RIETI Technical Paper Series 25-T-001

The Automation Risk Index (ARI) Database for Japan. Methodological Note

FUKAO, Kyoji
RIETI

IKEUCHI, Kenta
RIETI

NAGAYA, Yoshiaki
Nomura Research Institute

PERUGINI, Cristiano
University of Perugia and IZA

POMPEI, Fabrizio
University of Perugia

RIETI
Research Institute of Economy, Trade & Industry, IAA

The Research Institute of Economy, Trade and Industry
https://www.rieti.go.jp/en/

RIETI Technical Paper Series 25-T-001
June 2025

The Automation Risk Index (ARI) database for Japan. Methodological Note [*]

Kyoji Fukao (Hitotsubashi University and RIETI)
Kenta Ikeuchi (RIETI)
Yoshiaki Nagaya (Nomura Research Institute)
Cristiano Perugini（University of Perugia and IZA)
Fabrizio Pompei（University of Perugia)

Abstract

This note introduces the Automation Risk Index (ARI), a new dataset which assesses how exposed Japanese occupations are to automation by AI and robotics. It builds on prior studies by Frey and Osborne (2017) and Paolillo et al. (2022). The ARI is based on two data sources: (i) the JobTag-OID database on skill and ability profiles for Japanese occupations; (ii) a bespoke expert survey conducted in 2024 by RIETI and the Nomura Research Institute. Experts evaluated how likely AI and robotics could replace the skills, abilities and job adaptability attributes described in JobTag-OID. The resulting ARI measures automation vulnerability at a granular occupational level and offers insights for labor market research and policy planning.

Keywords: AI and Robotics; Automation Risk; ICT Capital; Labor Market
JEL classification: J23, J24, J31, O33

[*]This study is conducted as a part of the project "East Asian Industrial Productivity" undertaken at the Research Institute of Economy, Trade and Industry (RIETI). The questionnaire survey and interviews targeting AI and robotics experts were conducted as a part of joint research between RIETI and Nomura Research Institute. This study utilizes the micro data of the questionnaire information based on "Basic Survey on Wage Structure" which is conducted by the Ministry of Health, Labour and Welfare (MHLW), "the Basic Survey of Japanese Business Structure and Activities" and "Census of Manufacture" which is conducted by the Ministry of Economy, Trade and Industry (METI), "Economic Census for Business Activity" and "Annual Business Survey" which are conducted by the Ministry of Internal Affairs and Communications (MIC) and METI, and the Kogyo-Tokei converter, which is provided by RIETI. This research was supported by JSPS KAKENHI Grant Number JP25K05049 and the Hitotsubashi University Institute of Economic Research Joint Usage/Research Center Program (IERPK2403).

1. Introduction

This note outlines the methodology used to construct a novel dataset measuring job exposure to the risk of automation by artificial intelligence (AI) and robotics technologies in Japan, at a detailed occupational level. The resulting metric—referred to as the Automation Risk Index (ARI)—draws on and extends the approaches of earlier studies (Frey and Osborne, 2017; Paolillo et al., 2022)[1], integrating information from two primary sources. The first source is the *Occupation Information Database: Simplified Numerical Data Download Version ver. 5.0*, compiled by the Japan Institute for Labour Policy and Training (JILPT) and made available via the JobTag website (hereafter referred to as JobTag-OID) (https://shigoto.mhlw.go.jp). This database provides detailed descriptions and numerical ratings of skills, abilities, and job adaptability attributes for over 500 occupations in Japan. The second source is a bespoke expert survey, designed by the authors and administered by the Research Institute of Economy, Trade and Industry (RIETI) (www.rieti.go.jp) in collaboration with the Nomura Research Institute (www.nri.com) between August and October 2024. In this survey, experts were asked to assess the extent to which AI and

[1] Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerization? Technological Forecasting and Social Change, 114, 254–280.
Paolillo, A., Colella, F., Nosengo, N., Schiano, F., Stewart, W., Zambrano, D., Chappuis, I., Lalive, R., Floreano, D. (2022). How to compete with robots by assessing job automation risks and resilient alternatives. Science Robotics, 7(65).

robotics technologies could substitute for the various skills, abilities, and adaptability attributes specified in the JobTag-OID database. The data from these two sources were subsequently integrated to construct the Automation Risk Index (ARI), which quantifies the exposure of occupations in Japan to the risk of automation.

