Works Report 2016

Work Model 2030

Technology Innovates "Work" in Japan

Is technology a threat?
Our work style at the crossroads

Throughout the ages, new technologies have transformed our life and work styles. In the ancient times, the agricultural revolution transformed our society from that of hunter-gatherer to that of farming communities. The technology promoted permanent settlements and built the foundation of the human society.

Mechanization advanced during the industrial revolution in the 18th century. Power technologies that extended the physical capacities of humans brought about a significant improvement in productivity.

We are now living in the world of "information revolution" that started with the computer. As all kinds of things are digitized in this society, innovative technologies (mobile internet, artificial intelligence, robotics, virtual reality and augmented reality and the like) become able to replace the intellect of humans, such as cognitive capacity, decision-making, and creation. We can consider ourselves to be right in the middle of the historical period of transformation for technology and economic paradigms.

Being confronted with compulsive technological progress, more than just a few people consider that the technology as "threat" to mankind. Technologies that replace not only bodily activities but also intellectual activities are threats that can take away work from humans, and some people raise voices of concerns that technological transition poses risks as lowering of income or disruption of careers that are no longer avoidable.

It is not easy to wipe away the emotion of fear for things in the future. In the view that technology is progressing rapidly and dramatically in the recent years, it is undeniable that there will be a cataclysmic change with how things are in the world in just a dozen or so years ahead, and the "threat" cannot be conquered if we just devote ourselves to the changes. Would it be possible to overcome such a threat by formulating and sharing perspectives of the near future based on current sighs of the changes?

It is for that reason that this report was prepared to make a serious examination on what we should be doing now in preparation for the year 2030. The reason for focusing on the year 2030 is that it is the year in the future that is relatively in range to make predictions and as we considered that innovations must be conducted over a dozen or so years to change threats to challenges to overcome.

This report presents a number of recommendations for policy strategies to achieve a society where all humans can lead vibrant lives together with technology in the near future. It is hoped that discussions on technology and work style can be evoked and lead to proactive activities for innovations.

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1 "Work" in Japan facing major changes

Era in which the span of career is double the life of corporations

The world undergoes cataclysmic changes through technology

The progress of technology is remarkable with significant improvement in the communication environment, such as the internet, as well as substantially elevated performance of computers. Such movements are likely to proceed continuously in the future as well.

Our work style changes with technological advancement. There have often been occasions when the development of servicing progressed with the transformation of the industrial structures in the past, while the implementation of technology resulted in the work of people being replaced by machines. Predicting future as an extension of the past will become impossible in the future, as substantial progress of technology will take place. Major technologies with particularly significant impact can be sorted into the following four categories.

1. Mobile and cloud

First, we have a category that is represented by mobile or cloud technologies. Smart phones, which did not exist just ten years ago from now, have quickly become popular since their emergence, significantly changing the life styles of individuals. A single smart phone can provide support for handling emails at work as well. The advancement of cloud and internet technologies also makes it possible to access data anywhere facilitating work and life styles with a greater leeway. Such technologies amplify the capabilities of individuals.

2. IoT and robotics

The second category is represented by technologies such as the IoT (Internet of Things) and robotics. The IoT can store data generated by respective work operational processes at corporations and facilitate optimization of work processes in greater dimensions and on a diverse range of levels, while making it possible to change processes to adapt to external environments in an instant.

The popularization of robotics in a broad range of fields will likely promote a significant advancement with networking and data collection that are currently proceeding with the IoT.

3. VR and AR

The third category of technologies consists of virtual reality (VR) and augmented reality (AR), which will continue to develop and provide more realistic sensations. VR and AR are currently being utilized in some occupations, such as piloting of aircraft, as a part of skill training. Such technologies are expensive and their needs are limited and as such their applications are limited to only a few occupations. However, the cost can fall with progress in the future, and thus spread across a variety of occupations. Once a technology becomes popular to a certain extent, more effective utility methods will be discovered, which in turn can potentially lead to an explosive popularization of such technology.

4. Artificial intelligence and big data

Finally, we have a category that is consists of artificial intelligence. The history of the development of artificial intelligence has taken several twists and turns. The aspect that is drawing a high level of attention in the recent years is "big data," which facilitates the accumulation of a large amount of data. This combined with the improved performance of computers led to the progress of technology for machine learning, making it possible to make more accurate predictions. The reason for such predictions, which are different from the thought patterns of humans, being made is not revealed by artificial intelligence at all. If the accumulation of even greater amount of data becomes possible in the future, which can go hand in hand with the IoT described above, then it will facilitate the expansion of the range of fields that utilize artificial intelligence.The impact of these technologies on society is significant and according to a report published by McKinsey Global Institute, they are expected to have an economic impact worth $15 trillion in 2025. Corporations utilize these

technologies to make innovative changes to their business models. Once the movement spreads, the industrial structures and competitive environments will change resulting in the world to undergo a significant change as well.

A portion of tasks (duties) within a given work is automated in such a world, while tasks that are taken care of by humans become a collection of projects with clear goals. A world in which people come together when a project at a corporation is proceeding, then split up once it is completed to participate in a project of another company can be conceived. Currently, there exists what is referred to as the "alliance" in the Silicon Valley of the United States, where corporations and individuals work based on a relationship of trust. This type of work style can potentially become prevalent by the year 2030.

Career span of 50 years and corporation life of 25 years

When the progress of technology accelerates even further, productivity improves. This will not only eliminate the tasks (duties) performed by humans, but also accelerate the rate at which changes occur with business.

The life of corporations becomes shorter as the pace of business accelerates, resulting in more corporate mergers, consolidations, and/or the discontinuation of businesses through M&As and the like.

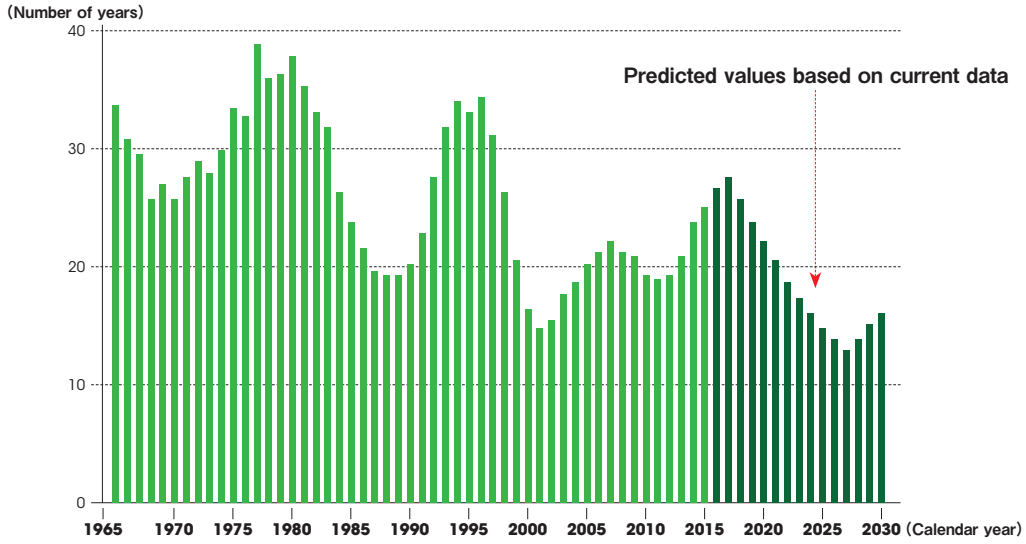
The average life of corporations in S&P 500 from a long-term perspective is falling, which is projected to be 20 years or less in the future. Such changes are also observed in Japan, with the average life of corporations that went bankrupt in 2014 being merely 23.5 years. The life of a corporation is about 25 years in average and it can shorten even further because the environmental factors that shorten the life of corporations are expected to increase in the future.

On the other hand, the longevity of humans is progressing. The healthy life of a Japanese, which indicate the healthy period of an individual's life, is 71.19 years for males and 74.21 years for females (Health Japan 21 (2nd Edition), Ministry of Health, Labor and Welfare). The currently implemented employment security provisions in Japan apply up to 65 years of age. Taking into consideration that there are movements intended to promote employment that extends beyond 65 years of age, there will be an era in the near future wherein working until at least 70 years of age will become normal. The span of careers from entering the work force to retirement can therefore be considered to reach 50 years.

The span of careers will be 50 years while the life of corporations will become 25 years, which means that the span of careers will be twice as long as the life of corporations. Working for one company for the entire career was not unusual for an individual in the past, but it will become increasingly difficult to spend the entire span of one's career with a single company in the future. Work styles and career formation of the past will no longer pass for in the future, and thus innovations will be required.

Average life of corporations among corporations listed in the S&P Index

(seven year moving average)



Source: Innosight ", Corporate Longevity: Turbulence Ahead for Large Organizations" , Executive Briefing, 2016

Breakthrough is not achieved by " NG" work style

Current work style is "National" and "General"

Let us verify the current characteristics of work style in Japan.

The table below was prepared based on observations of skills and work locations in Japan as well as a number of other countries. The results indicate that in the case of Japan, a large proportion of responses was dominated by "slightly close to my skills can be leveraged in any company" and "slightly close to my skills are best leveraged in this company", which imply that employees in Japan possess somewhat "general" skills. It is rare for individuals to consider work descriptions and post assignments as corporations make decisions on work descriptions or assignments in many cases. There are many people who can handle anything, like experiencing a variety of work through relocations and reassignments within a corporation. Once a person is out of a corporation, the broad range of knowledge and experience gained can no longer be considered as strengths and it would be difficult to believe that such skills can be fully utilized. People can be considered to be spending the majority of their working life in "general" careers.

Furthermore, the number of people with work “nationally” (within a single country) is not that small either. There is a trend with the Japanese, which is more so with them than with people of other countries. They do not desire to work overseas. Even though Japanese companies are increasingly expanding overseas, there is a trend among many employees that it is perfectly acceptable to deal only with the domestic market.

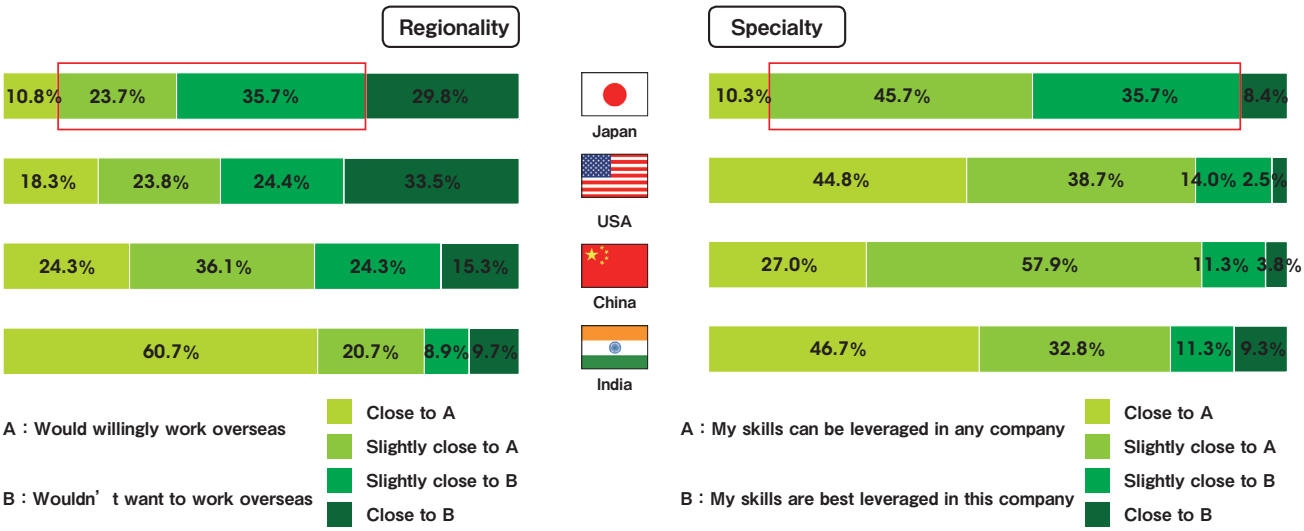
On the other hand, a corporation may order an individual who wishes to work in a specific area to transfer and relocate, which can become a source of significant stress for that employee.

Such background can be characterized as a typically Japanese employment practice but in reality the ineffectiveness resulting from a combination of "national" and "general,"."

What constitutes competitive advantages for humans? Ability to respond to technology

Current work style does not allow individuals to respond to environmental changes such as the progress of technology or the shortened life of corporations. Estimates made by Nomura Research Institute indicate that 49% of the employees in Japan could be replaced by artificial intelligence or robots. People talk about threat of diminishing work due to technology, but the real threat is not about diminishing work.

International comparison of work styles



Source: Authors' calculations from "Global Career Survey " 2013, "An International Comparative Study on Manager " 2015 by Recruit Works Institute

Work remains in spite of progress with technology, but people sometimes cannot respond to the work created by technology and work that change with the progress of technology.

A significant change of technology is that the technology becomes possible to create value added on its own. Everything is connected through the internet blurring the border between the real and the virtual. Technology is providing value added to the real world on their own and without any intervention by humans. The processing speed also accelerates with the evolution of technology, realizing machine intelligence that can instantaneously and autonomously process a large amount of complex data; thereby, exceeding human capabilities . The issue is how to make the work style correspond to such changes.

Facing risks of income reduction and career disruption

The competitive advantage of humans in the real world is also under threat at the same time, as the automation of intellectual duties by AI is believed to be growing. There are concerns about the income reduction of a large number of people who are employed to perform such work, due to partial automations of tasks. Although it is desirable for a variety of people to have opportunities to increase their income, there are people who are unable to cope with changes in work style due to technological advancement and gain benefits from it.

At the same time, continuing to work for a single company makes it difficult to continue performing a single duty due to the shortened life of corporations.

That forces people to follow through careers that are unexpected and not in line with their intentions. Going up the perceived steps of careers becomes difficult and that can make some incapable of fulfilling the entire span of their careers.

Furthermore, such changes developed at the pace of technology, which supersedes the speed of learning as well as the trial and error of people. The obsolescence of skills will become even more serious and produce risks that can disrupt careers.

Corporations are also negatively impacted if this situation is left as it is

Income reductions and career disruptions arising from overlooking the advancement of technology and the shortened life of corporations will not be limited to issues of how individuals perform their work.

The reduction in income of individuals leads to the sluggish consumption by individuals, which in turn negatively impacts the performance of corporations. Furthermore, disruptions of careers reduce the number of people who can sustain business operations, thus preventing smooth business operations. The dependence on human capacity is significant when corporations utilize technology, including corporations with strengths in technology. Unless employees have a certain degree of understanding it is not possible to sufficiently utilize the power of technology, even when technology is being utilized within a corporation.

Cutting out duties to outsource them is a method that can be considered as a means other than the utilization of technology within a corporation. Personnel in charge of such a task must conduct work, ranging from the selection of outsources to adjustments in a careful manner to achieve flow of duties in a more efficient manner. Once the income reductions and career disruptions become a reality, skills erode away followed by an extreme lack of personnel for performing adjustments of work, which makes it impossible to achieve flow of duties in an efficient manner. Such eventuality can have negative impact on corporate management.

Such observations indicate that the impact of the issues cited above are not limited to work style of individuals, but they can also be considered to have negative impact on corporations and as such, they must also consider such issues to be related to them.

Examples of work with a high probability of being replaced by artificial intelligence and robots

Clerical worker	Cement production operators
Railway station personnel	Land surveyor
School clerical workers	Taxi drivers
Managers of boarding houses, dormitories and condominiums	Inspectors and surveyors of textile products
Government administrative clerical workers	Express courier delivery personnel
Bank tellers	Blacksmiths
Metal workers and metal product inspectors	Building and facility maintenance technicians
Security guards	Platers
Accounting personnel	Customs agents
Construction workers	Data entry personnel
Automobile assembly workers	Computer technicians
HR clerical workers	Building cleaners
Newspaper delivery personnel	Boiler operators
Production site office workers	Insurance agents

Source: Excerpted from a portion of occupations listed under "100 occupations that are highly likely to be replaced by artificial intelligence and robots and the like", Press release (dated December 2, 2015) of Nomura Research Institute.

