Senior-Oriented On-Demand Economy: Locality, Matching, and Scheduling are the Keys to Success

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Abstract. The world's population is aging at an unprecedented rate. Promoting the engagement of senior workforces is essential to cover the increasing cost of social security and to provide aging workers with a raison d'être. Although many seniors are willing to work, senior workforces, with their waning strength and skills, are not commonly employed. We argue that the on-demand economy is a promising platform for the senior workforce because of the flexibility it provides to these workers. First, we introduce a new classification of on-demand services, distinguishing four groups: property sharing, real-world skills, bargaining of goods, and online crowdsourcing. Next, we discuss key technologies needed to improve support to senior workforce in an on-demand economy. Finally, we build an online consumer-to-consumer matching platform, GBER, where senior workers find local jobs. GBER consists of two functions: a comprehensive help-matching function, and a specialized freelancer-matching function.

Keywords: On-Demand economy · Crowdsourcing · Senior workforce · Job matching · Social inclusion · Social engagement

1 Introduction

1.1 Senior Workforces Will Solve Problems in an Aging Society

The world is facing an unprecedentedly rapid aging of the society. There were 0.9 billion people aged 60 or over by 2015, and this number are estimated to increase to 2.1 billion by 2050 [1]. Not only will the developed countries, which have already experienced an aging society, but developing countries will also face this situation. We conducted our research in Japan, the country that had the highest aging rate, 26 %, in 2015 [2].

The main problem of population aging is the increasing cost of social security, as there will be fewer taxpaying workforces and more non-labor-force population [2]. It is possible to alleviate the decline in labor force by raising the participation of those who have capacity to work, but are currently not working such as the elderly, the young, and the female workers. In this paper, we will argue about engaging the senior workforces.

Encouraging elderly people to work is beneficial not only in financial terms, which is, the reduction of social security costs and the supplementation of the house budget, but it also increases their quality of life (QOL). Many elderly people feel isolated from society after they retire from their job and lose social ties. Their hopes upon retirement

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are to contribute to society, make new friends and have someone to talk to, have something to live for, and maintain good health [2].

1.2 On-Demand Economy as a Suitable Platform for Senior Workers

Seniors' Requirements on Work. Although many senior workers are still willing to work, many current jobs do not fulfill these workers' requirements. In Japan, the country with the highest rate of aging, 51 % of the people aged 65–69 were unemployed in 2015. Of them, 25 % still wished to work. The number was 68 % for people aged 70–74 and 84 % for seniors over 75 [2].

The objectives of senior workforce are slightly different from that of the younger generation. Salary is not of the utmost importance to them because for many of them pensions received from the government or companies suffice to support their daily lives. In fact, 70 % of the elderly people have no worries about earning a living [2]. Their average savings are 1.4 times higher than savings in the other age groups [2]. They seek to stay in good health, contribute to society, and talk to people.

The main reasons why companies avoid to hire the elderly are [3]: it is difficult to uniformly deal with them as their individual physical and cognitive strengths differs largely (39 %), the companies are anxious about the workers' health problems (31 %), and the companies want to enforce restructuring of the employees (27 %).

We argue that jobs suitable for elderly workers are jobs in which they can work in vicinity, where their work times are flexible, and can contribute to society [2]. Working full-time and commuting to the office can be exhausting for many senior citizens because of their diminishing physical strength. It is thus desirable that elderly people work anywhere and anytime they like, and their work serves society well.

Utilizing Senior Workforces in the On-Demand Economy. The on-demand economy is on the rise and it is a suitable working platform for the elderly. The on-demand economy fulfills the requirements on the elderly on the time, place, and purpose of the job. On-demand economy differs from the traditional market such that customers interact with each other. The companies in this business only facilitate a platform where customers directly sell or buy goods and services.

To give a better illustration of on-demand companies, we introduce three major players in the on-demand economy. Uber [4] is the most successful company that provides on-demand taxi services. Customers summon Uber taxis on their smartphones; they can choose taxis on a map interface that displays a car location retrieved from GPS and the driver's information. The drivers are not the employees; they are freelance drivers who are registered to Uber. Uber makes profit from the margin. Another successful example is Airbnb [5], which offers a matching platform between hosts who want to sublet their rooms and tenants or guests who want to stay in places beside hotels to reduce their expense or to have special experiences.

Uber and Airbnb are actively trying to engage senior workers, recognizing the potential in their experience and responsibility. Uber announced a partnership with Life Reimagined, a company that helps the elderly plan their next step in life. Airbnb

announced on the same day that they are welcoming elderly hosts and guests. It is important to note that 25 % of the drivers at Uber are 50 or older, and 50 % of the hosts at Airbnb are over 40, while 10 % of them are over 60. In Japan, 84 % of the elderly are potential providers because they own houses that can be used for renting.

The Minnade-DAISY project [6, 7] is one of the successful examples in involving senior workers in an on-demand service. This project crowdsources micro-tasks that help create accessible books for the blind. A third of all participants are over 60, and they showed more continuity, engagement, and enthusiasm toward the project.