This note is structured as follows. Section 2 outlines the approach adopted in designing the expert survey. Section 3 details the implementation of the survey and presents the main findings. In Section 4, we discuss the key challenges and limitations encountered in the survey process. Section 5 describes the methodology used to construct the Automation Risk Index (ARI) at both the occupational and industry levels for Japan.

2. Experts Survey Design

The questionnaire used in this study was developed based on publicly accessible information from the JobTag-OID database, compiled by the Japan Institute for Labour Policy and Training (JILPT), an independent administrative institution in Japan. As of its March 2024 release, the database provides detailed information on approximately 500 domestic occupations. It includes descriptive summaries of each occupation, required skill levels, and the importance of specific knowledge, all quantified to facilitate comprehensive analysis. The data are collected via surveys administered to workers and subsequently processed and made available as open data.

For the purposes of this study, we extracted key information from the "Job Capability Profile" section of the JobTag-OID database, which forms the basis for assessing the potential impacts of artificial intelligence (AI) and robotics technologies on various occupations. Specifically, we selected a total of 53 items: 39 "skills" (e.g., reading comprehension, programming), 5 "abilities," and 9 "job attributes." All skill-related items available in JobTag-OID were included in the survey. By contrast, the selection of ability-related items was limited to those expected to pose significant challenges for AI or robotic substitution, such as “fingertip dexterity” and “ingenuity.” In addition, job attribute items—such as “teamwork” and “face-to-face discussions”—were classified under the broader concept of “job adaptability,” representing critical dimensions for assessing the potential for task substitution. These 53 items were incorporated into the expert survey questionnaire. A complete list and detailed descriptions are provided in Table A1 in the Appendix.

The questionnaire asked experts to assess the extent to which AI and robots are capable of replacing each of the 53 skills, abilities, and job adaptability attributes. Consistent with the original JobTag-OID structure, experts evaluated the substitutability of the 39 skills using a 7-point scale. For example, Figure 1 illustrates the evaluation scale for the skill "reading comprehension". Skill levels are rated from Level 1 to Level 7, with benchmark descriptions provided for Levels 2, 4, and 6 to guide assessments of proficiency. In the original JobTag-

OID design, these descriptions are crafted in plain language to ensure clarity and accessibility for workers across a wide range of occupations.

Figure. 1 Definition and evaluation scale of the skill “Reading comprehension"

Skill name: *Reading Comprehension*

- Skill Description: *Skills to listen attentively, get to the point, and ask the right questions when necessary without breaking the conversation*
- Evaluation Scale:

  Level 2: Read and understand the instructions on the questionnaire.
  Level 4: Read and understand documents written about management policies.
  Level 6: Read and understand technical papers.

The evaluation of the five ability-related items in the expert survey was also aligned with the scale used in the JobTag-OID dataset, which employs a five-point Likert-type scale. However, whereas JobTag-OID assesses the importance of each ability—ranging from 1 ("Not important") to 5 ("Extremely important")—this format was not directly applicable to our survey, which focused on the substitutability of abilities by AI and robotics. To address this discrepancy, we extracted detailed descriptions from the JobTag-OID database that correspond to each ability level and reformulated them to reflect specific task-based competencies. These revised descriptions were then used in the expert survey to frame the

evaluation of the abilities. For example, Figure 2 presents the redefined scale for “dexterity of the fingertips,” outlining task complexity at each level, along with examples of relevant occupations and their associated ratings. For Level 5—the highest competency level—the description was reinterpreted as “task level surpassing human capabilities”. In cases where the original JobTag-OID data did not include definitions for higher ability levels—for instance, “speed of movement of the arms and legs,” where Level 3 is the maximum—the scale was extended by defining Level 4 as “beyond human movement capabilities.” Accordingly, for such items, the evaluation scale in the survey was adjusted to range from Level 1 to Level 4.