Critical future indicated by predictions for the year 2030

Are causes of concern in an era where technology evolves and the span of careers is double the life of corporations, merely matters that entail the risk of reduced income or disrupted careers? Micro-simulations had also been conducted at Recruit Works Institute in the past, to predict labor markets for the year 2025. A model according to which the turnover rate doubles and hiring rates halve by the year 2025 was considered as a pessimistic scenario among such predictions. This model assumes the disruption of individual careers and the discontinuity of corporations in hiring people. Such aspects can overlap with the situations that may become a reality, such as the disruption of careers and reduction of income as mentioned earlier. Assuming that such assumptions become a reality, what would happen when the range of prediction is extended to the year 2030?

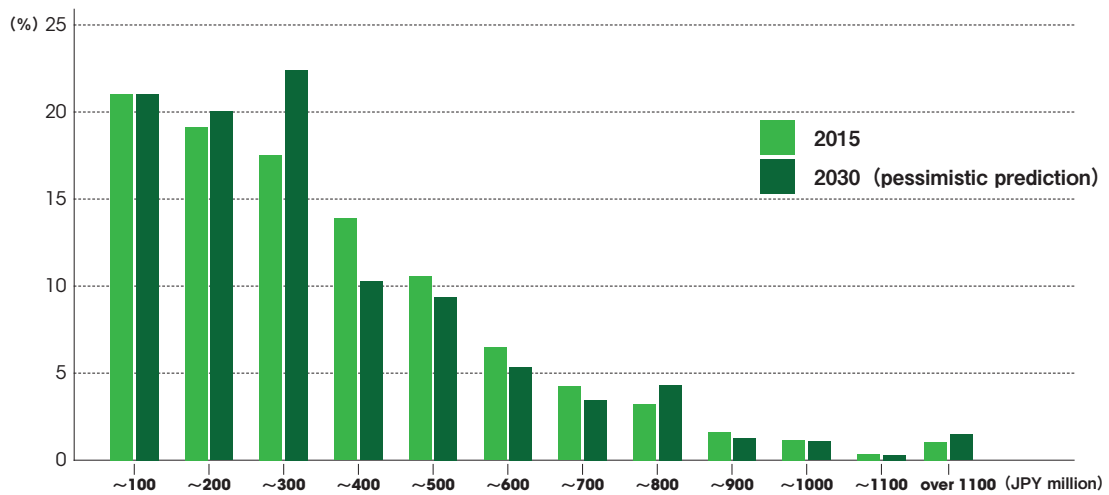
Performing a simulation for the period ranging up to the year 2030 based on the "Japanese Panel Study of Employment Dynamics 2016" and according to the pessimistic assumptions for the predicted labor market of 2025 described above resulted in the reduction in number of employed persons by 8.41 million down from 63.76 million in 2015 to 55.35 million in 2030 (the figure for 2015 was taken from the basic compilations provided in "Labor Force Survey" of the Statistics Bureau, Ministry of International Affairs and Communications).

There was a decline in terms of employment rate also, by about 5 points in a span of 15 years, from 57.6% in 2015 down to 52.9% in 2030. The number of unemployed people, on the other hand, will increase by 2 million from 46.95 million in 2015 to 49.23 million in 2030.

These figures do contain individuals who reach higher an age group and retire from the work force, but it is important to keep in mind that the same figures also include those individuals whose careers are disrupted and become unemployed. A simulation was also conducted for income. The peak is reached at JPY 2 million in the year 2030, while the share of those with income at the level of JPY 3 million will decline significantly. These are caused by the stagnant growth of income among non-regular employees, as well as those of individuals who leave work and then regain employment with significant reduction in the level of their income. Although very small, a peak is observed at the level of JPY 7 million as well. This small peak is caused by gathering people who had higher income than the level of JPY 7 million in the year 2015 and experienced turnover and re-employment until the year of 2030. The proportion of those employed individuals who experience a decline in their income both in 2015 and 2030 reaches 72.1%. The average income was JPY 3.292 million for the year 2015, but the figure declines by JPY 400,000 by the year 2030 to JPY 2.891 million.

If the current work style continues, the income reduction risks and the career disruption risks will become a reality and if that is the case, then the future will be considerably bleak by the year 2030. A reform of "how work is performed" is required at the present time to ensure that such predictions will not become a reality.

Pessimistic prediction of income in 2030



Innovations in the formation of career is urgent

What can we do to review our work style to respond to the advancement of technology and reduce the life of corporations? The points that we should consider are (1) how the autonomy of individual careers can be formulated; (2) how levels of individual's skills can be elevated; (3) how to smoothly proceed with the transition of careers.

(1) How the autonomy of individual careers can be formulated

A shift of perspective, from a world in which corporations form careers of individuals to a world in which individuals consider and formulate their own careers is necessary. This means that individual awareness about their careers will become increasingly important.

Although the necessity of career autonomy had been cited in the past, the reality of achieving complete career autonomy is just half fulfilled currently. The careers of individuals are tied to a corporation and the corporation is the principal in considering careers of individuals under the Japanese style employment. Corporations determine post assignments and work descriptions once individuals are recruited, and they merely need to follow instructions. It was not necessary for individuals themselves to consider their careers for that reason. The proportion of people in Japan who consider that "one's own career should be determined by the person himself or herself" comprises 45.4% of those surveyed according to the "An International Comparative Study on Manager" (2015) of Recruit Works Institute, which is lower than that in foreign countries where the proportion is about 70%.

Taking initiatives in making considerations is desired in a society where the span of careers is double the life of corporations. In other words, individuals who lack the ability to do so will end up with a disruption in their career.

(2) How the level of individual skills can be elevated

Securing opportunities to acquire skills and to master them early is required to adapt to the evolution of technology and make smooth transitions possible.

Under the current situation, however, the education and training budgets at corporations are cut back and investments by corporations are decreasing. There were opportunities to acquire skills at corporations in the past and such skills were often acquired through on the job training and the like, which required much time. Furthermore, self-enlightenment activities, such as voluntary studies conducted by individuals, could not be considered to have been conducted in a proactive manner, as revealed by the "Japanese Panel Study of Employment Dynamics" of Recruit Works Institute. It is essential that considerations be made on how to respond to such opinions as "I am too busy to study" or "I do not know what I should do."

(3) How to smoothly proceed with transitions in careers

In the past, evaluations of skills and experiences of individuals were restricted to a corporation. Therefore, corporations were hard to identify the market value of an individual who had work experiences at other corporations when they tried to hire mid-career employments. .

According to the "Global Career Survey" of Recruit Works Institute, the number of people who experience a decline in their annual income through a career change is relatively high in Japan as compared to that in foreign countries and this is inhibiting employee's intention to change their careers. Career transitions must be achieved smoothly to make continuous careers possible. It is not only necessary to make changing careers easier but it is also essential that a diverse range of careers, such as entrepreneurship, is achieved. For this, it is important to improve the existed labor market for increasing the career mobility and incorporate a variety of issues, such as transparency in the skills of individuals.

While such issues have been cited in the past, there has not been any significant improvement yet. Such issues must be addressed and dealt with before the evolution of technology accelerates and the span of careers becomes double the life of corporations. These are issues for which there is simply no time to wait for solutions.

chapter

2 Signs of innovations driven by technology

Technology will provide breakthrough for work style

Issues described in Chapter 1 can potentially be resolved by the ways in which technology is utilized. An outlook on what is known at this point of time and the future potential with regards to the impact of technology on how work is performed is provided below.

As mentioned in the previous chapter, a perfect prediction is not possible when technology is advancing at an astounding rate and the creation of new technologies is expected in the future. Considering how technologies that emerged in the past have been utilized and how they brought about innovations in work performance, the emergence of new technologies is expected to promote innovations as well.

For instance, technologies that are currently advancing, as introduced in Chapter 1, have been combined and utilized to bring about effects such as those described in the table below. First, improving the efficiency of work operational processes through means such as those represented by robotics has the effect of raising productivity of individuals.

Second, work can be performed without imposing restrictions on the location, as represented by means like mobile and cloud technologies. Further, more accurate predictions become possible by utilizing AI and decision making becomes more accurate and easy to perform. Such movements are already a reality, but with the advancement of technology, its benefits will become available to everyone at affordable prices. Furthermore, along with the progress of networks, sensors that support robotics and the IoT will be more widely utilized resulting in an explosive development of data accumulation. This will further expand the positive impact of technology.

Other than the cases presented here, the advancement of technology is accelerating and is starting to become a regular occurrence in a variety of fields, such as genome, brain science, and nanotechnology.

Impact from combining technologies on work style

	Cloud	AI & big data	VR & AR
Mobile technology	Database can be accessed anytime from anywhere and can be processed on cloud.	Advice and proposals with considerations for individual circumstances and situations can be made available when collecting information or making decisions.	Implicit knowledge of work sites can be digitized to make it available for virtual experiencing to make acquisition and transfer of knowledge and know-how easier.
IoT	Various entities can be connected at all times. Data of collective knowledge can be accessed on demand.	Automatically accumulated data can be analyzed and interpreted for making decisions. More efficient and more creative duties will increase in number.	Prototypes based on data gained in actual environments can be virtually verified to reduce cost and satisfy required specifications at the same time.
Robotics	Robots become input interface to accumulate audio information as well as behavioral information on cloud and utilize them for interpersonal services.	Robots that learn autonomously automate labor intensive work. People utilize the robots to optimize their behaviors.	The absorbing sensations given by robots functioning as an output interface for VR and AR raise the accuracy and quality of simulation learning, to accelerate the rate of learning.

Impact on careers expand due to complex technologies

If the positive effect of technologies increased even further, what are kind of changes that will occur in the near future, say the year 2030? The following matters can be considered as examples, taking into consideration the signs and technology predictions that are evident presently.

Future brought about by IoT, AI , and robotics

Efficiency of work processes is improved by IoT, AI, and robotics and once these can utilize collected data in an efficient manner, tasks that had in the past been performed manually can be automated. There are signs in the present time that indicate automation will be possible in labor intensive industries such as transportation or logistics. Having numerous tasks automated raises the value of work that can only be performed by humans. There are highly complex works that require a combination of multiple tasks such as project planning, formulation, and development. Due to the increase in the number of processes that are automated, the way time is used will also change, in that, time can be allotted to tasks that exhibit significant value rather than miscellaneous work that require much time. The concentration of tasks performed by humans to such work will further raise the level of proficiency for skills.

Future brought about by VR and AR with big data

Storing explosive amount of data will facilitate more accurate predictions. This is not limited to promoting work as similar occurrences also take place when making career selections.

While many declare that "I don't know what I should learn," predictions based on data can facilitate individuals to gain understanding on what such individuals should learn. Furthermore, while proficiencies at work is most often based on experience, individuals can visualize skills of highly proficient individuals by utilizing data and facilitate simulated experience of proficient individuals by utilizing VR and AR, which will enable them to acquire skills at rates that were inconceivable in the past. The hurdle for career transitions into occupations of other categories can be lowered significantly if skills can be acquired instantaneously.

New work is created by technology

In such a world, multiple technologies progress simultaneously and create new work. First, there is a dramatic increase in the demand for people who support or create technology, referred to as technology related profession types. Some theorists claim that the singularity (a state in which technology exceeds the intellect of humans) will occur in the near future; however, based on what we anticipate for eventualities leading up to the year 2030 it is unlikely that technology itself would evolve to the point where it would maintain itself, at least not across a broad area. On the other hand, new profession types that specialize in the utilization of technology, such as maintenance and technical operations, will emerge. These are not merely software engineers, but they will master multiple technologies and support technologies that can serve as infrastructure.

Second, there will be work that can be handled only by humans, referred to as social related profession types. A renowned chef, for instance, exhibits his superior creativity and provides meals with high values only because they are prepared by him. This is not limited to chefs and the value of work can also improve for entertainers, teachers, and other individuals who conduct work by providing services through dialogues, communication, or performance. Similarly, the kind of work that require sustained relationships with people, such as counselors and consultants that consult people, will also have greater value as well.

Such works are relevant to technology while exhibiting strength of humans and can contribute to the productivity of enterprises. This outlook is not just a dream, but it is something that is currently progressing. Case examples illustrating the promotion of decision-making on careers by utilizing data as well as those with increasing number of people who are able to create or easily utilize AI will be introduced in the next column.

Simulation

World for "happy simulation of life"

Work style of individuals becomes freer with technology.

General Manager, Planning Administration Office, HR Research Institute, Recruit Holdings
Ryuichiro Nakao

Increase in the number of occasions to consider about careers and changes with subjects themselves

The people who got a life time employment after graduating from schools, irrespective of whether that was what they were seeking, will be required to transition into a society where job transfers are presumed, due to the advancement of technology. Lifetime employment is a system in which the company is in charge of careers of employees. On the other hand, in a society that presumes job transfers, skills that are useful outside any particular company and not those that are useful only inside a particular company will become important. Merely advancing into the management within a single business will not be a career in such a society. The path for advancing through career will involve enhancing proficiency in skills for a particular occupation to get a pay raise. Each individual autonomously selecting an occupation to enhance their career and selecting their own career and acquiring skills will become increasingly important.

The timing with which people consider their careers in Japan at present is limited only to the student years prior to joining a company. In a society where job transfers are presumed, it will become a common practice to periodically review one's career even after joining the work force. There will be a time where we all need to periodically reconsider our careers autonomously on our own.

In such a society, it will be necessary to simulate careers. There is useful information that can be referenced in relation to this.

Effects of Career and Money Simulation

A simple career and money simulation software intended for women who have not worked while raising children was developed by Recruit Jobs. Future incomes and outlays of households are produced by entering data such as annual household income, ages of children, living expenses, and educational policies. On one hand there will be families that will end up with positive figures in the future even if they remain the way they are now, while there will also be households that will be revealed to have potential of ending up with negative figures in their future household balance if they remain the way they are now. For those households that can potentially run into negative figures to resolve their deficit, there will be an option of either decreasing their outlays or increasing their incomes or both. To increase their income, a re-simulation would indicate that if they are not dedicated to raising children they can start working and their deficit will be resolved. 70% of women who are currently not working and found out from the simulation that their household will be in deficit in the future responded that they will start working again. This revealed that when a simulation that provides information of money in addition to career is made available, those who are currently unemployed would seek work again. This experiment was conducted three times due to our circumstances, changing locations and subjects each time. Each time we conducted the experiment we got the same result, which demonstrated the validity of the simulation.

Evolution of simulation brought about by the evolution of technology

It would be possible to imagine that in addition to the evolution of the AI, simulation will be evolving in leaps and bounds in the future as a variety of data is accumulated and the computational speeds go up. There are two directions evolution can take. One is an evolution towards a life simulation that is capable of simulating information on money in addition to career. The other is an evolution that facilitates reducing the time for acquiring a new career. The case examples introduced earlier illustrate the transformation with attitudes of people that came about by adding information on money in addition to career. However, it is not just the work that has an impact on the incomes and outlays of households. In terms of incomes,

the pension in the future is quite important. Incomes from financial assets as well as real assets also have significant impact on incomes. Assistance or inheritance from parents can also be considered. In terms of outlays, where the residence will be, the market information on housing, as well as the information on expenses related to the education of children, expenses needed for day care and kindergarten or nursing care, and coverage such as life insurance or expenses arising from illness in the family will all have an impact.

This life simulation has a high probability of proving its utility when people consider to "retire from work or transfer jobs" at different times in their life, such as when they marry or give birth as well as when moving or selecting schools for children, in addition to occasions where they are selecting a job or considering a job transfer. Such data is subject to various constraints at present because they are scattered or not organized and there are restrictions imposed on the use of data, such as matters relating to the handling of personal information. There are also a large number of variables that create technical issues in simulations. The evolution of various technologies in the future and the improvement of rules for using such data in both public and private sectors will resolve such constraints.

