)

   Potential follow-up questions:
   a. (Management) If the answer includes anything related to training:What is your approach on training related to the application of AI?
   b. (Management, Social Partner, User) If the answer discusses automation:What potential risks lie ahead? Which opportunities came from this use of AI?
   c. (Management, Social Partner, User) If answer discusses substitution:Are you sure that there was no bias, inequality, discrimination coming from this use of AI.
   d. (Management, Social Partner) Are there general agreements on AI usage in the company (ethic boards, codes of conduct etc.)?

6. (User, Social Partner) Are workers/representative bodies involved in setting goals of the AI application?

Potential follow-up questions:

    a. (Management, Social Partner) If the social partners are not included, why? (Skip similar questions on Social Partners afterwards)

    b. (Management, Social Partner) Are there Social Partners' guidance – on what level?

    c. (Management, Social Partner) Are there approaches regarding collective agreements (Co-government) on goals and possibly conflicting objectives? What is the starting point of information and bargaining? Are there regulations on co-determination and if so, in what respect?

    d. (Management, Social Partner) Are there general agreements on AI usage in the company (ethic boards, codes of conduct etc.)?

7. (Management, User, Developer) Is cooperation with researchers / developers and external experts given?

    Potential follow-up questions:

    a. (Management, User, Developer) If not, why?

    b. (Management, User, Developer) What skills are involved?

    c. (Management, User, Developer) What part is delegated?

    d. (Management, User, Developer) What are the risks and opportunities encountered?

Employees' personal data:

8. (Management, Developer, User) Are employees' personal data required for operational use or affected by operational use? (if yes, what kind of data···)

    Potential follow-up questions:

    a. (Management, Developer) If not, why?

    b. (User) Are you aware of the use of your personal data?

    c. (User) Have you experienced an event related to your personal data?

    d. (Management, Developer) What kind of data?

    e. (Management, Developer) How does the technology track the user?

    f. (Management, Developer) What are the purposes and uses of this data?

    g. (Management, Developer) When is traceability used to define a responsibility?

Human Machine Interaction:

9. (All) Is HMI currently involved in your work?

    Potential follow-up questions:

    a. (Management) If the HMI technology is not yet implemented, is it intended to be applied in the company? In what respect: empowerment of employees, traceability, explainability, etc.

    b. (User, Social Partner) What kind of HMI technologies do you use? (Bot, chatbot, social robot, cobot or other kind?) (One to one or in group?)

    c. (User, Social Partner) What kind of interactions do you have with these technologies? (In face-to-face, by phone, by internet?) (Language interaction [spoken, written], physical interaction [facial, gestural,

touch, multimodal] or both language and physical interaction?)

d. (User, Social Partner) Are HMI technologies useful for your work? How much of your time is spent interacting? (100% 75% 50% 25%)

e. (Management, User, Developer, Social Partner) What is your assessment about the following issues of the work with human-like cobots and chatbots? (Autonomy v. obedience, replacement v. augmentation, creativity v. dependency)

f. (Management, User, Developer, Social Partner) If the HMI technologies do not fully meet the expected work or present some errors, do you have procedures for reporting the anomaly to management?

g. (Management, User, Social Partner) Does the system help in making decisions? Which opportunities resulted from it? (Work done easier, quicker or better)

h. (Management, User, Developer, Social Partner) Do you like to interact with HMI technologies?

i. (Management, User, Developer, Social Partner) Which risks are you expecting from HMI technologies? (High, medium, low or no risk) (User, Social Partner) What are the most important social values (positive and/or negative) of working with human-like cobots and chatbots?

j. (Trust, transparency, explainability, tolerance, fun, traceability, scalability, empowerment, integration, security, or others)

The ethical factors considered while designing the AI system:

10. (All) Is the transparency of the AI system for the company (and for the user in the company) required and given?

a. (All) At what stage of the design?
b. (All) Does the system communicate? Or is it a black box AI?
c. (All) How does the system communicate its motives and states?
d. (Management, Social Partner) Who in the company is involved in the interface design – workers and representatives?
e. (Management, Developer) Which information is logged?
f. (Management, Developer) Who has got access to that logged information?

11. (All) How is Data quality addressed?

a. (Management, Developer, User) Is the data adapted to your needs?
b. (Developer, User) Are there any ethical risks involved in processing the data?
c. (Developer, User) What are used technics and methods to reach this data quality?
d. (Developer, User) What potential functions and opportunities does this data quality allow you?