Figure 2. Definition evaluation scale of the ability "Dexterity of the Fingertips"

Ability name: *Dexterity of the Fingertips*

- Ability Description: *Ability to grab, manipulate, and assemble very small objects, and to coordinate the fingers of one hand or both hands precisely and smoothly (example: assembling a machine inside a small watch)*
- Evaluation Scale:

  Level 1: Work level of desk work such as computers: Web Director (1.3)
  Level 2: Light work required level: Convenience Store Clerk (2.0)
  Level 3: Professional work level required for assembly work in factories, etc.: Automotive Assembler (3.3)
  Level 4: Work level required for special precision work: Dentist (3.9), Nailist (4.2)
  Level 5: A level of work that goes beyond the dexterity of a person's fingertips

As with the evaluation of abilities, the assessment of job adaptability attributes in the expert survey employed a scale ranging from Level 1 to Level 5, based on task descriptions provided by the JobTag-OID. In instances where the original JobTag-OID questionnaire measured the frequency of occurrence of specific tasks, the format was adapted to assess their importance instead, ensuring consistency across all item definitions. For example, Figure 3 illustrates the item “face-to-face discussions”, presenting detailed descriptions corresponding to different task levels. Survey respondents were then asked to assess the

extent to which AI or robotic systems could feasibly perform such tasks—specifically, to identify the highest level of competence they believed these technologies could achieve.

Figure 3. Definition evaluation scale of the job adaptability attribute "Face-to-Face discussions"

Attribute name: *Face-to-Face discussions*

- Attribute Description: *To carry out duties through face-to-face discussions with others*
- Evaluation Scale:

  Level 1: Hardly Needed: Food Deliverer (1.5)
  Level 2: Moderately important: Route Bus Driver (1.9)
  Level 3: Important: Secretary (3.0)
  Level 4: Very important: Japanese Teacher (4.0)
  Level 5: Vital Importance: Prosecutor (4.9)

In the survey, experts were asked to assess the feasibility of implementing AI and robotics technologies for specific tasks at three distinct time points: the present (2024), the near future (2030), and the more distant future (2040). For example, in relation to the skill “reading comprehension,” respondents were requested to estimate the highest skill level that AI or robotic systems could feasibly attain within each of these timeframes.

Feasibility was defined according to two key assumptions: (1) a medium-sized enterprise (approximately 500 employees) would be capable of implementing the technology within one year; and (2) the expected cost savings—such as reductions in labour costs—would outweigh the costs of implementation, thereby ensuring economic viability. Respondents were not required to provide empirical evidence to substantiate their assessments, allowing their evaluations to reflect informed subjective judgments grounded in their professional expertise.

3. Expert Survey Implementation

Survey respondents were carefully selected from among domestic experts with substantial experience in advanced AI and robotics research. The selection criteria focused on individuals operating at the intersection of "AI", "robotics", and "society". Experts were identified through their involvement in national committees, affiliations with research institutions, or participation in organisations engaged in leading-edge initiatives. Additional considerations included recent professional activities, such as delivering seminar presentations or publishing research within the previous two years.

Invitations to participate in the survey were sent directly via email to the identified experts. To complement the questionnaire and enhance the reliability of the findings, in-depth

interview sessions were conducted alongside the survey. These interviews aimed to explore the challenges, proposed solutions, and future prospects concerning the societal integration of AI and robotics.

The survey was conducted over a two-month period, from August to October 2024. Of the 38 experts invited, 13 submitted complete responses, yielding a response rate of 34% (see Table 1). To preserve participant confidentiality, all personally identifiable information was anonymised. Only generalised attributes—such as the respondent's area of expertise (e.g., AI, robotics, or other) and the response date—were retained for analytical purposes.

Table 1 Breakdown of the complete questionnaires obtained

Expertise	Number of completed questionnaires
Artificial Intelligence Researcher	6
Robotics Researcher	6
Other (Sociology)	1
Total	13

To ensure the validity of the data used in the analysis, outlier responses were removed by trimming the upper and lower 10% of values for each questionnaire item. Specifically, for each of the 13 collected responses per item, the highest and lowest values were excluded prior to calculating both the mean—used in the construction of the Automation Risk Index (ARI)—and the standard deviation, which served to measure the variability in responses and assess the consistency of expert feedback. The results of the survey for each reference year are presented in Table A2 in the Appendix.

4. Issues and limitations of the survey

The findings of this study are based on the expert judgments of domestic professionals actively engaged in advanced AI and robotics research. Compared to surveys targeting non-expert populations, expert assessments are expected to yield more accurate and realistic

projections, grounded in up-to-date knowledge of technological developments. Nonetheless, this approach is not without limitations.