The evolution of technology significantly reduced the time required to gain skills to become an expert. There are already existing signs of this. The durations of aptitude tests have been significantly reduced in this era of digital testing in comparison to when mark sheets were used for testing. This is because technology has advanced to the point where the questions given to test subjects can be varied depending on whether previous questions were answered correctly. Technologies for minimizing time to acquire skills have been emerging in fields, such as technologies for test studies or language learning, by utilizing the knowledge from brain science or behavioral science. Contents for skills acquisition have also been digitized. A variety of know-how from around the world can be acquired in video as well. Dramatic changes are about to take place in the food and beverage industries where apprenticeship of sushi chef or opening of ramen noodle shops can be shortened from what used to be years to a few months or even a few weeks. At present, there are still some opinions that suggest the levels of skills that can be achieved under the present conditions is still low, but there is still hope to reduce the time for people to become experts in a variety of fields.

How to live and work more pleasantly

The healthy life of individuals is extending and the duration of people's working period is becoming longer. The evolution of technology dramatically shortens the time required to acquire skills. This suggests that there is an increased possibility for an individual to becoming a variety of experts a number of times.

It is possible to build specializations around a single core career. It is also possible to become an expert in an entirely different field by taking a complete departure from the past career. Due to a dramatic reduction in time required to acquire careers, the world will be such that it will be possible to start over one's working life.

Life simulation will prove effective in such instances. An era will arrive when it is possible to simulate the ways to spend the rest of our lives in a pleasant manner and to achieve that in short time. To make that a reality as soon as possible, public and private sectors must cooperate and improve rules to facilitate the use of relevant data and create a society in which anyone can easily perform a variety of simulations.

Actual screen from a career and money simulation

Enter information such as annual household income and presence of children.

Future incomes and outlays of the household are outputs.

Artificial Intelligence

The key is held by people who create AI and people who use AI

Business productivity will improve dramatically with technology

General Manager, Promotions Office, Recruit Institute of Technology, Recruit Holdings
Ko Ishiyama

Will AI really rob us of our jobs?

I imagine many people have seen news articles that suggest that jobs will be stolen by technology, primarily AI. However, there are not many people who actually understand the mechanism by which the AI takes jobs away. To examine this problem, the author attempted an experiment when he took the podium to give a lecture for the session called "How Human Resources Change Due to the Latest Brain Science and the Evolution of AI and IT" at the HR Summit of 2016. About 200 people that are involved in human resources were participating in the aforementioned event. Such participants were asked to respond to a series of questions by raising their hands. The first question was whether they have seen any news articles that suggested that the AI will take away jobs. Everyone raised their hands. Next, a more specific question was asked, whether they have seen any news that dealt with the contents from the survey conducted by Professor Micheal A. Osborne at the University of Oxford. Nearly half the people raised their hands, which is obvious as they are individuals who are involved with human resources. Next, they were asked if they have actually read a report on the survey. Suddenly, less than 10% of the people raised their hands. Finally, they were asked if they understand what the Gaussian Process Classifier* cited in the report is. The number of people with their hands raised finally went down to zero.

The experiment mentioned above is not a strict one in that it was merely conducted to get a rough idea on how people have adopted the stereotyping of the issue of AI stealing people's jobs in their daily lives. Professor Tom M. Mitchell of Carnegie Mellon University in the United States, who is an advisor for the Recruit Institute of Technology and is affiliated to the AI Research Institute of Recruit, has pointed out the following in relation to the issue of technology and employment:

"A new mechanism for understanding, observing and tracking the impact of science and technology on workers should be implemented. Leaders of a government should be formulating important policies to deal with such issues as the transition of employment or distribution of wealth, as well as the need for education; however, surprisingly, fundamental and specific information considered necessary to resolve problems has hardly been collected. In the United States, for instance, it is not even possible to acquire information needed to respond to basic questions such as "Which technology is currently replacing humans to the greatest extent?"; Which technology is creating the most number of new jobs?"; "Which economic sector has increased or decreased employment through implementation of technology?" It is essential that such questions be answered in order for leaders to make policy decisions based on intimate understanding of relevant fields. Hence, I strongly recommend that thorough investigations be conducted not just for such questions, but also for other relevant questions and the information gained

Tom M. Mitchell

A representative researcher involved with a broad range of fundamentals and applications for machine learning since its early days. He is also the author of the representative text book for machine learning, "Machine Learning," and has established the first university department for machine learning in the world. He led numerous startups in the past and is known to have sold part of his assets in the startups he took part in. He was the founder of Whiz Bang.com developed a job search website (called Flip Dog.com),which they then sold to Monster.com.He is a member of the American Academy of Science,a fellow of the AAAS as well as a fellow of the AAAI.

Alon Halevy

A scientist, entrepreneur and educator of computer science. He was a professor at the Department of Computer Science at Washington State University, where he established a database research group. He founded Nimble Technology Inc., which provides information integration base for enterprises, as well as Transformic Inc., which provides deep web. He used the occasion of selling these businesses as an opportunity to start working for the headquarters of Google as a Senior Staff Research Scientist to take charge of research in the field of data management. He is an ACM fellow and has been awarded the VLDB 10-year Best Paper Award in 2006.

*One of the machine learning methods, used by Professor Osborne and his associates to predict work with high risks of becoming automated.

be disclosed.

Fortunately, the availability of online data has improved and the government should be able to acquire clear solutions to such issues by creating new data collection methods or collaborating with businesses that already have necessary information.

Professor Alon Halevy, the CEO of Recruit Institute of Technology, has cited following points:

"What technology replaces is not occupation but task. It may appear as if new occupations are being created, one after another, but in reality there are those that have changed significantly from occupations that were available in the past, while there are also many that have retained the same names of occupations but are actually different in content. Such issues as those described above cannot be resolved by gaining a macroscopic overview on the increases and decreases of employment solely based on occupations. The replacement of individual tasks by technologies, which becomes evident when observed at a more micro level, will reveal the kind of impacts that are manifested at the macro level and it is important to conduct an elaborate and detailed investigation on each and every one of these causal relationships."

What is in common between Professors Tom M. Mitchell and Alon Halevy is that they are not preoccupied with stereotypical discussions but instead place their emphasis on the approach of verifying detailed data based on specific case examples. We will now verify the kind of changes taking place at sites where AI has actually been implemented based on two case examples.

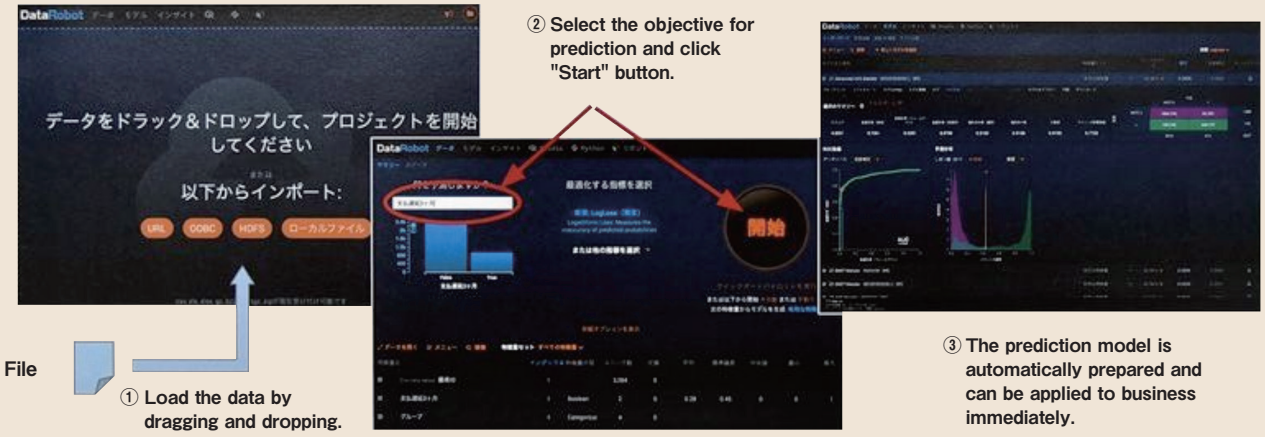
What is happening at sites where AI is implemented?

1 New values created by data scientists and AI

According to the announcement made by McKinsey, United States in May 2011 in "Big data: The next frontier for innovation, competition, and productivity," data scientists indicate that calculations revealed there will be shortage of personnel in certain occupations by the year 2018 in the United States, which require personnel with sophisticated analytics skills in amount of 140,000 to 190,000 as well as managers and analysts capable of making decisions by utilizing analytics of large scale data sets by 1.5 million. These can be considered fields in which a raised level of productivity is expected through the implementation of AI. One of the businesses conducting research and development in this field is DataRobot, Inc., which is headquartered in Boston, United States. This company provides the "DataRobot" software, which substitutes a part of data science work operations with AI. Utilizing the DataRobot converts work operations that in the past were carried out by data scientists to tasks that are as easy as the spreadsheet application, Microsoft Excel. More specifically, data in the Excel format is dragged and dropped into DataRobot and the items for which predictions are desired are selected, then the Predict button is pressed to prepare a prediction algorithm. This means that work operations of data scientists can now be performed by individuals other than data scientists.

The case example described above can be considered as an example that indicates the relationship between tasks and occupations, as described by Prof. Alon Halevy. If it were possible to substitute say eight of ten required tasks of a given occupation with AI, then the skills required from

DataRobot



people who are engaged in that occupation would be related to the two remaining tasks. Considering the subject in this manner reveals that the substitution of tasks by AI is not simply about the AI taking away jobs but rather increasing employment opportunities.

Recruit Holdings, with whom the author is affiliated, made a capital investment in DataRobot, Inc., in November of 2015 and during the half year that followed, conducted an experiment that entailed implementing this tool at all Recruit Group companies. The experiment involved 13 companies of the group and 80 of their corporate organizations, resulting in the preparation of a total of 2,890 prediction models. Many of the prepared prediction models were prepared by employees who are not data scientists. If the development of a prediction model is outsourced to an external business, the estimated cost for the preparation of a single model is about JPY 3 million on average. What this means is that if we simply apply that value to 2,890 models described above, the trial calculation derives the cost of about JPY 8.6 billion. The fact that this was achieved with just the cost of the DataRobot software can be considered extremely efficient. The utilization of this tool also changed work style of data scientists. The time required for tasks such as cleaning of data, selection of prediction models, and tuning of parameters constituted 80% of total man-hours in the past, while only 20% was allotted for formulation for the purpose of resolving a new problem. This constituent ratio of time was reversed by utilizing DataRobot, with 20% of time allotted to the former and 80% to the latter; while the number of prediction models that can be prepared within a specific time frame actually increased about five times, this resulted in an increase in the amount of time spent to conduct discussions with a variety of other divisions to extract new problems.

Thus the implementation of DataRobot in the work sites of data scientists resulted in five positive factors brought about by the AI, namely (1) reducing the gap between demand and supply in the labor market where the supply of data scientists is in shortage; (2) improvement of employment opportunities by making it possible for non-data scientists to fulfill the role of data scientists; (3) improvement of productivity for both non-data scientists and data scientists alike; (4) increased time for creating new values for data scientists; (5) increased total amount of communication conducted by data scientists.

2. The active role of AI in nursing care

Issues such as the gap between the supply and demand of personnel similar to the case of data scientists as well as the high turnover rates, are becoming prevalent in the work sites of nursing care; hence, much is expected from implementing AI in this field. A case example illustrating communications conducted by AI and humans is introduced for this field as well. One of the caring methods currently in use for "dementia" is referred to as the "humanitude," which was developed in France. This is a new method for providing care for dementia combines technology with the philosophy of care that was developed by Prof. Yves Gineste and Prof. Rosette Marescotti. It is gradually spreading in Germany, Canada, the United States, and Japan. The factor that was getting in the way of its popularization was the question relating to the scientific nature of this methodology. The question is whether the method of humanitude is actually effective as a care for dementia. Those who decided to look into this issue were the AI researchers. Images of humanitude being conducted on care receivers were captured (including images captured with the NIRS brain measurement equipment) and the analyses of video images were performed at the Takebayashi Lab of Shizuoka University. More specifically, whether the method of humanitude was present was tagged on captured video images. Big data indicating how the conditions of the care recipients changed during the tagged time intervals was prepared. Changes, such as whether brain activation occurred when humanitude was actually conducted, were successfully verified by analyzing this big data through AI technology. This resulted in humanitude being verified to be effective for the care of dementia.

Furthermore, activities relating to the automation of analysis as an application research described above, have been started at Nakazawa Lab of Kyoto University. Based on video images of the nursing care supplied to the AI, this research makes it possible to receive advice on improving the methods indicated by red entries. This not only leads to the improved quality that benefit care receivers, but also to the reduction in load on care providers and is expected to contribute in a way that the turnover rate of personnel will also be reduced. The considerations described above resulted in a conclusion, which indicated that five positive factors were brought about by AI: (1) Fall in the difference between demand and supply in the labor market where the supply of nursing care providers is in shortage; (2) Scientific verification of services provided by humans using AI; (3) Improvement in quality of service provided by humans due to assistance provided by AI; (4) Improvement of productivity for nursing care providers; (5) Collaboration with humans to deal with issues that could not be resolved

by AI alone.

Improvement in productivity through the distribution of roles among people who create and people who use

What are the common aspects of the two case examples of data scientists and nursing care providers? Prof. Alon Halevy discusses the roles of the people who create the infrastructure for utilizing AI and the people who use AI in the following manner:

"Let us assume there were two corporations in the world. Company A has a portion of its researchers engaged in the research and development of AI who develop 10 units of AI annually. Company B has an infrastructure that enables everyone to develop AI and as all employees can be engaged in the process, they are able to develop 100 units of AI annually. Under these circumstances, which company would have a higher productivity?"

The answer, of course, is Company B. The description above is a story about companies as examples. When we consider this issue for society as a whole, it is important that everyone move towards the organization of Company B as soon as possible. In the case example of data scientists, the infrastructure was improved by DataRobot, Inc., while non-data scientists utilized the infrastructure to achieve a rapid improvement with productivity. In the case example of nursing care providers, the research and development on the improvement of infrastructure was conducted by Shizuoka University and a method for dementia care was scientifically verified to contribute towards the popularization of the new method and the telemedicine to be implemented in the future. A society with the role of people who create infrastructure and the role of people who use functioning successfully in this manner, leads to a successful utilization of AI. Therefore, researchers of AI must not monopolize technology, but should maintain a good balance between provision for a fee and for free when distributing them, and provide the technology in an open manner as a social infrastructure so that the whole pie of the AI technologies can broaden from the overall macroscopic perspective and correct disparity among income levels gained from benefits provided by AI technology.

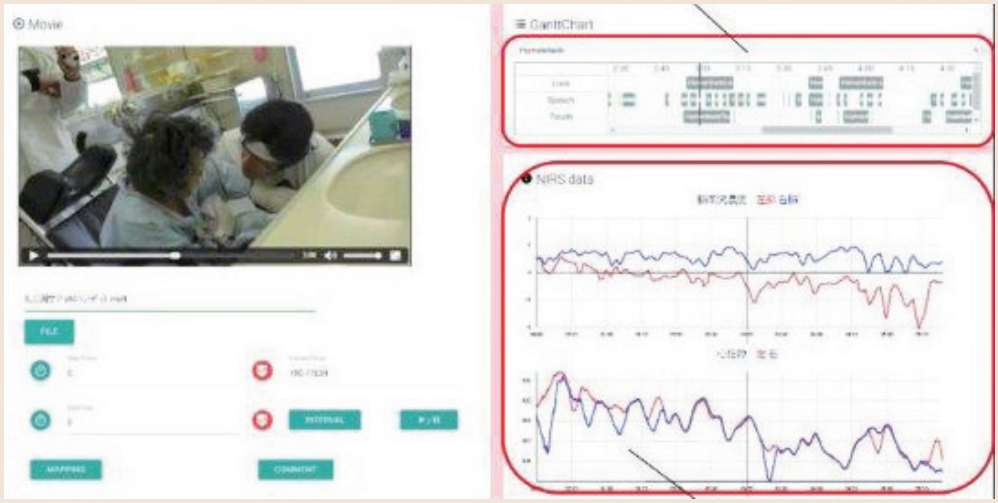
Whether a world of Company A or one of Company B will be created is up to mankind.