2 A Case Study on Senior Workforce in Japan

2.1 Seniors' Potential to Work

The reason why we propose the engaging senior workforce is beneficial is based on an assumption that the elderly have both potential and ability to work. Several facts and examples about senior workforces support this assumption.

Current seniors are healthier than ever before. The retirement age in Japan was 55 in the 1980s; it was 61 in 2015 and will be raised to 65 by 2025. One reason is that the average life expectancy is rising to over 80, and people are still in good health under the age of 65. About half of the people over 65 experience subjective symptoms, but only a quarter of them experiences problems in their daily lives. This means that 75 % of the people over 65 are still able to work.

Additionally, seniors own properties and have valuable skills and knowledge, and for frail seniors, sharing or selling their properties is one of the easiest ways to contribute to society. Eighty-four percent of the elderly have their own house, in which they can rent out spare rooms. They have free land for parking space. Also their experience in cooking or childcare can reduce the burden on full-time workers. They have knowledge that young people do not. For example, many seniors work as storytellers in war museums.

Another example is employing senior taxi drivers in advertising local sightseeing spots. Hana-navi [8], which means flower navigation in Japanese, is an application where taxi drivers in Kyoto upload photos of local flowers daily. The database they created attracts many tourists into the region because flower viewing is one of the most popular reasons for trips.

Further, Kamikatsu is a model town for agriculture and commerce cooperation by the elderly. Its population is only about 1,500 and 52 % of the inhabitants are over 65. The elderly workers harvest beautiful leaves for decorating plates and ship them to restaurants all over Japan. Their annual sales are ¥ 260 million (approximately $2.3 million as of February 2015); some workers earn twice the average of Japanese workers.

2.2 Reestablishing Local Ties

Many elderly people want to join some group activities [2]; 61 % of the elderly participated in group-activities from their own initiative in 2013, which is 6.2 % higher

than in 2003. They feel that they made new friends (48.8 %); they have a sense of fulfillment (46.0 %), and they feel confident about their health condition (44.4 %). Men answered that they contributed to the society (32.7 %), whereas women answered that they could help each other (37.2 %). Another report says that 60 % of the elderly wish to interact with young people [2].

Social isolation of the elderly is one of the biggest problems in an aging society. Although the percentage of the elderly who talk to others more than once a day exceeds 90 % in total, 25 % of the people who live alone only talk to others less than once in three days [2]. Talking has proven to be effective in preventing dementia, which requires expensive treatments. Therefore, it is beneficial for both the elderly and the society to reestablish local bonds and to promote talking in person.

There are many efforts by local governments and nonprofit organizations to recreate local communities. We introduce the first local social networking service (SNS) in Japan, Gorotto-Yacchiro [9], as such an example. Gorotto-Yacchiro is a portal site and the social networking site of Yachiro City. It has blogs, bulletin boards, news, Q&A sections, and links to local company websites. When you log in, you can view friends' updates, join the community, and become a town reporter. Local SNS are not popular among young people because they cannot connect with people outside the city, and it usually has classic, unattractive user interfaces. However, this became popular among senior people who are unfamiliar with IT and do not have friends outside the city. The Ministry of Internal Affairs and Communications is trying to expand local SNSs to many cities in Japan.

3 On-Demand Economy for Senior Workforce

3.1 New Classification of On-Demand Market

The on-demand economy has been successful so far. The number of the freelance workers in the US surpassed 53 million people, which is 34 % of all labor force, and is expected to exceed 50 % in 2020. More than 60 % of the major US companies will substitute part of its current workforce with freelance work. Companies can reduce their personnel costs by hiring workers only for a period or for certain temporary jobs that require special knowledge. They want to adjust their productivity to the fluctuating market demand; hence, the stable number of employees became a burden. Workers can work flexibly, anywhere and anytime they want. The key motivation factors for freelance workers are (the percentages in brackets show the rate of affirmative votes in Japan and in the US, respectively): they have more freedom and flexibility in their work lives as they are not constrained by time and place (46 %, 42 %), they can contribute to the family budget (42 %, 37 %), and they can complement their main income professions (42 %, 68 %).

There are many words used to describe the on-demand economy: sharing economy, peer economy, classified online marketplace, e-commerce, online auction, collaborative economy, and so on. Not only the terms, but also the field of business is wide ranging. Among 180 startup companies of on-demand services in the US, professional services represented the largest segment—43 % of the companies [10]. The second largest

segment was home services (36 %), followed by transportation (35 %), food and beverage (25 %), health and beauty (24 %), delivery and logistics (16 %), dining and drinks (14 %), travel and hospitality (9 %), and events (9 %) [10].

In this section, we propose a new classification method that divides the on-demand market into four groups—real-world skills, property sharing, online crowdsourcing, and bargaining of goods—according to the criteria of local vs. global, material vs. immaterial (Table 1). We point out the important aspects of their implementation to senior-oriented services. We believe that local services are more suitable for seniors.