First, the sample size is relatively small, comprising responses from only 13 experts. Furthermore, the analysis indicates a rise in response variability as the projection horizon extends further into the future. Specifically, the average standard deviation across all questionnaire items increases from 1.425 in 2024 to 1.535 in 2030, and further to 1.739 in 2040—highlighting the growing uncertainty associated with forecasting long-term technological change. To address this limitation, future research should aim to expand the sample size, thereby enhancing statistical reliability. Ideally, variability should stabilise within a narrower range, with standard deviation values converging towards 1.0.

Second, the questionnaire items were formulated with reference to tasks within the current Japanese labour market. While this approach ensures practical relevance, it introduces ambiguity when projecting into future scenarios, particularly regarding the specific contextual assumptions attached to each skill or ability level. This ambiguity may lead to inconsistencies in how respondents interpret the requirements of each item, thus contributing to variability in their assessments. Future studies should prioritise refining the clarity and standardisation of task definitions. Providing respondents with more detailed and

consistent contextual scenarios would help minimise interpretive discrepancies and improve the accuracy of estimates concerning the replicability of tasks by AI and robotics

5. The computation of the Automation Risk Index (ARI)

Following Paolillo et al. (2022), the Automation Risk Index (ARI) for each occupation r_t listed in JobTag-OID database is defined as follows:

$$r_t = \frac{\Sigma_{j=1}^{N} m_{t,j} d(s_j - m_{t,j})}{\Sigma_{j=1}^{N} m_{t,j}}$$

Where:

- j denotes skill, ability or adaptability attribute (with j=1, 2, ..., 53);
- $m_{t,j}$ represents the level of skill/ability/adaptability j required for occupation t according to JobTag-OID;
- s_j refers to the level of skill/ability/adaptability estimated to be achievable by AI and robot, based on expert survey responses for the year 2024, 2030, and 2040;
- $d(\cdot)$ denotes a logistic function, used to model the likelihood of technological substitution human labour, with location parameter of 0 and a scale parameter of 0.05.

The ARI could be computed for 487 of the 504 occupations in the JobTag-OID dataset. In 17 cases, the data on skills, abilities, or job attributes were either largely incomplete or entirely missing, precluding calculation. An additional 82 occupations contained partial data; however, these omissions did not prevent the estimation of their respective ARI scores.

The 487 JobTag-OID occupations for which the ARI was calculated were reclassified into the 144 occupational categories used in the Basic Survey on Wage Structure (BSWS) to link ARI data with other major labor market and business databases available for Japan. When a direct one-to-one correspondence between the two classification systems was not possible, the following procedures were applied: If the ARI variability among the JobTag-OID occupations within the same BSWS category was low (coefficient of variation of 0.5 or below), the BSWS category was assigned the average ARI of the corresponding JobTag-OID occupations. Conversely, if the variability was high (coefficient of variation above 0.5), the

BSWS categories were further subdivided according to the distribution of BSWS occupations by industry (in five cases)[2] and by hourly wage (in one case)[3].

Finally, we computed the industry-level ARI based on the detailed 100 industry classification of the Japan Industry and Productivity (JIP) Database (version 2023). The industry-level ARI is obtained as the weighted average of the occupation-level ARI (in 2024), using as a weight the share of hours worked in each occupation in the industry/year (available in harmonised form in BSWS from 2009 to 2023). Hence, for example, the industry level ARI in 2009 describes the exposure to potential risk of automation for each industry as

[2] For example, the BSWS occupation 1244 (Private Tutors) corresponds to five JobTag-OID occupations: 120 (Sports Instructor), 122 (Music School Instructor), 219 (Outdoor Instructor), 396 (Cram School Teacher), and 398 (English Conversation Teacher). The BSWS occupation 1244 was thus subdivided into five 'sub-occupations' (1244_1 to 1244_5), each corresponding to one of these JobTag-OID occupations. Depending on the industry in which occupation 1244 was found in the BSWS data, we assigned the most appropriate 'sub-occupation' and its corresponding ARI value. For instance, occupation 1244 within industry 823 (Supplementary Tutorial Schools) was recoded as 1244_4 and assigned the ARI value of JobTag-OID occupation 396 (Cram School Teacher). Conversely, occupation 1244 within industry 804 (Sports Facilities) was recoded as 1244_1 and assigned the ARI value of JobTag-OID occupation 120 (Sports Instructor).