Data analysis on humanitude conducted by utilizing AI

Multi-modal video image analysis tool

Description data and sensor data are visualized using the video image.

Data that describes the actions taken by observing the scenes of nursing care



Acquired sensing data

chapter

3 Work Model 2030

Work style that evolves with technology

A proposal for a new work model

The case example of an embryonic stage illustrated in the preceding chapter suggested that the potentials of innovations in our work style lies in the utilization of technology. Work style is enhanced by technology, which makes it possible to increase income of individuals or extend their careers. This contributes to sustaining or expanding the consumer population or otherwise leading to the development and accumulation of human resources within corporations, which in turn contribute to the augmentation of earnings and improvement of productivity for businesses. The change in the work style through the utilization of technology is an inevitable consequence for both individuals and corporations. Then, the question that arises is that of the direction. Will work style in the future evolve with technology? What is the pivoting factor in selecting the work style to avoid risks and continuously create value-added?

What should be considered as strength?
Utilization or development of specialty

In a sophisticated and complex society where technology is advanced, such works become more valuable that is fun for humans to perform and that can be performed only by humans or with machine intelligence. Such a society requires the capability to combine specializations of humans and technologies and maximize their utilization, while simultaneously requiring humans to work on technology and dig deeper into individual fields of specialization. Should utilization or development of specialty be made the strength in the collaborative working arrangement between technology and humans? The time for each and every individual to make the choice has arrived.

Where to earn a living
Global or local

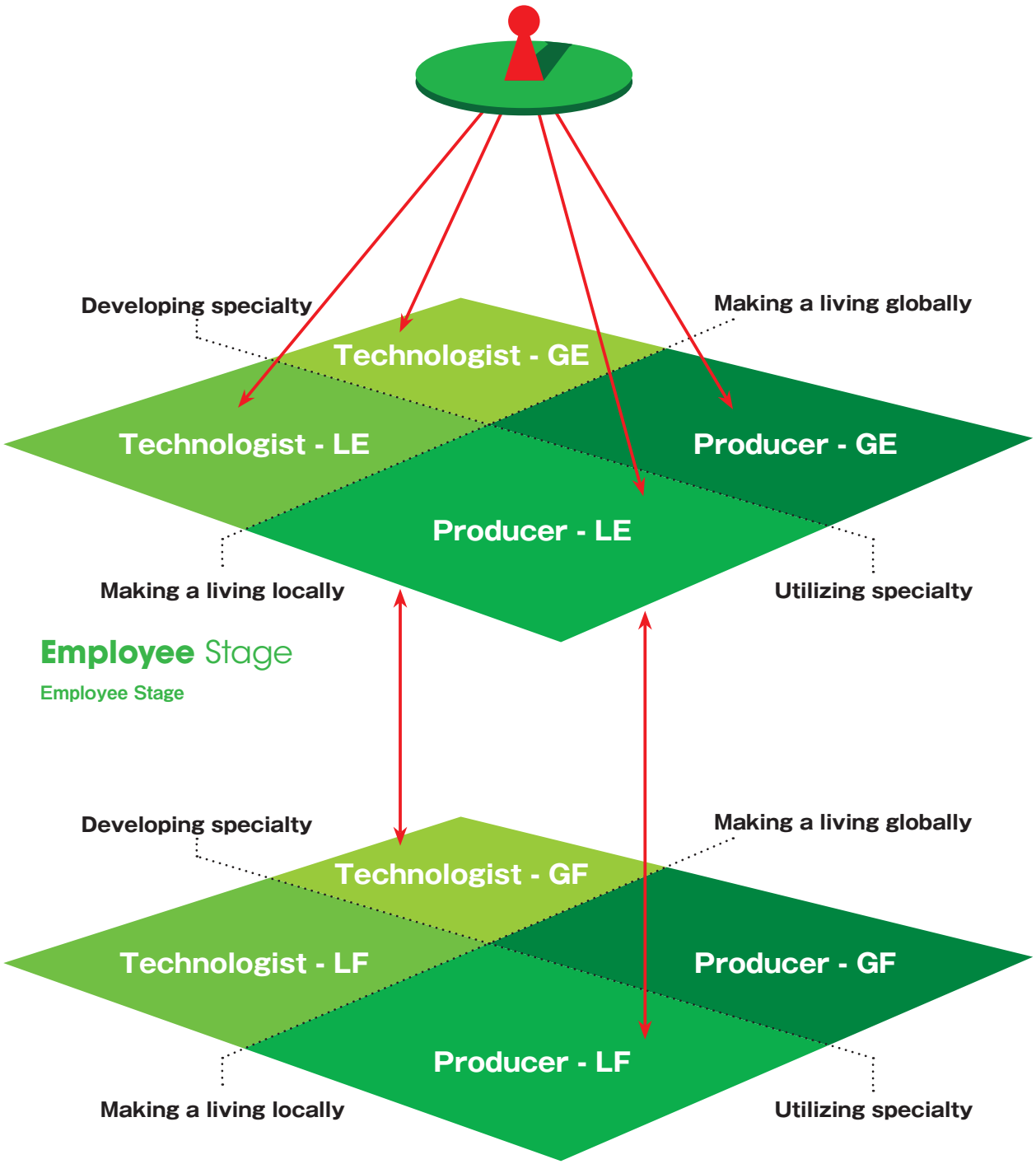
All sorts of boundaries, including those between countries, businesses, business categories, and tasks are becoming ambiguous due to the advancement of technology. By creating goods and services offering universal values, contributions can be made to various regions crossing the constraints of national boundaries or regions, which means value of work will be enhanced; for example, work that creates value only after contact between people is made, such as interpersonal services, or work that requires specific knowledge of a particular region, or work that requires attachment to a region. Thus, what kind of irreplaceable values should be provided, to whom, and where?

How to work
Employment or no employment

During the era of mass production, we concluded an employment contract with a particular corporation and provided products and services using resources owned by corporations (production facilities and stores). However, we are about to be empowered by technology. We are able to work anywhere and with anyone. Personalization of products and services has evolved and the values of ideas and the uniqueness of individuals are becoming increasingly higher. We as individuals who can exhibit our strengths would naturally be drawn to the "not-employed work style" by a company at turning points in our working life in the future. That would pave the way for us to the live a life with abundant variety, a life that can be achieved by developing individual potentials.

The orientation of the work model becomes spontaneously visible, by considering "what, where, and how work is performed" in the era of technology. The model for resolving risks through the advancement of technology and to work with technology comprises the Work Model 2030.

Work Model 2030



Overall image of the Work Model

4 types of professions and 2 stages

Work Model 2030 is a model for work style in the future achieved by utilizing technology. It cannot be described through conventional classifications such as occupation and employment mode. Each individual will acquire skills based on what their career considerations and achieve smooth transitions from work by around 2030 when this model becomes a reality. This will become the cornerstone of the portfolio for strategic personnel utilization for the era of technology for corporations as well.
The work model is comprised of four types of professions and two stages.

The four profession types indicate what the strengths are, where a living is made and the combinations thereof. As illustrated at the beginning of Work Model 2030, we are standing in two positions, National (domestic) and General (comprehensive). The patterns of how various individuals take the initiative in selecting their own careers and the combinations in a subjective manner indicate their work style.

The two stages are categorized by whether an individual is employed. The utilization of the stage for those that are not employed is emphasized as being effective rather than just being employed to excel with the four types of profession.

Conventional work models presumed that individuals worked through a career pattern of joining a company and then going up the corporate ladder within the company. This corporate ladder of careers will change in the future and will no longer be something that is restricted to a particular company. We must take the initiative to utilize technology to create career patterns by ourselves. The four types of professions and two stages indicate the field of dynamic process.

Four types of professions form the foundation for the acquisition of income and the continuation of career

The four types of professions comprises of the development of specialty, utilization of specialty, global type, and local type with combinations thereof. Mastering one of these would lead to the materialization of technology and increased value added for the work performed by that individual. Specialization utilizing type personnel is referred to as the producer, while the specialization developing type personnel is referred to as the technologist. The differences between producers and technologists, as well as the conventional generalists and specialists can be explained by describing technologists and producers. Technologists are defined as those who manipulate technologies that are necessary for their work with greater specialization than the conventional specialists who focus their efforts on fixed duties that are limited to a specified scope of work. Producers are those who create new business to make more benefits and profits by combining various people than what conventional generalists did.

Producers

Producers have intimate knowledge about multiple specialized fields and they are capable of creating new values or business models by utilizing technologies. They seek places where they can exhibit their abilities in global as well as local areas to conceptualize their individual ideas. Such activities vitalize the economy as a whole and bring about increases in incomes. Producers in the employee stage will maximize the organizational capabilities for the purpose of procuring funds and investing in business operations and human resources to utilize management resources in an efficient manner and provide the outcome as organizational knowledge. On the other hand, producers of freelance and entrepreneurial stage bring about values that do not exist within an organization. They are concepts creators.

Any attempt to trigger innovations by combining personnel from within and outside an organization can prove to be difficult under current situations due to the stratified decision-making processes or strong restraints imposed on employment contracts. There are also limits to the number of successful attempts at trial and error for the purpose of innovation, which restrains the essential capabilities of producers.

Technology is the key for the release from such a condition. The creative activities of producers are supported by free work style that promotes creativity (sharing of creative ideas by using teleconferences, social media and chat tools that incorporate VR or AI). It is facilitated by information and communication technology (ICT) as well as technology tools (programming languages, shared languages such as 3D-CAD) that enable them to go back and forth between organizations. They are able to create new concepts with anybody regardless of relevant corporations, industry types, or occupations.

Technologists

Technologists* are specialists with narrower and deeper specialization in a specific area who raise the value added of work by creating and utilizing technology. They are, for instance, innovators who develop new software or programming language, automate routine work, are clerical workers capable of rapidly executing non-routine work such as management decision making, operational workers who can freely manipulate technology, service workers capable of responding to subtle emotional signs in a resourceful manner and make people they are faced with happy, and have highly specialized knowledge and skills. Their career continues with an orientation for deepening their specialization allowing them to extend locally or globally if their levels of abilities are high.
Technologists at the employee stage manipulate technology to standardize work operations within an organization, horizontally implement it, and contribute to the improvement of efficiency for organizational activities. Technologists at the freelancing and entrepreneurial stages possess personal and universal specializations and receive outsourced work of an organization to drive the sharing and the on-demand economy.

By using AI and big data, they automate routine work, multifaceted work operations, as well as pseudo-creative work that take up a lot of man-hours so that they are able to concentrate on decision-making duties. As a result, they accumulate empirical values for highly sophisticated decision-making. The development of technology itself or a supplemental duty creates highly value added work, while digitizing non-language information at work sites can improve productivity at work sites even further.

Two stages promote career transitions

The Work Model 2030 features two stages, the employee stage and the freelancing and entrepreneurial stage, as work styles for excellence by freely moving between four types of profession.

Drawing out not only capabilities of individuals but also that of the organization creates value added in the employee stage. Knowledge is accumulated by the organization and passed on in an unbroken chain as collective and formal knowledge. This becomes an organizational culture and brings about the competitive edge of an organization, which exceeds individuals. Contribution to the

Profession types of Work Model 2030 (work style that utilizes technology)

	Producers	Technologists
Characteristics of duties	They have multiple specialties and create new values and business models by utilizing technologists. Create earnings to increase wealth	This is a sophisticated specialist post with narrower and deeper specialization in a specific area to develop and utilize technologies and raise the value added of work.
Representative examples of occupations	● Entrepreneurs ● Corporate managers ● Creative directors ● Project managers	● Technology innovators ● Technology related profession (operational support and maintenance) Business related profession (business management, sales and marketing) ● Social activities related profession (interpersonal services)
Relationship with technology,	● Capable of working with anyone due to the evolution of ICT ● The business expands across industry type and business category due to penetration of the IoT. ● Creative duties are assisted by the evolution of teleconferencing systems that incorporate tools that facilitate creativity such as AI, VR, or AR as well as chat ● Cloud is utilized to acquire funds and orders.	● The efficiency of routine work is improved by utilizing AI and big data to raise the level of standard for decision-making duties. ● Digitization of experience and knack by AR and VR, as well as speedy learning. ● Technology is utilized in pursuit of human intelligence (a multi-modal intervention that creates values at points of contacts between people).

*According to Drucker, P.F. (2002), technologists, mentioned in "Managing the Next Society," must be aware of the extensive history of technology to use tools in a constructive manner, make decisions by themselves, and learn according to the relationship between humans and society.

organizational knowledge is necessary.

On the other hand, specialization in work, which is not possible to achieve in an organization, is required in the freelancing and entrepreneurial stage. They are change makers who inject new knowledge or eradicate adverse effects from the organization with their individual styles. The freelancing and entrepreneurial stage also has a more proactive significance. The source of value added in work is derived from the combination of specialization and regionality. There are instances where it becomes necessary to recombine them to one's competitive advantage. The freelancing and entrepreneurial stage is the turning point for introspective opportunities.

The expression freelancer generally refers to workers who have secondary jobs or side jobs*. However, freelancers not only accept outsourced work by utilizing technology, but also coordinate multiple jobs with workers who on many occasions develop into a small business or a start of a venture business. This signifies that various paths of careers, including freelancing and entrepreneurship, become available in the "not-employed work style." The term freelancer is used as a generic term that represents people who range from freelancers in the strict sense to those with a "not-employed work style."

Activities of professional freelancers significantly change the meaning of side jobs and secondary jobs. In the past there were many who had non-regular side jobs in the form of self-employed businesses that were considered as sub-work and was conducted while retaining regular employment as the principal work or those who held multiple jobs without having any principal work. However, in the future, there will be an increasing number of specialist-type workers who work a number of side jobs and secondary jobs in parallel. The freelancing or entrepreneurial stage is based on the highly professionalism of individuals.

To have side jobs and secondary jobs as a freelancer not only means that there will be higher potential for receiving work, but also means that there will be increased number of opportunities to secure higher income or greater number of work opportunities. This can serve as a safety net in case a job transfer becomes inevitable. The standpoint of a freelancer, which is not restricted to a fixed employment contract relationship with a company, would be more beneficial in gaining knowledge necessary to start a business or to acquire personal connections when starting a business in the future is taken into consideration.
However, to achieve the freelancing and entrepreneurial stage, it is necessary for businesses to proactively seek collaborations with freelancers, visualize duties, and reorganize themselves. This is also a process that is essential for a business themselves, to improve their own productivity.

Synergic effects created by technology and the Work Model

Securing income and sustaining one's career while simultaneously improving earning power and improving productivity of a business is achievable in a world wherein the work style enhanced by technology is achieved and producers and technologists are actively conducting their work.

The utilization of technology and review of allocations can provide a breakthrough for the current situation where real earnings have not grown as much as the improvements made with labor productivity due to factors such as globalization.

The evolution of technology can evolve the work model.

This evolution of the work model brings about further evolution of technology to coordinate with the increase in personal income and improvement of productivity in businesses. The Work Model 2030 aims for a world where everyone can benefit from the synergic effects of technology and the work model.

*However, statistics relating to actual conditions of freelancers has not been developed and there is a certain degree of margin with numerical values. The number of self-employed persons was 5.43 million (of which 1.3 million also had employment) according to the 2015 edition of the "Labor Force Survey" issued by the Ministry of International Affairs and Communications, while this number was estimated to be 1.064 million according to the survey on actual conditions of freelancers conducted by Lancers, Inc.