12. (Management, Social Partner) How is the issue of accountability addressed?

Potential follow-up questions:
a. (Management, Social Partner) How are responsibilities distributed in the company?
b. (Developer, User) For each stakeholder, what are their means of action on the data? What are its limits?

13. (Management, Developer) Is the system auditable?

   Potential follow-up question:
   a. (Management, Developer) Is there audit process in place?

Impact assessment: Ex Ante Analysis:
(Recall that these questions deal with the front end of the implementation)

14. (Management, Social Partner) What working areas / working groups were affected in respect of the number and quality of jobs (reorganizations etc.)?

15. (Management, User, Social Partner) Which impact (bias)?

16. (All) Were there Impacts on qualification demands and skill management?

17. (Management, Social Partner) Were there impacts on the workload, working conditions and health management?

18. (Management, Developer, Social Partner) Were there impacts regarding the use of personal data of workers (privacy, data protection and trade-offs; realize benefits to employees)?
   (skip if already covered)

19. (Management, Developer, Social Partner) Were there regulations on using personal data and if so, in what regard?
   (skip if already covered)

Implementation:
   (Please prepare further questions for the interview with committee 2 if there are specific cases of training or learning at work)

20. (All) What are the required skills? What are the measures put in place for training?

   Potential follow-up questions:
   a. (All) What are the measures put in place for safety?
   b. (All) What are the measures put in place for responsibilities in HMI?
   c. (All) What are all others measures put in place when implementing the AI application?
   d. (User, Developer) How is the assimilation of an AI skill different from another technology?
   e. (Management, User, Social Partner) Were employees involved in developing these measures?
   f. (User, Social Partner) Is the pedagogy limited to the use of the system or does it also lead to the understanding of the system?
   g. (Management, Social Partner) Are there Social Partners' guidance – on what level

<u>Reviews and adjustments (Ex Post Evaluation):</u>

(Recall that these questions deal with the aftermath of the implementation)

21. (Management, User, Social Partner) Do you find that the system makes mistakes? (many, moderately, not at all)? Can it be trusted? (totally, moderately, not at all)?

22. (All) Are there experiences, reviews and adjustments (Ex Post Evaluation)?

23. (Management, Developer) How is success for this use case measured?

24. (Management, Developer) What worked less well in the use case?

25. (All) Describe the effects on number of jobs, quality of jobs, job satisfaction, workload, skills? (AI replacing or complementing experts)

    <u>Potential follow-up question:</u>
    a. (All) What were the reactions of workers to these effects?
    b. (All) Why?

26. (All) How much the workers need to know to manage the AI application?

    <u>Potential follow-up question:</u>
    a. (All) How much time do you think it should take to be accustomed to this AI application?

27. (Management, Social Partner) Has your organization ever used AI-enabled processes for human resources applications, including screening job candidates, making hiring decisions, evaluating worker performance, or promoting workers?

    <u>Potential follow-up questions:</u>
    a. (Management, Social Partner) If yes, does your organization currently use AI-enabled processes for human resources applications? If the process was abandoned, why?
    b. (Management, Social Partner) If yes, does the organization assess the fairness of the systems used in those human resources applications? If so, how?
    c. (Management, Social Partner) If yes, does the organization test for bias in the systems used in human resources applications? If so, how?
    d. (Management, Social Partner) If not, what is holding the organization back from adopting AI applications for human resources applications?

28. (Management, Social Partner) Does your organization assess the transparency of the AI system for workers?

a. (Management, Social Partner) Does your organization assess the fairness of the AI system for workers?
b. (Management, Social Partner) Does your organization assess potential bias impacting workers by the AI-systems?

29. (All) Are there unintended outcomes for workers situation and prospects?

30. (All) Are there opportunities and ways to redesign the AI system and work organization?

   Potential follow-up questions:
   a. (All) Are there feedback and participation opportunities for the employees?
   b. (Management, Developer, Social Partner) Has the use of the solution raised new issues around the transparency of the system?
   c. (Management, Developer, Social Partner) Usage of employees' personal data (Surveillance)
   d. (Management, Developer) Opportunity to do predictive analysis (Data) that was not initially thought of?

31. (Developer) Can you provide a usecase of your AI-System at the workplace?

Other comments?
   (Message to be sent to the GPAI, Question from the respondent)

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