[3] In the case of BSWS occupation 1405 (Personal Care Workers), the industry-based rule did not provide useful guidance. This BSWS occupation corresponds to four JobTag-OID occupations: 52 (Hotel or Inn Manager), 414 (Front Desk Staff, Hotel/Ryokan), 415 (Housekeeping/Room Maintenance, Hotel/Ryokan), and 416 (Customer Service, Hotel/Ryokan). Since these four JobTag-OID occupations are likely associated with different task complexities and pay levels—high for occupation 52, intermediate for occupations 414 and 416, and low for occupation 415—we recoded BSWS occupation 1405 into three 'sub-occupations' (1405_1 to 1405_3) and assigned ARI levels as follows: (i) 'Sub-occupation' 1405_1 was assigned the ARI of JobTag-OID occupation 52 when the hourly wage was above the 90th percentile of its distribution; (ii) 'Sub-occupation' 1405_3 was assigned the ARI of JobTag-OID occupation 415 when the hourly wage was below the 60th percentile; (iii) 'Sub-occupation' 1405_2 was assigned the average ARI of JobTag-OID occupations 414 and 416 when the hourly wage was between the 60th and 90th percentiles of its distribution.

a result of the AI/robots technologies available in 2009 or that became available in the following years (until 2024).

Finally, we computed the industry-level ARI using the detailed 100-industry classification from the Japan Industry and Productivity (JIP) Database (version 2023). The industry-level ARI was calculated as the weighted average of the occupation-level ARI (as of 2024), using as weights the share of hours worked in each occupation within the industry and year (data harmonized in the BSWS from 2009 to 2023). Hence, for example, the industry-level ARI in 2009 reflects the potential exposure to automation risk for each industry, considering AI and robotics technologies available in 2009 or introduced in subsequent years up to 2024.

The complete Automation Risk Index (ARI) dataset for Japan includes: (i) ARI estimates for 487 JobTag-OID occupations for the years 2024, 2030, and 2040; (ii) ARI estimates for 144 BSWS occupations for the same years; and (iii) ARI values for 94 JIP industries, available annually from 2009 to 2023.

Appendix

Table A1. Skills, abilities and Job adaptability attributes included in the analysis and as items of the questionnaire survey

Category	Item Name	Item Definition
Skills	Reading comprehension	Skills to listen attentively, get to the point, and ask the right questions when necessary without breaking the conversation
	Listening skills	Skills to effectively convey information in writing tailored to the reader
	Writing skills	Skills to talk to others in a way that effectively conveys information
	Explanatory power	Skills in reading and comprehending foreign language texts
	Reading a foreign language	Skills to listen to and understand foreign languages
	Listening to a foreign language	Writing skills in a foreign language
	Writing in a foreign language	Skills in speaking in a foreign language
	Speaking in a foreign language	Skills that utilize mathematics to solve problems
	Mathematical skill	Skills in solving problems using the laws and methods of science
	Scientific skill	The skill of using logic and reasoning to identify the advantages and disadvantages of how to approach a problem, how to solve it, and how to come to a conclusion
	Critical thinking	Ability to understand the implications of new information for current and future problem-solving and decision-making
	New information Application	The ability to select and practice training and guidance methods and processes according to the situation when oneself or others learn something.
	Selection and practice of learning methods	The ability to continuously observe and evaluate oneself, others, organizations, and other external environments and situations for improvement and correction
	Continuous observation and evaluation	Skills to notice and understand how others react and why they react the way they do
	Understanding the reactions of others	The skill of coordinating the activities of oneself and others. Including scheduling arrangements, joint work, and coordination with business partners
	Coordination with others	Skills in convincing others to change their way of thinking or behavior
	Persuasion	Skills in negotiating to resolve differences of opinion
	Negotiation	Skills to teach others how to do things
	Guidance	The ability to proactively search for what kind of help and help is effective for others, such as customers and those in need.
	Personal assistance services	Skills to grasp the essence of complex problems and solve them by organizing related information
	Complex problem solving	Skills to analyse the requests and requirements presented in order to create specifications and design drawings
	Requirement analysis (Creation of specifications)	Skills to develop new equipment and technologies to meet the needs of users, or to modify them to meet the needs of the site
	Customization & Development	Skills to determine the type of tools, equipment, and facilities required for the job
	Selection of tools, equipment and facilities	Skills to install equipment and machinery, perform wiring, and install and configure programs according to specifications
	Installation and configuration	Skills in creating computer programs for a variety of purposes
	Programming	Skills to monitor instruments, dials, and other indicators to ensure that the machine is operating correctly
	Instrument monitoring	Skills to control the operation and operation of equipment, facilities, or systems