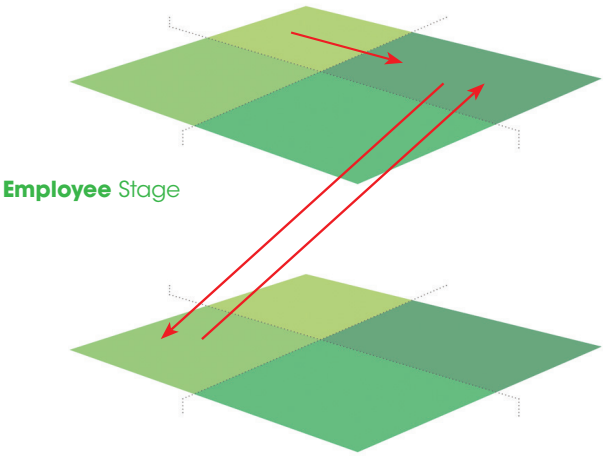
Work Model that formulates diverse range of careers

Producers and technologists that understand the source of value added of work from the perspective of specialization and regionality build continuous careers by going back and forth between the employee stage and the freelancing and entrepreneurial stage.

How are career paths formed? There are as many career paths formulated by work models as there are number of people. A number of cases will be presented here to illustrate the reality of career paths that technology can achieve, with stories incorporating future changes based on a number of actual examples.

Career pattern 1

Career developed by going back and forth among four profession types and two stages in a dynamic manner



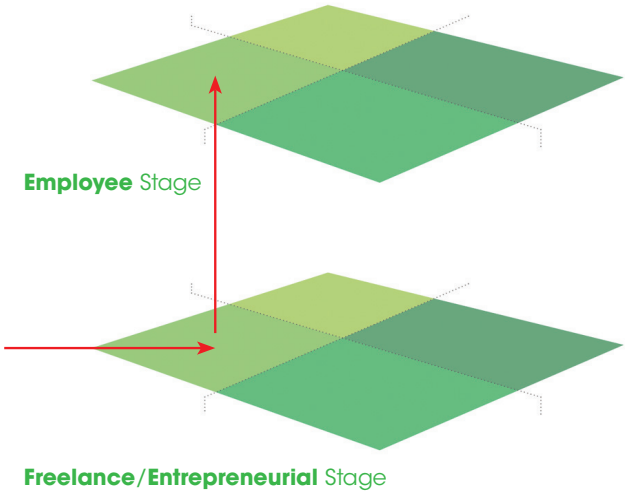
The career path of an individual was presumed to be within a single business involving the accumulation of experience to improve it. It was difficult to evaluate the skills and degree of contribution made by an individual from outside a business and these had to be determined within the context of a business. As the progress with technology is blurring various boundaries, not only the contributions of individuals to the employer but also contribution to society by sharing knowledge is now evaluated positively. Information transmitted to a community such as social media, for instance, can be helpful to someone else and that can lead to the visualization of the person's skills and formulation of multifaceted evaluations. This means that anyone can become an expert and there will be an increase in versatility of specialization. One pivoting factor for the formulation of careers in the future is the acquisition and exhibition of versatile specialization. Individual positions are formed and careers are improved as people seek their place by joining and leaving the same business a number of times and by going back and forth between working as an employee and as a freelancer to accumulate and acquire synergic effects of technology and practical experience.

CASE 1

Mr. A was assigned to the HR Department as a data scientist after studying programming and algorithms. He gained practical experience in designing HR systems to grasp the point of personnel affairs, after which he started his work of data analytics. He becomes a manager that is essential for decision making for HR and corporate management, by dealing with employee turnovers, improvement of performance as well as by questioning and interpreting results generated from data, one after another. At the same time, he also participated in events of HR community or transmitted information over the internet to share his knowledge to visualize his skills and to form positive evaluations. He then receives requests to provide support in improving HR systems from a number of startup companies. He switched to a freelancing HR data scientist in order to take initiatives from a more free position and achieved a great success. His ability was sought by his former employer and rejoined the company with a promotion to the position of a General Manager, to take on a substantial reform of HR system, with help from former colleagues of the company.

Career pattern 2

From no work via freelancing to employee stage



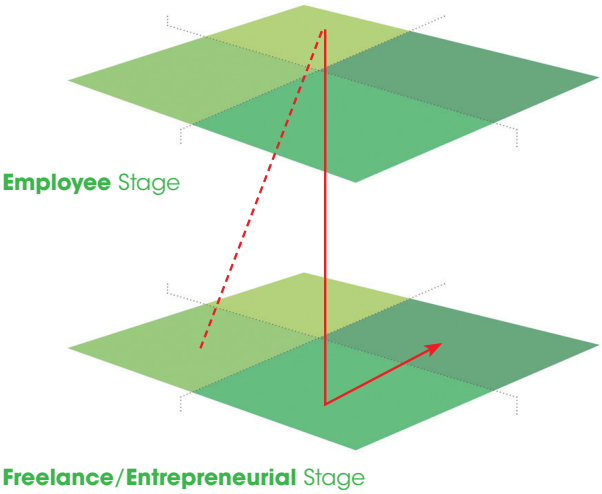
The expenses required to gain skills constituted a bottleneck for changing careers in the past. It had been difficult for individuals of mid to advanced age to restart their careers by considering a career change as time and money are needed to learn a new set of skills. There were thus quite a few people who gave up on the idea of taking on the challenge to improve their skills and simply went on with what they had until they reached their retirement age.
However, the evolution of technology brought down the expenses to a minimum. Adaptive learning optimized learning and improved the efficiency of relearning irrespective of age. Financial assistance for learning was also personalized to enable individuals to receive the necessary amount of assistance at a necessary timing.
Once freelancing functions as a safety net, switching from unemployment to freelancing and acquiring new skills and technologies while balancing work and learning can be achieved for re-employment with a promotion. This has become both natural and simultaneously possible in the era of technology.

CASE 2

A single mother Ms. B saw the monotonous work at a medical work site to be a dead-end job. She resigned from work to acquire higher qualifications to improve her career prospective. Continuing with her study while having no work had become a significant burden on Ms. B, who was now in her 50s. She then finds out about a public training fund would not only reimburse her class fees, but also offer her courses that she can complete in a short time and provide other necessary assistance. These were part of the assistance provided to single mothers. Ms. B was able to work as a freelancer and gain sophisticated knowledge in a short period of time through adaptive learning. She intends to find work at medical work sites with sophisticated expertise, such as sensor measurements or powered exoskeletons, which are latest technologies in the field.

Career pattern 3

Holding onto a secondary job as a technologist while switching to become a producer



There are more than just a few people who want to turn their ideas into reality. However, the degree of difficulty increases instantly when starting a business becomes a reality. This is because there are mounds of issues to be dealt with, such as balancing the new work with current work, finding collaborators and securing sources for procuring funds. Technology is about to change such a situation. There are for instance people who refer to themselves as a one-man manufacturer. They are individuals who are both technologists and producers, who manufacture and sell their own products by maximizing the use of the technology environment, driven by their desire to make what they themselves want. The novelty of products they create, as well as their personal sentiments touch off affinity with many people. There are movements also with major businesses, to trigger innovations with individual sentiments as the origin, by establishing fab laboratories in the house. A diversified activity infused with personal sentiments paved the way for the next stage of a person's career in an era where a variety of things are individualized. There will be an increasing number of career patterns that are formulated by side jobs and secondary jobs as well as hobbies that develop into a principal business that then leads to independence from employment.

CASE 3

Mr. C was making his own gadgets on weekends, while working full time for a business. Driven by his strong desire to make what he wanted, he visited a fab laboratory. He operated a 3D printer to create his prototypes over and over again. He looked for feedbacks as he featured his prototypes on social media and at market places for handmade products. As he received positive evaluations from his peers, he decided to exhibit his work at a trade fair overseas and received many orders from select shops overseas. Mr. C wanted to respond to such orders and resigned from his employment and then started a full scale mass production. He gathered funds to start his business through crowdfunding. He secured highly skilled manufacturing outsources, in part with assistance of a business matching producer, and managed to start mass production without any mishaps. He hired personnel with high degree of specialization and looks forward to presenting his next prototype for review by the public as soon as possible.

Diversified career paths become individuals to drive society

Let us summarize characteristics of career models introduced so far. One involved freely going back and forth between the two stages of employee stage and the freelancing and entrepreneurial stage. Case 1 involved securing a free position to take initiatives, while Case 2 was about seeking a safety net in switching from no work to freelancing. In both cases their experiences and learning as a freelancer were evaluated positively, which allowed these individuals to be promoted as they were re-employed. Technology offers a boost for utilizing freelancing as a stage for switching careers.

The next aspect is to wear many hats. This was illustrated in Case 1 as contributions made to the community outside the employer, while in Case 3 this involved a secondary job on weekends. Side jobs and secondary jobs become natural things to do, as technology supports knowledge sharing and personal activities. The diversity paves the way to the next phase of an individual's career.

Finally, producers and technologists are mutually essential existences. Concepts created by producers are made into reality by technologists. Mr. A from Case 1 was able to launch his career as a technologist because he received support from his superior (producer) who utilized his specialization. Mr. C from Case 3 succeeded in starting his mass production because technologist, who was a manufacturing outsource with sophisticated level of technology, was willing to lend a hand. Behind every successful producer, there is the ability of a technologist to turn an idea into reality, while behind every successful technologist there is the conceptual ability of a producer.

Diversified career paths achieved through four types of profession and two stages while empowered by technology will raise each individual person to an existence with individuality and constitute a major source of driving force for society. Work Model 2030 illustrates an image of society wherein individuals autonomously pave the ways for their careers, work actively, and full of energy as diverse range of workers with various strengths utilize opportunities to gain employment, to learn and increase their income.

Future indicated by micro-simulation

Society in which Work Model is achieved by 2030

What are the risks relating to the reduction in income or collapse of a career in a society where the Work Model has been achieved by utilizing technology? A prediction was again conducted by using micro-simulation introduced in Chapter 1. The actual prediction work was based on the "Vision of New Industrial Structures: Strategy for Japan to Lead the Fourth Industrial Revolution" (April 27, 2016) published by the Ministry of Economy, Trade and Industry. The fourth industrial revolution occurs in which technologies such as IoT, AI, and robotics that have been observed so far are utilized to the maximum, to dramatically improve productivity and smooth transition of economic resources to growth industries take place and the "Innovation Scenario" in which movements of personnel to jobs that respond to such business processes are estimated in terms of industrial structures and employment structures are outlined in this document. The results from the prediction of this scenario indicated that the real GDP growth rate will be +2.0% and the wage increase rate will be +3.7%, which are values that are higher than recorded figures in the past.

A scenario in which assumptions for predictions are referred to, while freelancing as we have seen so far will become popular was simulated. More specifically, the fact that the maximum rate of increase for recorded years was 6% in the past 25 years in the United States was taken into consideration and that this 6% annual rate of increase will also occur in Japan was assumed to perform the simulation. Although the annual income was set to the same overall level of increasing rate as the "Innovation Scenario" published by the Ministry of Economy, Trade and Industry, the annual income was predicted with the assumption that the mechanism for determining annual income described by the "National Employment Status Panel Survey" for the year 2015 will deal with regular employees and non-regular employees as well as non-employees (such as self-employed persons) in the same way by the year 2030.

Risks of income reduction and career disruption are significantly evaded

The number of employed persons by the year 2030 will be 64.62 million, which is about 9 million more than 55.35

Results from prediction by micro-simulation

	2015	2030 (Pessimistic prediction)	2030 (Work Model achieved)
Employed	63.76 million	55.35 million (-8.41 million)	64.62 million (+0.86 million)
Freelancers (full-time)	0.79 million	0.68 million (-0.11 million)	1.88 million (+1.09 million)
Side jobs, secondary	3.43 million	2.88 million (-0.55 million)	5.92 million (+2.49 million)
Jobs and freelancing Unemployed	46.95 million	49.23 million (+2.28 million)	39.96 million (-6.99 million)
Average annual income	JPY 3.292 million	JPY 2.891 million (-JPY 401,000)	JPY 3.892 (+JPY 600,000)
Principal assumptions for predictions	*	The case where the turnover rate for people between ages of 25 to 59 doubled while the hiring rate halved between 2015 and 2025.	The case where the participation in labor market progressed and the economic growth of the Fourth Industrial Revolution progressed.

Note: The values indicated inside brackets ( ) represent difference from the values from 2015.
Details on the assumptions for predictions are featured on the website of the Recruit Works Institute.
*Source of data: The "Labor Force Survey" published by the Ministry of International Affairs and Communications and the "National Employment Status Panel Survey" published by Recruit Works Institute.

million according to the pessimistic scenario. On the other hand, the unemployment figure for the year 2030 will be 39.96 million, which is a reduction by about 7 million from 46.95 million in 2015. In a society where the Work Model is achieved, career transitions are made in a smooth manner and so there is an assumption that people can quickly transfer to a new job once they resign from the previous. Aging progresses in 2030 when compared with 2015 for this reason and the number of people leaving the labor market is thus predicted to increase, but as the career transitions, including those for people of higher age, will be conducted smoothly and career disruption risks are shown as being averted. Furthermore, the full-time freelancers will double from 0.79 million to 1.88 million, with the number of those that are gainfully employed but also freelancing increasing to 5.95 million.

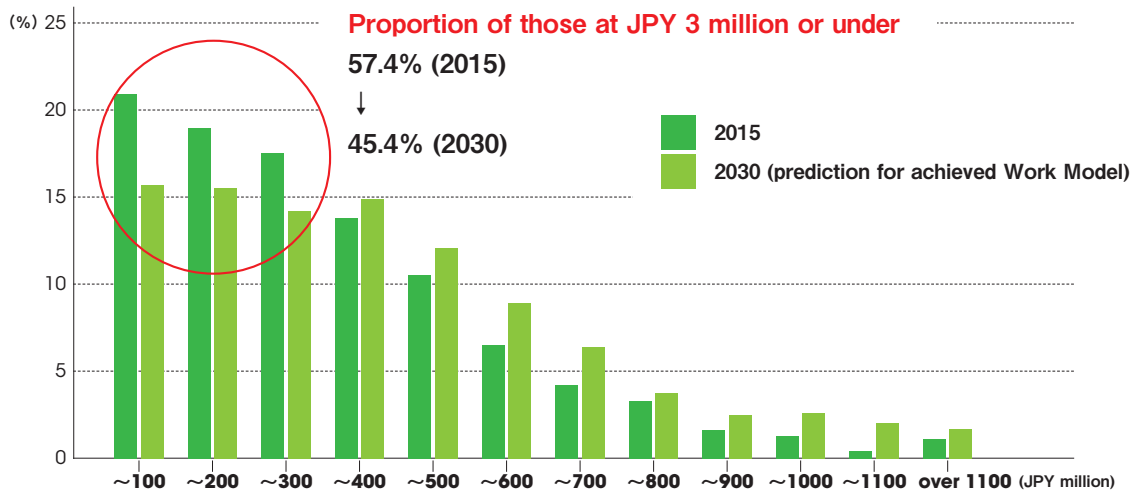
A simulation was also conducted on the income. The proportion of those with JPY 3 million or less significantly decreases as compared to that in 2015 and the proportion of those with JPY 3 million or higher significantly increases. Productivity improves with the evolution of technology, while when the Work Model is achieved the tension relating to wage negotiations is heightened, resulting in the improvement of productivity distributed in the form of personal income. The high value added for newly created work, such as technology related profession types and social profession types, also have an impact on this outcome. The proportion of those individuals who experience an increase in their income among those who are employed both in 2015 and 2030 reaches 79.6%. The average income will vary by JPY 3.892 million, which in turn would vary by more than JPY 1 million from the pessimistic prediction, JPY 2.891, given in Chapter 1. In this aspect the income reduction risk can be considered to become completely different depending on whether the Work Model is achieved.

Technology brings positive growth cycle to society

The possibility of risks relating to reduction in income or collapse of a career reducing in a society where the Work Model has been achieved by utilizing technology is high. This suggests that the reduction of risks for each individual worker contributes towards abundance for the society as a whole.

The increased income of workers leads to increased expenditure and services for businesses. Reducing risks for workers is essential in sustaining and expanding a market.
In this manner, business and individuals can be empowered by technology to form the middle class in society. Having hopes for the future and having a real feeling of growth can be possible against the backdrop of many people gaining increases in their annual income. This is desirable for both the business and the individual. Achieving the Work Model by utilizing technology will benefit more people with more abundant life as it is in the mechanism for creating such positive growth cycle.

Prediction on income distributions when Work Model is achieved by 2030



Frontlines of the Work Model in the United States

—Realities and Trends of "Freelancers"

Michi Kaifu, Consulting CEO ENOTECH

The reduction in stable employment and the development of IT is said to have triggered a rapid increase in the number of freelancers since around the year 1990 in the United States. Once the internet became popular, the number of those individuals that prefer freelancing or those who would earn more by freelancing than by being employed increased. The emergence of the sharing economy that occurred from 2010 onwards also pushed diversification of freelancing.

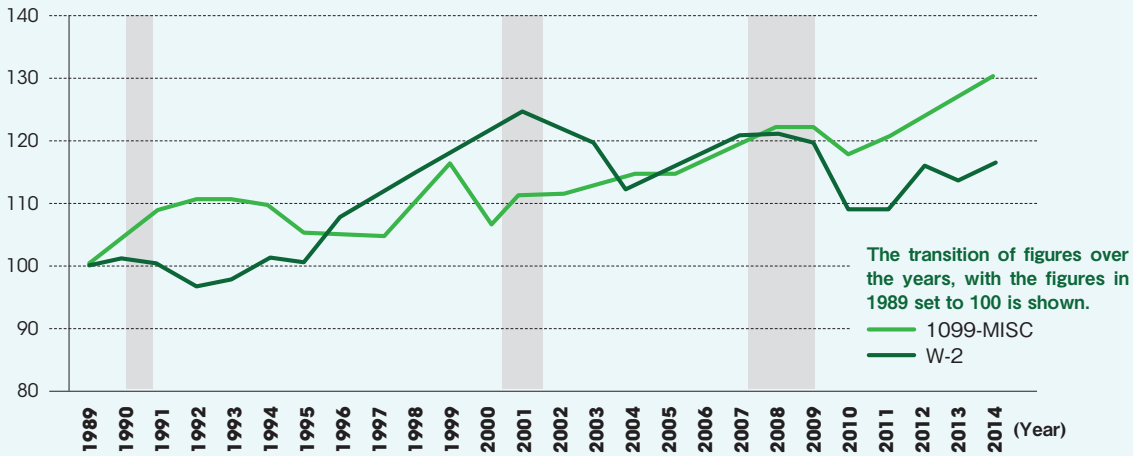
The graph presented below reveals that the growth in the income tax category of "1099-MISC" (freelancers and self-employed persons) exceeded that of "W-2" (employee) since 2008 (the graph sets the figure for 1989 to 100 and the actual figures for W-2 is still by far greater).

Freelancers diversify across occupations and employment modes

A survey conducted jointly by the Freelancers Union and Upwork (a network service that provides matching service for freelancers) in 2014 and 2015 are known as the latest reports that summarize current conditions of freelancers in the United States. They indicate that the number of freelancers in the United States as of the year 2015 reached 54 million, which was 34% of the total work force, and was estimated to have increased by 0.7 million compared to the previous year. The blanket term "freelancer"* applies to a diverse range of occupations and modes of employment. The reports described above sorted freelancers into a number of categories according to the aspect of "work style" and provided estimates of respective composition ratios. The boundaries of such categorization according to work styles are ambiguous and no clear line can be drawn between categories. It is possible to conceive the "Career Spectrum of Freelancers," as depicted in the figure on the next page, by setting the relative importance of management responsibilities as independent business operators on the horizontal axis.

Categories on the left end of the spectrum, such as "side jobs" and "secondary jobs" include work with relatively low importance of management responsibilities, such as Uber drivers or work in sharing economy systems. Such light-weights of freelancing, which differ from full-time

Transition of income tax categories in the United States



*Gaining understanding on actual figures is difficult with freelancers, since they may have multiple jobs, have unscheduled periods with no work and figures fluctuate depending on definitions. The estimate for the total numbers significantly varies depending on how definitions were set or the purpose of a survey. The figures are estimated on the high side with the survey. Figures such as 30 million people are also seen with other estimates. The definition for this survey is "people who have done freelancing work within the past year".

Source: Internal Revenue Service, Office of Research; Analysis by Bay Area Council Economic Institute.

independent freelancers, are sometimes referred to as "gig workers."

The "small business" (self-employed businesses of small scales) follow to the right of "independent contractor," followed further to the right by a group that is ordinarily called the "venture business." The difference between the "freelance business owner" and the "small business owner" can be considered "whether there is any office or store," while the difference between the "small business" and "venture business" can be considered "whether there is an objective for exit, such as a buyout." Since in reality a freelancer can have their own office in a shared working space and a small business owner can sell his business operations, the boundary still remains ambiguous. There are also instances wherein this spectrum is moved left to right by the same person, depending on the time it is produced.

According to the Small Business Administration (SBA) of the federal government, the number of small businesses (businesses that employ 500 or less people) in the United States is 28 million, of which "businesses without any employee" is 22.5 million. A large number of independent contractors and freelance business owners are included in this 22.5 million, while the "venture business," according to the definition described above, would also be included in this figure.

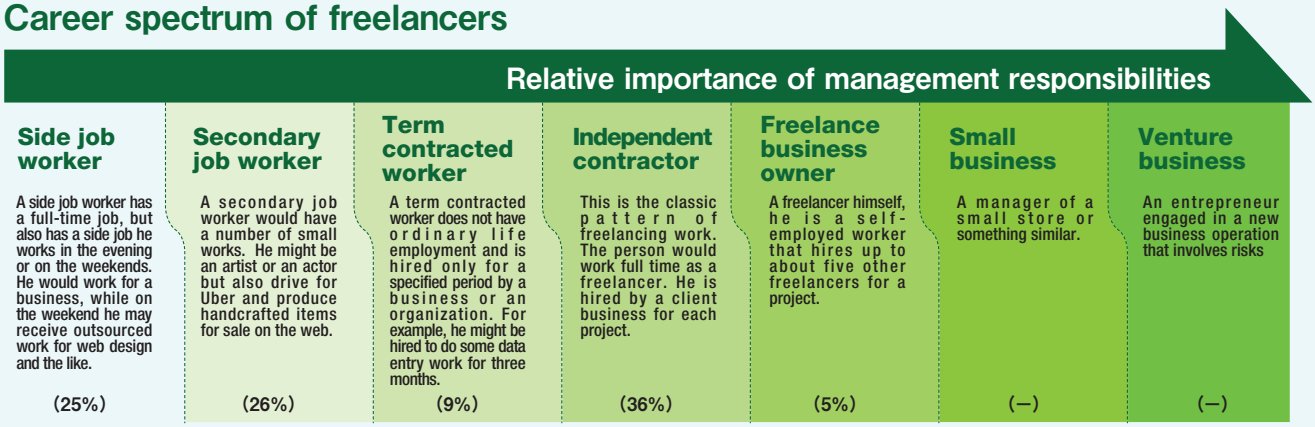
Career of freelancers that go back and forth across the spectrum

A list of typical occupations for freelancers would be as described below. They are distributed across all employment modes in the career spectrum and extends even to "small business" and "venture business." It should also be noted that many people in marketing, sales, clerical, customer service, and HR at ordinary businesses are cited, aside from IT related engineers and writers, as well as translators, who are specialists that are ordinarily considered as freelancers. There are many with skills that are applicable across industries and can be used in numerous businesses.

The actual conditions of freelancers are diversified and there are many case examples that go back and forth across the career spectrum.

- When a freelancer participates in a major project, there are often instances wherein two or three other consultants are hired. In such cases, the freelancer may become the "freelance business owner" **(independent contractor → business owner)**
- A woman who used to work for a business and conducted duties relating to HR, recruitment, public relations, marketing and the like became pregnant and resigned from employment. She still continues to perform and takes outsourced work that consists of same duties at home as a freelancer. The number of client increases thereon and the scale of business becomes larger, to become a self-employed busines**s (general employee → Term contracted employee → Independent worker → Self-employed worker)**
- There are more than just a few people who "own a small chauffeur driven car hire business" among those who work as a driver for Uber. While there are those who already had the business to start with, there are also cases where becoming an Uber driver presented them with the opportunity to establish a company **(secondary business → self-employed worker → small business).**
- While working as a full-time employee, sells articles created as a hobby on Etsy (a web site dedicated primarily to single handcrafted items). The scale of business expands and becomes an independent worker, but as the business expands even further, the production work is outsourced overseas **(secondary business → self-employed worker → small business).**
- After working for a business as a designer, the person resigns from employment and studies interior design at a community college. The person then starts creating designs for renovation of kitchens and bathrooms. A store is opened thereafter and hires employees **(general employee → independent worker → small business)**
- Specialists of HR and recruiting came together to launch a venture business offering cloud service **(independent worker → venture business).**

Career spectrum of freelancers



Note: Figures indicated inside brackets represent respective composition ratios in 2015 (excluding small business and venture business); Source: Prepared based on data provided by Freelancers Union, Upwork and Edelman Berland.

Principal occupations for freelancers

Type	Occupation
IT related	Project management, software development, web design, computer & IT, mobile application development, SEO (search engine optimization), SEM (search engine marketing), e-commerce, 3D modeling and CAD, as well as game development.
Specialist	Writing and copy writing, editing, research, creative design, graphic design, education and training, translator, web survey, legal service, photography and image capturing, logo design and illustration, music and video production, data entry as well as architectural design.
Sales, clerical and management	Sales marketing, management accounting, management and support duties, customer service, social media coordinator, community manager as well as HR.

Source: Prepared based on data provided by FlexJobs and Money Connexion.

Evaluation of the "not-employed work style"

As reported by the media, once Uber became popular and the number of "freelance drivers*", which is of a different order of magnitude compared to any others, became registered, the situation became such that drivers spent long hours working, but generated relatively small amount of sales and are required to pay insurance out of their own pocket. As such imagery is strong, there are many people who believe that an increasing number of people are being oppressed as "cheap labor requiring no welfare benefits." The story about how the employees who have been laid off due to the Global Financial Crisis could not find regular jobs and had no choice but to become freelancers is the reason behind the rapidly increasing number of freelancers since around 2008 is a deeply rooted as well.

Even though the number is increasing rapidly, freelancers of the sharing economy systems are still relatively small in proportion. Furthermore, according to the survey conducted by Freelancers Union, 60% of people did not select "had no choice", but rather selected freelancing "willingly" and the majority responded that their income increased in comparison to before becoming a freelancer (based on survey conducted in 2015). 36% of those people who are not currently freelancers responded that they are "considering of resigning from employment and becoming a freelancer" while 80% responded that they "want to have a side job while keeping the current job" (according to survey results for 2014).

Aspects that are significantly different between freelancers and entrepreneurs according to broader interpretation in the United States and the aspect that differs significantly for non-regular employees in Japan is that a career spectrum exists with a freelancer. Problems with non-regular workers and the working poor at the present time that goes without saying are the low income and poor treatment but the fact that no career path exists for the future is a significant issue.

In case of freelancers, on the other hand, there are pathways available to them, by moving to the right side of the spectrum to become a self-employed worker or start a small business. There is no overhead necessary to drive an organization and the business modes and occupations can be changed in response to given situations based solely on one's own decision.

Furthermore, once an individual has been recognized to have the capability required of a freelancer, there are often cases wherein such an individual is switched from a term contracted employee to a direct hiring by the client in the United States, where the outsourced labor market has developed. Employees are frequently laid off by their employers in the United States, "doing what was done as a side job as the main job" and "doing what was done for an employer as an independent freelancer" fulfill the role of employment buffer making it possible for individuals to transition to full-time employment or expand to a small business.

This means that discussions in the media or at conferences hardly ever produce any opinions that suggest that freelancing on its own is something "that should be avoided" and discussions are primarily about "strategies for reducing demerits as much as possible" and "mechanisms for providing education, training and support to promote transitions to the right or full-time employment."

Mechanism that supports freelancers

The ability to work in a flexible manner is the most significant advantage of being a freelancer. The demerit consists of unstable source of revenues and difficulty involved in finding work, followed by the concerns relating to collection of fees from clients, uncertainties about how long the demand for the available skills will continue, high

For those who are starting freelancing for the first time in particular, pricing services can be difficult. They also have a difficult time refusing such requests as "do this for free" and there are also many instances where fees are not paid properly.

expenses relating to the benefit package that has to be paid out of their own pockets, and cumbersome paperwork and procedures prescribed by the government (according to a survey conducted in 2014).

- **Difficulty in finding work** Freelancers must do sales as well as the work on their own.
  In many cases they rely on organic sales methods, which involve introduction by associates.
- **Concerns relating to collection of fees** It is difficult to determine the "pricing" and "fee collection" when making direct sales of skills of people.

Many matching services are being provided for freelancers to resolve such concerns, which make it possible to easily find a new project in a short period of time. Furthermore, there are also "platforms" that perform the range of services including pricing to fee collection, the most significant of which is Uber. There are also mechanisms for visualizing evaluations based on reviews and points given by customers, which are also fulfilling an important role. Examples that can be cited include services described below.

- Uber is a platform for performing pricing and fee collection and it is easy to get started for beginner freelancers as well.
- Zintro is a mechanism that facilitates consultations with experts in a specific field at a standard time-based price and the fee collection is also performed by Zintro, so services can be provided with peace of mind, even to first time customers. The mechanisms of the "platforms for freelancers" that use IT are lowering the hurdle for becoming a freelancer.
- Amazon Home Service "sells" services provided by various self-employed workers on the internet, such as cleaning, repairing, music lessons and the like and this system also provides introductions as well as fee collections. Fees are set by self-employed workers themselves, but a "prevailing value" that makes it easy to compare with other providers is formed.
- The mechanisms for users to evaluate services provided by self-employed workers and freelancers, such as Yelp, Uber, and AirBnB, have already widely spread and this has resulted in a dramatic improvement about the impression of such services provided, which used to be "services are poor in the United States," over the past ten years.

Other than these, cloud-based accounting and tax accounting services, operational support, and communication are being provided by a program of reasonable monthly fees to freelancers and small businesses. Such tools made possible with a diverse range of technologies support the day to day operations of freelancers and small businesses, while mechanisms of legal systems and associations, along with tools made of technologies are also fulfilling significant roles in providing support for advancement through career paths.

Social security program

Tax system

A document referred to as the form "1099" is provided by clients who make payments of $600 or more for the purpose of tax returns.

The form "1099" sent by multiple customers indicates the business revenue. There is no need to establish any company and there is no advance procedure that must be performed even when conducting a side job, so the hurdle is low. A business license must be acquired (a simple form is submitted at a city office and municipal tax is paid) prior to starting a proprietorship business and not just a little side job. When filing tax returns, the document referred to as form "Schedule SE" (Self-employed) is used to report business revenues as incomes, in addition to regular forms. The Self Employment Tax must also be filed in addition to personal income tax (representing social security tax and Medicare tax, together comprising 15.3% of revenues with half subsidized by the company with an employee, in which case the rate is 7.65%). As a withholding is not made like employees, it is necessary to deposit estimated amount of tax every quarter (April, June, September and January).

The tax saving benefits provided by "Schedule SE" is described below:

- Those working at home may deduct a portion of the costs relating to the house as home office expenses (interest on housing loans, utility expenses and the like).
- Various expenses that are related to the business may be deducted as business expenses.
- The amount installed into the retirement plan for the self-employed may be deducted from income.

Pension

In addition to the ordinary individual retirement account (IRA) there is the IRA "401(k)," which is intended for self-employed workers and small businesses. Although there are no benefits provided by the company that "matches the amount paid by employees," the annual

installment amount is high and the advantage is not just a preparation for the future but also significant tax saving effect.

Health insurance

Various plans became accessible through the Affordable Care Act (commonly referred to as the Obamacare) through the health insurance market place for individuals (there are those that are administered by the federal government, as well as those that are administered by state governments).

Long-term disability insurance

Long-term disability insurance can be acquired irrespective of whether a person is an employee or a self-employed worker.

Private sector support organizations

Various support organizations have been established to improve contracted labor conditions by filling the gap in the negotiating capability between organizations and freelancers.