Category	Item Name	Item Definition
	Operation & Control	Ability to perform routine maintenance and determine what kind of special maintenance needs to be performed at what time of year
	Maintenance & Inspection	Skills to determine the cause of a malfunction and determine its corrective measures
	Identification of the cause of failure, etc.	Skills to repair a machine or system using the necessary tools
	Repair	Skills in testing products, services, and processes to evaluate performance and quality
	Quality checks	Skills to consider the relative costs and benefits of feasible measures and choose the best one
	Rational decision-making	Ability to analyse the impact of changes in society, technology, and circumstances on the activities of companies and organizations, and to determine how to respond
	Analysis of the activities of companies and organizations	Skills to grasp the scales and indicators for evaluating the performance of companies and organizations (performance, productivity, operational efficiency, etc.), and to clarify the measures necessary for improvement and correction based on goals.
	Evaluation of the activities of companies and organizations	Skills to manage one's own time and those of others
	Time management	Skills in determining how to pay for the funds needed to accomplish work or accounting for those expenditures
	Money management	Skills to acquire and manage the equipment, facilities, and materials necessary to perform a specific job and ensure that they are used appropriately
	Materials management	The ability to motivate, develop, and direct people while they are on duty and identify the best people for a particular job
	Human resources management	Skills to listen attentively, get to the point, and ask the right questions when necessary without breaking the conversation
Abilities	Imagination about how things look	The ability to correctly imagine what an object will look like when it moves or changes position. Example: Assembling a metal storage shelf according to the drawing.
	Dexterity of the fingertips	The ability to accurately and smoothly coordinate the fingers of one or both hands to grasp, manipulate, and assemble very small objects. Example: Assembling a machine inside a small watch.
	The speed of movement of the arms and legs	The ability to quickly move arms and legs. Example: If a defective product comes down the line, quickly remove it. Quickly climb to high footholds. Knock flies with a fly swatter.
	Ability to generate many ideas and alternatives	Ability to come up with many ideas and alternatives to a topic (regardless of quality, accuracy, etc.) Example: Come up with as many names for your new product as possible.
	Ingenuity	Ability to come up with a special or good idea for a given topic or situation, or to construct a creative way to solve a problem.
Job adaptability attributes	Work in groups and teams	How important is it to interact with others to work as part of a group or contribute to a team?
	Face-to-face discussions	How often are face-to-face discussions with others required? (Including group discussions)
	Contact with external customers	How important is it to deal with external customers and the general public?
	Coordinate and lead with others	How important is it to coordinate and take the initiative with others? (Excludes cases where you give instructions as a supervisor or leader)
	Physical proximity to others	How close are you physically to others at work? (colleagues, customers, patients, passers-by, etc.)

Category	Item Name	Item Definition
	Freedom to make decisions	To what extent do you have the freedom to make decisions without being instructed by anyone?
	Self-setting priorities and goals	To what extent are your priorities and goals un-predetermined and left to your own judgment?
	Responsibility for the health and safety of others	To what extent will you be responsible for the health and safety of others?
	The impact of decisions on others and companies?	How significant are the impact of your work decisions on others and on your employer's image, reputation, and assets?