- Freelancers Union
  (a not for profit organization that provides information and administers health insurance programs).
- Editorial Freelancers Association
  (a support organization for writers)
- Society of Professional Journalists
  (a support organization for journalists)
- Freelance Lift
  (provides community and resources to freelancers)
- MBO Partners
  (a support company that is specialized in independent contractors to provide support such as back office for profit)

Representative commercial tools

[Market Place Matching]
Up work (online work provision service established through a merger between e Lance and o Desk), Zintro (a matching service for a broad range of consultation services),

[Time management]
Toggl (a support tool for time management), Timely (a tool that supports time management and can be linked with other tools)

[Document preparation]
Google Docs (documents can be prepared and managed on cloud), OpenOffice (provided free of charge as an alternative for Microsoft Office)

[File management]
Dropbox (stores and manages files on cloud), Google Drive (stores and manages files on cloud)

[Accounting and tax accounting]
Quickbooks Self-Employed (an accounting, tax return support tool for self-employed workers), FreshBooks (an all-in-one service including accounting, invoicing, time sheets and the like), TurboTax Home & Business (a tax return support tool), Wave (free services for fundamental portions of accounting and invoicing processes), Shoeboxed (scan and organize receipts), Expensify (an expense settlement tool for business trips and the like), Square (receipt of payments conducted in person or on line), PayPal (receipts of payments conducted on line), Mint (free disbursement management and expense management)

[Project and task management, as well as communications]
Slack (chat and file management), Basecamp (project management), Google Apps (Hangouts, Task, Calendar, etc.)

[Contracts and proposals]
Bonsai (preparation of contracts, digital signatures and payments), DocuSign
(digital signatures)

[Contact management]
HubSpot CRM (a free CRM for small businesses), Insightly (CRM and project management)

[Marketing]
MailChimp (an email marketing tool), Weebly (a tool for easy preparation of websites), Squarespace (a tool for easy preparation of websites), Wordpress (a tool for easy preparation of websites and blogs)

[Others]
Breather (on-demand provision of conference rooms and work spaces)

Spread of new work styles

The top 50 cities in the United States with the highest proportions of self-employed workers, who are not necessarily freelancers, are widely spread out. The ratio is generally higher on the West Coast, but the figure is not necessarily overwhelmingly high in Silicon Valley. The highest ratio is found in Riverside County, outside Los Angeles. The same survey also estimated the highest mean value for hourly wage of self-employed workers was San Jose in Silicon Valley at about $31.

The IT industry itself is creating a diverse range of employment for freelancing specialists and those occupations that are referred to as belonging to the "Creative Class" are most often found on the West Coast. The locations where the hourly wage of the "Creative Class" is high is not necessarily in the IT regions, as the Northeast region that includes New York City and Boston as well as Birmingham in the state of Alabama and Houston in the state of Texas are among the highest ranking regions. It is also evident that freelancers and self-employed workers are not only in the IT sector, but are spread across many occupations and regions.

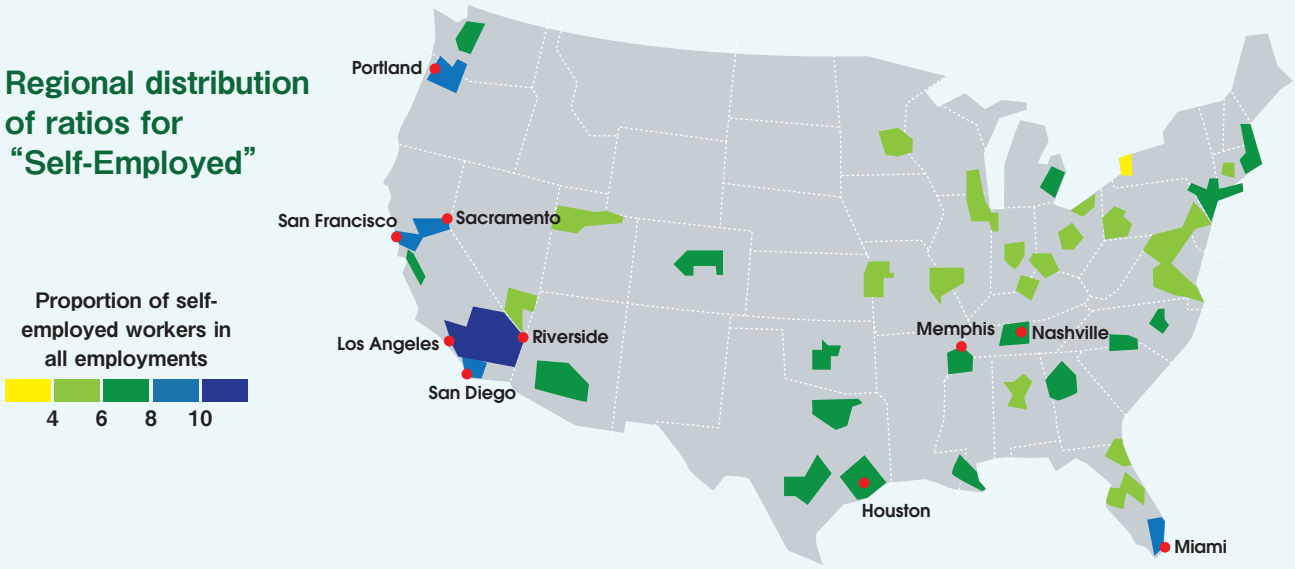
A review of the occupations indicates that clients of freelancers and small businesses can be private customers, but are more often businesses. Just because the number of freelancers is increasing, it does not mean that all work will be done by freelancers in the future. Businesses and self-employed workers as well as freelancers are in the relationship of mutually helping each other and at present are at the juncture where the balance of this relationship is shifting towards the self-employed workers and freelancers.

The spread of freelancing work style is a flow of events that cannot be avoided in the changes that occur through the ages,but as mentioned a number of times before, there still remains issues relating to businesses using them as "workers that do not cost much" to their convenience.
Those that are conducting independent work of higher levels, on the other hand, are treated in the same manner as gig workers and are subject to negative effects of businesses not signing contracts due to the threat of risks. There are some that suggest that a certifying program should be established to show that individuals can opt to have a certification indicating that they are freelancers, by choice.

Improved efficiency and high value added for small to medium companies and small businesses as well as the necessity to nurture such capabilities are often pointed out as a part of the strategy for increasing employment and wages in the United States, where the industry structure is changing from conventional manufacturing and service industries to intellectual industries with high value added. The other polarity of such a movement is the responsive actions taken by the government for "freelancers," as well as improvement of the private sector services along with formation of associations and other such social activities, which are rapidly progressing in many quarters.

Resolving issues that are currently in hand and promoting a shift towards the right side of the spectrum or general employment and providing support strategies for forming career paths are particularly important and whether these can be achieved is considered to have a significant impact on the stability of the society in the United States in the future.

Regional distribution of ratios for "Self-Employed"



http://www.citylab.com/work/2013/02/geography-americas-freelance-economy/4118/
Source: Citylab, by Martin Prosperity Institute

chapter

4 Towards realization of Work Model 2030

Five policy agendas towards 2030

Work Model 2030 evolves with technology and creates new value added. It is also a model that provides positive growth cycles such as increased income and employment opportunities. The potentials are not limited to suppressing the concerns that lead up to the year 2030, such as reduction of income or collapse of careers.

The work style of being employed by businesses became widely popular after the war in Japan and the "not-employed work style" continued to shrink. According to the "Labor Force Survey" published by the Statistics Bureau, Ministry of International Affairs and Communications, in 1955, the ratio of employees among all those that are working was 43.5% and the ratio of self-employed workers was 25.1%, while the ratio of family business workers was 31.4% with the "not-employed work style" exceeding 50%, but by 2015 the ratio of employees was 88.5% and the ratio of self-employed workers was 8.5%, while the ratio of family business workers was 2.5%, indicating that practically all workers were hired by businesses. It is a known fact that the increase in the number of part-time workers and contracted employees and other such non-regular workers is driving the increase in the number of workers in this period.

Currently, employment stabilization associated with the expansion of non-regular work force and the ways to broaden the pipeline for greater income is becoming a major issue for policy making. One of the goals in this effort for employees is the transition to a regular employee. The fact that career paths are available only in one direction for the work style in which employment is gained suggests the hierarchy of the regular employees being in better shape than non-regular employees. The goal for diversified work styles should really be about how an individual can exhibit his capabilities, raising productivity, and having a positive outlook of the future. It should not be determined by the employment mode. What can break through this issue is the typing of professions as producers and technologists as well as the freelancing and entrepreneurial stage.

There are a diverse range of work styles available to freelancers as indicated by the career spectrum of freelancers. As the importance of corporate management is raised, entrepreneurs and the recruitment of new employees come into view, paving the way for a transition to corporate manager. This means that freelancing is a stepping stone in a career to become a corporate manager. In other words, the freelancing and entrepreneurial stage has a potential to create new type of careers differ from a traditional regular employee's.

Towards building Work Model 2030

Five policy responsive actions are required to achieve Work Model 2030. First, the nurturing of personnel as the foundation for co-prospering with technology. Second, the substantiation of educational programs that support a diverse range of career selections. Third, the building of a new work model consisting of four types of professions and two stages. The creation of a new work style, which was not mainstream in the past, such as freelancing, entrepreneurship, side job, and secondary job. Fourth, the improvement of mechanisms for improving labor conditions. Fifth, the improvement of mechanisms for smooth transitions of careers, such as specialization and regionality, as well as employment contract related issues.
The overlapping of these strategies will realize the new work model that can formulate careers that span beyond environmental changes, from the conventional employment model that had "employed to work" at the core.

Nurturing of personnel who become the foundation of a technology society

In addition to AI and robotics, life sciences that include genetic information as well as a broad range of technology will be dissipating the work style until 2030. Suppressing technology divide and personnel for creating such technologies are essential for such an era.

Sending out personnel that create technologies of the next generation

Although Japan had been considered a nation founded on technology for a long time, Japan has not been successful in making its presence known in the international standardization of AI and IoT. However, further advancement is still expected of Japan in the fields of AI and ICT as there are a large number of personnel with high potentials and fundamental researches exist in Japan proven by the fact that the country maintained the first place in economic complexity index for 15 years in a row.
To achieve that it is necessary to concentrate promising researchers, both domestic as well as overseas, from a number of technical fields such as AI at prioritized universities and promote the collaboration between the industry and the academia and thus increase the number of students majoring in such areas. It would be desirable to add education on leadership and entrepreneurship to the conventional management of technology (MOT) for students majoring in such areas to send out producers and entrepreneurs. It would also be effective to indicate the potential of path selections as a part of career training in high schools.

Strengthening of technology literacy

It is extremely essential that there is no technology divide between many people for technology to further penetrate daily work. Programming education to start from infancy, as already declared by the government, is expected to serve this purpose. Programming is not only be about a language used to "converse with technology," but it has a depth that promotes the nurturing of logical thinking and connecting one's own module with someone else's.
The ways to stimulate the curiosity of students and provide quality education that caters to fun programming is extremely important in promoting programming. According to the "Program for International Student Assessment" (PISA) of 2012, the mathematical literacy of Japan is higher than that of other countries, but students are unsure about mathematics and find little fun in it, which is a conflicting result. No matter how much the potential capacity may be, if it is known that a person is not good at using such a capacity, then he/she will not attempt to utilize it.

Children can learn with pleasure by utilizing an interface that is full of fun, such as the programming language "Scratch" developed by the Massachusetts Institute of Technology (MIT). The development of such superior educational programs and the way they are taught are important aspects. An examination on the "nurturing of personnel for nurturing technology personnel" is necessary for that reason.

Broad career education that supports a diverse range of career selections

The three types of education are the key to the autonomous selection of a diverse range of careers. As career education was proposed at the Central Council for Education in 1999, it has been provided during primary and secondary schooling. The support for employment was also enhanced for the tertiary education (university level) at the same time and a decision was made to establish universities that are dedicated to professional training. In any event all these were focused on "what type of employment to take" and light has not been shed on the contractual relationship between individuals and organizations or not-employed work styles such as entrepreneurship.

Support for selection of occupation during first half of university studies

Although the university entrance rate exceeds 50%, the main route for selecting careers starts with the employment after graduating from the university. , According to the "Global Career Survey" conducted by Recruit Works Institute, the path to be taken after graduating is already determined by the end of the first half of university studies by 64.4% in Germany, 58.1% in the United States, 53.1% in Australia, about 30% in Asian nations, and only 15.9% in Japan. There is the aspect of this delay in determining the career path that in the end leads to the extended period of recruiting activities and if there are to be more selections for career paths in the future, it would be necessary to provide an educational program for selecting occupations earlier.

It would be desirable to have students consider what their life plans are and how they want to work with their career paths before completing the first half of the university education. As the first step in that direction, it would be desirable to increase opportunities to consider the kind of occupation they would like to get into.

Incorporating entrepreneurship in the selection of occupations

The importance of entrepreneurship will increase as a part of career formation of individuals in the future as well as social expectations such as the inducement of innovations or the expansion of employment opportunities. The number of freelancers increase as changes in life styles and the dissemination of various tools take place. There is a career path of becoming a corporate manager as a next step for freelancers. An increase in income can be expected from becoming a corporate manager as well.

The business startup rate in Japan is under 5%, which is only about half of that in Europe and the United States, with the number of people desiring to become an entrepreneur declining from 1.67 million in 1997 to 0.84 million in 2012 ("White Paper on Small and Medium Enterprises" published by the Small and Medium Enterprise Agency). The fact that entrepreneurship as an occupation is unfamiliar to most is also considered to be an underlying cause for this phenomenon. To disrupt this downward spiral and reverse the trend, it is necessary to start by presenting "entrepreneur" and "corporate manager" as options available for career paths.

Thus, providing opportunities to re-learn about the work force by substantiating courses that provide practical know-how for entrepreneurship and corporate management during tertiary education is expected.

Education on rights of workers that constitutes the cornerstone of career formation

As technology permeates, risks of losing jobs or the reduction in income will be increasing in the future. Further substantiation of education on the rights of workers is essential to build careers that can overcome such insecure situations. Although this problem have been discussed since the late 2000s, there is no critical solution yet.

For instance, on one hand non-regular employment expanded by 40% of the work force and insecure employment has become a social issue, there are many contracted employees who are not even aware of the terms of their own contracts. The "Basic Survey on Employment Structure" conducted in 2012 revealed that 16% of 3.23 million people that are working as non-regular employees responded that they "don't know" the contracted period of employment.

While legislative process is ongoing to improve laws for protecting non-regular employees in the recent years, the intentions of these amendments have been made little-known. Unlike regular employees who are hired for life, workers with individualized employment contract terms or working conditions must gain understanding about their own contracts and learn how they are protected by law. As the negotiating power of individuals against organizations is asymmetrical, not knowing such details will raise the risk of being pushed to accept disadvantageous conditions.

Education of rights of workers, centered on fundamental knowledge of labor laws, is essential for the society as well, in order to protect individuals through this era of diversified career selections. Poor and illegal working environments, such as the "black business" (sweatshop), has become a problem in the recent years and this is due in part to the ignorance of corporate managers and a great number of employees about the rules that govern the work style. Everyone being aware of rules regarding work hours or health and safety as well as the procedures for changing working conditions in itself can act as a deterrent to a certain degree. As risks surrounding careers are expected to increase in the future, the knowledge that supports careers can be considered to become even more important.

The selection of occupations, entrepreneurship education, and education on the rights of workers are all in a broad sense education for formulating careers. It was difficult for these to permeate education despite understanding their necessity because they did not suit the conventional educational curriculum. However, there can be a breakthrough of this obstructed condition through the use of technology. This is because such educational programs can be developed and horizontally implemented through online transmissions under the leadership of the government.

It would be desirable to sort and improve the education system relating to career formulation according to the broader definition by the year 2030 and consider the development and promotion of educational programs.

Building new work model

The aspects that are at the core of achieving Work Model 2030 are the threefold, namely, the innovation of the employee stage, improvement of the freelancing and entrepreneurial stage, and the improvement of the work styles such as side jobs and secondary jobs.