Table A2. Expert survey results (2024, 2030 and 2040)

Item Category	Item Name	2024 mean	2024 s.d	2030 mean	2030 s.d.	2040 mean	2040 s.d.
Skills	Reading comprehension	2.091	1.362	4.000	1.713	5.200	2.011
	Listening skills	2.182	1.348	3.909	1.849	4.800	1.947
	Writing skills	3.182	1.912	5.273	1.758	6.000	1.897
	Explanatory power	2.727	1.758	4.200	1.619	5.636	1.748
	Reading a foreign language	3.727	2.468	5.000	2.111	5.500	2.108
	Listening to a foreign language	3.273	2.018	5.091	1.940	5.600	1.792
	Writing in a foreign language	3.364	2.018	4.636	2.005	5.300	2.312
	Speaking in a foreign language	3.091	2.328	4.273	2.145	5.100	1.647
	Mathematical skill	2.636	0.982	4.200	1.033	5.636	1.286
	Scientific skill	2.600	1.265	3.800	1.080	4.600	1.317
	Critical thinking	2.182	1.401	3.500	1.633	4.545	2.228
	New information Application	2.727	1.104	4.000	1.265	4.700	1.229
	Selection and practice of learning methods	1.182	1.214	2.545	1.753	3.800	1.687
	Continuous observation and evaluation	2.455	1.514	3.909	1.640	5.273	1.868
	Understanding the reactions of others	1.636	1.789	3.091	1.888	4.100	1.434
	Coordination with others	2.545	1.673	3.909	1.888	5.182	2.040
	Persuasion	2.727	1.446	3.818	1.679	5.091	1.849
	Negotiation	2.545	1.286	3.600	1.229	4.727	1.849
	Guidance	2.636	1.868	3.900	1.841	4.800	1.506
	Personal assistance services	2.636	1.973	4.364	1.629	5.200	1.418
	Complex problem solving	2.300	1.958	3.500	1.932	4.600	1.912
	Requirement analysis (Creation of specifications)	2.500	1.889	4.200	2.150	5.200	2.359
	Customization & Development	1.800	0.949	3.100	1.174	3.800	1.398
	Selection of tools, equipment and facilities	2.909	1.954	4.364	1.849	5.727	1.635
	Installation and configuration	1.700	1.229	2.909	1.375	4.727	1.629
	Programming	3.000	1.375	4.636	1.508	5.700	1.476
	Instrument monitoring	3.636	1.834	5.091	1.471	6.400	0.994
	Operation & Control	2.545	1.779	4.000	1.748	4.900	1.889
	Maintenance & Inspection	1.455	1.272	3.182	1.722	4.300	1.549
	Identification of the cause of failure, etc.	1.545	0.674	2.818	1.286	4.200	1.578
	Repair	1.200	0.632	2.300	0.943	3.700	1.287
	Quality checks	2.545	1.214	3.700	1.350	4.700	1.814
	Rational decision-making	2.818	1.421	4.300	1.619	5.400	1.792
	Analysis of the activities of comp. and organ.	2.545	1.804	3.900	1.897	5.100	2.119
	Eval. of the activities of comp. and organ.	3.364	1.695	4.800	1.647	5.700	1.932
	Time management	3.818	2.098	5.273	1.673	6.000	1.506
	Money management	3.455	2.162	5.000	1.849	5.900	1.650
	Materials management	3.273	2.328	4.500	2.108	5.545	2.183
	Human resources management	1.727	2.401	2.900	1.841	4.200	2.319
Abilities	Imagination about how things look	1.818	1.000	2.818	1.272	4.091	1.789
	Dexterity of the fingertips	1.600	0.843	2.545	1.214	4.000	1.252
	Speed of movement of the arms and legs	1.600	0.823	2.300	1.101	3.600	1.398
	Ability to generate many ideas and alternatives	2.000	1.333	3.000	1.619	3.500	1.955
	Ingenuity	1.600	0.699	2.900	1.265	3.500	1.636

Adaptability	Work in groups and teams	1.364	0.934	2.455	1.286	3.300	1.595
	Face-to-face discussions	1.636	0.874	2.636	1.293	3.500	1.767
	Contact with external customers	1.600	0.516	2.700	0.966	3.700	1.650
	Coordinate and lead with others	1.636	1.079	2.700	0.966	3.600	1.713
	Physical proximity to others	1.364	1.036	2.455	1.120	3.500	1.101
	Freedom to make decisions	1.444	0.756	2.100	1.093	3.111	2.031
	Self-setting priorities and goals	1.636	0.786	2.455	1.191	3.300	1.912
	Responsibility for the health and safety of others	1.300	0.500	2.400	1.054	3.111	2.167
	The impact of decisions on others and companies	1.727	0.982	2.700	1.075	3.600	2.011