Promotion to reform the employee stage

The employee stage will be transformed by 2030 from the current specialist and generalist to technologists and producers who work either globally or locally. The businesses independently proceeding with changes according to their competitive strategy is the fundamental principal for the innovation of the employee stage.

The innovation of the employee stage might be also promoted by the industrial development policies that aim to support growth industries such as tourism, pharmaceutical, and welfare. Assistance will be provided for implementing various technology in small to medium businesses that have little investment capability in particular as well as management reforms utilizing such tools will be supported. In addition, it is important to promote the nurturing of personnel that surpasses boundaries of businesses by improving career ladders for technologists.

Improving work styles of freelancers and entrepreneurs

Since 1960, the number of non-regular employees increased in Japan, while the number of "not-employed work style" such as self-employed workers continued to decline (according to the "Labor Force Survey" published by Statistics Bureau, Ministry of International Affairs and Communications). Technology will make it easier to achieve individual intentions, such as reducing time for meetings to concentrate more on work of specialization or performing outsourced work aside from the main work, during the period leading up to the year 2030. There will also be an increasing number of people in advanced age after the retirement age is extended or those who desire not to work as an employee to be able to deal with both nursing care and child rearing. Four activities are required to improve the freelancing and entrepreneurial stage.

First, the consideration on how individuals working as freelancers should be protected. Applicable laws are completely different for self-employed workers (such as individual outsources) and employees (see next page). The current situation is such that self-employed workers will not have law and regulations pertaining to industrial accident sustained during work. While pension and health insurance premiums are ordinarily halved through labor negotiations, they need to bear the burden of the portion paid for by users as well, resulting in the feeling of unfairness. The ability to work in the same manner regardless of which work style is selected is the foundation for diversified career selections. It is essential to start discussing about how self-employed workers should be protected, assuming that the number of freelancers will be increasing in the future.

Second, the career path from a freelancer to an entrepreneur must be enhanced. In improving the work style of freelancers, many are satisfied in that it is easier to achieve the balance between work and life, but on the other hand one must learn from the issue of so-called non-regular employees, as unintended non-regular employees were created. Freelancing should not be considered merely as a work style with greater degree of freedom, but it is also essential to illustrate an outlook of the career for the future, with high productivity in terms of man-hours and greater exhibition of capabilities. Using freelancing as a "stepping stone" to become an entrepreneur is an effective career path to secure continuous employment and improved income. Educational programs pertaining to management of small businesses and assistance funds should be established to support the change from "working alone without being employed" to "hiring a few people to work" to create such career path.

Third, support for freelancers and entrepreneurs must be provided by technology. There are at this moment a diverse range of tools available to support people engaged in work styles without being employed, as introduced in the trend of the United States. Using such tools will significantly improve productivity. Such information must be acquired individually. The provision of business matching service and support for implementation of operational management tools should be promoted in a proactive manner.

Fourth, an understanding of the current status based on the elapsed number of years should be gained and implementing additional strategies should continue. Positioning and issues relating to non-regular employees have changed with the passing of time. It is important to expect the unexpected with freelancers as well.

Improving work styles of side job and secondary job

The proportion of employees with a side job peaked in 1977 and continued to decline since then until 2012, according to the "Basic Survey on Employment Structure" published by the Statistics Bureau, Ministry of International Affairs and Communications. The background to this is the fact that side jobs from the period of high economic growth

were conducted by primary industry employees who were doing work on the side during slack periods to gain additional income. Once the number of primary industry workers declined, side job was not organized in the secondary or the tertiary industry. As a matter of fact, regular employees are either required to obtain permission or otherwise prohibited from engaging in side jobs according to the findings of the survey conducted by the Japan Institute for Labor Policy and Training in 2004. The reason businesses do not approve of side jobs lies in the deterioration of productivity arising from working long hours and the apprehension about maintaining confidentiality. While businesses are unable to guarantee life time employment, keeping them locked within the business would be considered detrimental to the potential of employees for their career selections.

Side jobs that bring in additional work on top of the main work, as well as secondary work that have multiple main work offer many benefits. First of all, if one work is lost, a certain level of income can still be secured. Furthermore, these are not skills that are useful only in one business, but employees are able to acquire more versatile skills and this increases their selection of work. Experience gained through side jobs and secondary jobs, such as new ways of seeing things, can potentially lead to raised motivations in conducting the main work, as well as the improvement of productivity. The "cross-boundary learning" conducted in fields that differ from the day job, provide a diverse range of effects in such manners.

Side jobs and secondary jobs should be approved in order to raise the employment potentials of employees. As there are concerns that approving side jobs and secondary jobs in a proactive manner during the initial period of an individual's career where concentrated education and training is given by a business can be detrimental to the formation of one's career, following measures may be considered.

First, prohibiting side jobs and secondary jobs as a general rule. Starting from the mid-career phase in particular, except for issues that are considered essential such as confidentiality or prevention of work done for competition, prohibiting side jobs and secondary jobs as a general rule and entrusting the work style to the discretion of the individual.

Second, work styles of side job and secondary job must be improved. Improvement of rules that take into considerations the existence of multiple employers is needed, more specifically, issues relating to the calculation of working hours or disbursement of overtime pay, as well as the application of industrial accident related laws and regulations for accidents that occurred during transit from one work place to another. The necessity of such issues has already been pointed out in the past, but as understanding the status of side jobs and secondary jobs has been difficult, progress was hard to come by. The national personal identification known as the "My Number" will be used as a key to link employment data in the future to gain more accurate understanding of actual conditions.

Work style modes and scope of legal applications

Legal name		Application of law							
		Employee							
		Regular personnel and employee (＊1)	Non-regular personnel and employee, as well as board director (＊2)					Self-employed worker(Individual work consignments, etc.)	Family business employee
			Contracted employee	Temporary employee	Part-time, casual and short-term employees, etc.	Individuals who also fulfill the role of a General Manager or Manager, etc.			
Protection of fundamental rights of workers	Labor Union Law	○	○	○	○	○(＊3)	×	△	×
Fundamental rules for labor contracts	Labor Contract Law	○	○	○	○	○	×	×	×
Minimum working conditions, etc.	Labor Standard Law	○	○(＊4)	○(＊4)	○(＊4)	△(＊5)	×	×	×
	Minimum Wage Law	○	○	○	○	○	×	×	×
	Industrial Safety and Health Law	○	○	○	○	○	×	×	×
	Equal Employment Opportunity Law	○	○	○	○	○	×	×	×
	Child Care and Family are Leave Act	○	○＊6)	○(＊6)	○(＊6)	△(＊5)	×	×	×
Workmen's insurance	Workmen's accident compensation insurance	○	○	○	○	○	×	△(＊7)	△(＊7)
	Employment insurance	○	△(＊8)	△(＊8)	△(＊8)	○	×	×	×
Social insurance	Health insurance (for employees)	○	△(＊8)	△(＊8)	△(＊8)	○	○	× (＊9)	× (＊9)
	Welfare pension	○	△(＊8)	△(＊8)	△(＊8)	○	○	× (＊9)	× (＊9)
Other potentially applicable laws				Worker Dispatching Law			Civil Law (contracting, etc.	Homework Law	
			Part-time Workers Act						

Source: Materials submitted at fellowship party "Future of Work Style 2035" sponsored by the Ministry of Health, Labor and Welfare.

＊1: Generally refers to full-time employees that have no contract term.
＊2: Board directors include individuals who have concluded a contract of mandate with the company.
＊3: Guarantees of fundamental rights of workers according to Article 28 of the Constitution of Japan does apply.
＊4: Number of days for annual paid holidays will vary depending on the prescribed number of working days and the prescribed number of working hours.
＊5: Supervisors and managers stipulated by Section 2 under Article 41 of the Labor Standard Law are partially excluded.
＊6: Term contracted employees must satisfy requirements such as a certain employment period at the time an application is made.
＊7: In the event the individual does satisfy certain requirements, then the individual may arbitrarily join the special membership program.
＊8: satisfying a certain working hours is a requirement for admission to membership. In the event the individual is unable to join, he or she will be provided with national health insurance, national pension and the like.
＊9: In the event the individual is unable to join, he or she will be provided with national health insurance, national pension and the like.

The most important aspect of building a new work model is to spend as much time as needed and build the system in a careful manner. While the evolution of technology and globalization is ongoing changes on the work styles will progress regardless of whether we like it or not. On the other hand, there will be confusion if we were to prioritize speed over quality in reforming labor, which is the foundation for life style and economy. In addition, it is also difficult to make a complete assumption on all influences that policy measures may have on medium to long term at any given point in time. It is essential for us to acquire data through the passing of time during the time leading up to the year 2030 and to implement additional measures to improve the work style.

Schemes for improving working conditions such as wages

Organization of freelancers and non-regular employees

A mechanism for improving working conditions, such as wages, will be necessary in the future, irrespective of whether there is an employment contract with a business. According to the National Employment Status Panel Survey published by Recruit Works Institute, 53.7% of regular employees and 62.5% of non-regular employees responded that "there was no organization or means secured to negotiate the interests of workers." The underlying reason for this is that the organization rate of workers have declined and negotiations for working conditions of non-regular employees is difficult to prioritize by corporate unions that are formed primarily for regular employees.

Such a situation is more likely to occur with freelancers who sign work consignment contracts instead of employment contracts. Unlike some countries where professional unions have evolved, considerations must start from organizing as well as how labor representative system should be set up. Organizations that provide business matching services for freelancers and improve professional unions or "guilds," must be included in the discussions.

Labor movements that are conducted through the internet have increased in the recent years. Moreover, technology makes new labor movements possible.

Schemes for smoothing career transitions

The number of times people change their career will increase in the future giving extended healthy lives and shorter corporate lives. There are three types of support needed in such instances, namely the life simulation, the acquisition of skills needed to change career, and job matching, all of which are supported by the evolution of technology.Decision mak

Decision making support for career selection (Life simulation)

The selection of careers is inherently affected by a variety of factors such as orientations and capabilities relating to one's own career, skills in possession, future prospective of the industry, changes in incomes for respective occupations, time required to acquire skills, orientation of the family and changes in life stages, tax system of the country, pension program, and respective strategies. The evolution of technology such as AI makes it possible to perform such complex simulations. Career selections that one can be satisfied with can be made if it were possible to perform simulations based on the timing for starting one's career or considering changes in career as well as the timing at which the life stage changes.

Algorithms for performing complex simulations must be developed to ensure that effective big data, which is owned in a distributed manner by the government and the private sector and can be shared, is essential for performing life simulations. Data disclosure and use rules must be organized for that reason and the formation of consensus between the government and the private sector should be the first step.

Training program for closing gap of skills

Acquisition of skills needed for a new career can also be assisted by technology. The evidence for this can already be seen in the present time. Technologies that provide support for efficient learning in short time using adaptive learning and action learning in addition to utilization of video images, smart devices, and cloud are now available. The evolution of VR and AR technologies will make it possible to acquire various skills efficiently and in short time in the future.

Various useful skill acquisition contents are scattered primarily within corporations, public vocational training centers, and universities in Japan. In addition to the evolution of technology described above, it is important to

establish rules for the mutual use of such content to create a condition wherein they can be used from anywhere. Furthermore, the outcomes of vocational training are expected in the future as data to improve on the accuracy of training programs.

Enhancement of recruiter and job seeker matching functions

In addition to conventional matching of recruiters and job seekers, the spread of side and secondary jobs will create the need to match projects in terms of specific time duration and work operations. Work operations in organizations must be broken down into detailed tasks and these must be matched with skills and orientations as well as available time of individuals without the constraints of location or language. In addition to matching potential needs of businesses and individuals, recommendations to fulfill potential needs through means such as social media will evolve.

With the reduction in the time taken to acquire skills, the capacity to learn will be included along with the matching of experience and skills to expand the range of matching. Improvement and relaxation of rules pertaining to the handling of personal information are required to achieve higher precision in matching.

Sophisticated support for transition of careers will become possible by utilizing big data that covers work and life styles. All this must start by creating rules pertaining to data such as handling of data in possession of public institutions and the private sector as well as personal information.

In addition, considering who will be responsible for developing such a program will also be necessary. The assumption of public vocational training or public job placement in the past had been to get trained "at the very site." Technology removes the constraints of distance and makes diffusions of these new matching programs. The flip side is that the success or failure of the user interface is directly linked to the effectiveness. The private sector has accumulated more know-how in general and the distribution of roles between them and the government with respect to the development of programs is an issue that needs to be resolved by 2030.

Work style evolves with technology

Technology will penetrate our daily lives by the year 2030. How we exist and benefit together with technology will be the cornerstone for the formulation of careers of individuals and the improvement of productivity in businesses. It is essential that the consideration for building the Work Model that evolves with technology towards 2030 be started urgently. There are three reasons for this.

First, "work" is the foundation of life style and economy and excessively hasty changes will present serious side effects. Therefore, it is necessary to take actions with care. Second, technologies can trigger unexpected changes. The legal systems relating to work style in the past had been maintained based on changes in actual conditions. However, such trailing approach would be inefficient in averting risks related to technology.

Maintaining work rules with advance measures against anticipated issues already in place become important for the future. Third, there is a major gap between the ability to imagine the effects of new technology and the general popularization of such functions. For example, AI has become a fad many times in the past, but everybody lose interests after a short time. As building a new business flow by using technology and reforming work style require time. As such, taking quick action is important.

Economic conditions and social environments that differ from initially anticipated situations will probably present themselves before reaching 2030. The stance of acquiring data with the elapsing of time and implementing additional measures is essential in considering policy issues for that reason.

Technology has an enormous capacity to achieve that which cannot be achieved by humans. There are policy issues that despite being recognized are unpractical and thus are left untouched. Technology has the potential to break through such state of obstruction.

It is necessary to start creating a new work model and complete it until 2030.

Policy issues towards 2030

Ⅰ. Nurturing of personnel that become the foundation of technological society

Improvement of research environment to produce prominent personnel in every field of technology

Suppression of technology divide through programming education

Ⅱ. Career education in the broad sense to support a diverse range of career selections

Support provided to ensure that students become capable of selecting their occupations before the completion of their first half of college life

Entrepreneur is incorporated in the list of occupations available for selection

Education provided on rights of workers, which form the cornerstone of career formulation

Ⅲ. Building of new work model

Promotion of reforms in employee stage

Improving work styles of freelancing and entrepreneurship

- Consideration of how protection should be implemented for "not-employed work style"
- Support for transition from a freelancer to an entrepreneur
- Support for utilization of technology tools
- Gaining understanding with time and the implementation of additional measures

Improving work styles of side job and secondary job

- Prohibition of side jobs and secondary jobs as a general rule
- Gaining understanding of actual conditions and organizing rules pertaining to side jobs and secondary jobs

Ⅳ. Mechanism for improving working conditions such as wages

Organization of freelancers and the shape of new labor movements

Ⅴ. Mechanism for smoothing career transitions

Development of life simulations utilizing big data possessed by the government and the private sector

Development of vocational training programs to fill gaps in skills

Development of recruiter and job seeker matching systems using AI

People who develop/use technology create the future

This report began with a question, whether technology is a threat to our life and work. An overview of the two risks that technology poses, namely, the reduction in income and disruption of careers, were considered and the Work Model 2030 was presented as a solution.

The essence lies in the autonomous choice of diversified careers through the four types of profession and the two stages that of utilizing technology. The message seeking a world where everyone can benefit from the synergy between technology and the work model was incorporated in this report.

The work style that involves the utilization of technology will enhance our individual characteristics, which makes ourselves mutually essential. This is our social image that we share empathies one another and move forward with the evolution of technology.

The biggest accelerator for achieving the Work Model 2030 is not technology, but humans. Risks brought about by technology should be resolved by technology, and humans are main actors who create such technology and who use them so that the new Work Model can function. The future wherein we exist and benefit together with technology will come only when the Work Model can be achieved.

We hope that this report serves as a trigger to take that first step toward achieving our future.

Work Model 2030

Technology Innovates "Work" in Japan

Issued in November 2016

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