Property Sharing: Local and Material. Property sharing represents services where people can lend and borrow properties. The sharing economy has grown widely across many industries worldwide in the past 6 years. The main domains of sharing include cars, money, parking, home goods, food, housing, and clothing—essentially anything people own. Airbnb [5], who is one of the biggest players in this field, earned $800 million a year in 190 countries by providing a platform for renting houses. Spacemarket [11] offers a marketplace to lend spaces like rooms, halls, or even desert islands.

Sharing of properties is a good way for the elderly to earn money because they are usually wealthier than the young. As we discussed earlier in the Airbnb example, many sharing-platform companies try to attract the elderly to make their unused possessions available. This allows even frail people to earn money because sharing does not require physical strength.

However, there are some concerns. The existing regulation makes it difficult for new companies to enter the market. The insurance companies are not willing to offer policies in case of loss or damage to the property. Airbnb is facing a number of lawsuits concerning its responsibilities for accidents and crimes in rented houses. A change in legislation and increased security are needed for these services to evolve. Another concern is that it is difficult for seniors to gain a sense of fulfillment from work because sharing usually does not require special skills.

The scheduling and recommendation functions need to be improved for better user experience. Currently, scheduling functions often cannot prevent double booking and multiple applications. Sharing requires strict time management because a new customer cannot use the property until the previous customer returns on time. In addition, customers usually send applications to multiple providers because they are not sure if property is available. Improving the matching recommendation function could reduce the time customers spend on finding a good and available lender.

Real-World Skills: Local and Immaterial. Real-world skills refer to certain jobs that require professional knowledge or skills, for instance, driving, housework, babysitting, caregiving, consulting, and teaching. Tour guiding became popular recently; many seniors offer local tours like nature explorations or history-themed guided tours. We include services for finding friends of similar interests into this group, although they are not accompanied by monetary transactions. This is because the primary goal in this category is matching people to people.

This is the most promising area for the senior workforce because they can play an active role in the local community, utilizing their knowledge and skills to connect

people. It triggers high satisfaction among workers because they can make use of their skills and knowledge to improve other people's lives.

Nevertheless, background functions need to be improved. First, there is a safety issue because the worker and the customer meet in person. Some platforms are accused of being a hotbed of crime. Background checks on the workers (and the customers) need to be conducted by requesting credit information and introducing a worker-evaluation system. Second, a scheduling function to support work sharing among multiple workers is needed. Current services are limited to single-worker jobs, but they need to cover more complex jobs. Most jobs are conducted as a cooperation of several people. That is especially true in the senior workforce. We propose a mosaic-type work system [12], where elderly workers share their time and skills to compensate for their lower strength and form a virtual worker. Hence, we need a system that coordinates the schedule of several workers for a single job. Finally, we need to have a matching recommendation function in order to reduce the time workers spend on routine tasks like matching, messaging, payment, commuting, etc. If the time spent on routine tasks was relatively long compared to the actual working time, workers would find the system dull and would not use it again.

Bargaining of Goods: Global and Material. The bargaining of goods represents e-commerce websites and Internet auctions. There are two types of e-commerce websites: direct and indirect selling. In direct selling, people sell their own product, but they have to keep some stock at home. In indirect selling, on the other hand, people shop on-demand and ship to the client's address, a certain percentage of which is overseas transactions. Direct selling is a good e-commerce platform for the elderly workers when they sell products that are made as a hobby or are local staples. Popular products as a hobby are paintings, clothes, sundries, and photos.

We need to support the senior sellers who often do not comply with laws and regulations. For example, they sell photos that breach portrait rights or are trademarked or copyrighted. The services need to detect these illegal acts and should provide support for the inexperienced sellers.

Online Crowdsourcing: Global and Immaterial. In micro-task crowdsourcing, people perform easy micro tasks such as image labeling, writing short texts, transcribing, data input, data cleansing, etc. Amazon Mechanical Turk [13] is the global leading service in this field. The problem with purely online services is that they are usually underpaid, they require certain IT skills, and the tasks are often monotonous. These are not so attractive for the senior workforce because the elderly are often weak in operating computers and they are more interested in jobs in which they are more socially contributing. Minnade-DAISY [6, 7] was an exceptionally successful project in Japan because it had a good cause—to help the blind. In the future, purely online services will include macro tasks that require more expertise, time, and collaboration such as design, music or video creation, and smartphone application development.

One of the research topics on supporting online crowdsourcing of senior workforce is the automatic detection of stealth marketing and shilling [14]. Senior worker are a likely target because they have lower IT literacy and are easier to deceive.

Table 1. Classification of On-Demand Services and Pros and Cons for the elderly workers

	Material	Immaterial
Local	**Property Sharing** **Lending their properties: cars, rooms, etc.** *(US) Airbnb, ParkWhiz, Lending Club, (JP) Spacemarket, Anyca,* **Pros.** Seniors have more properties. Frail people can earn money. **Cons.** Law regulation and lack of insurance. Constant income not ensured. No skills required. **Tech.** Current scheduling functions are imperfect. Search cost for the borrower is high.	**Real-World Skills** **Providing Services using Skills and Knowledge** *(US) Uber, BlaBlaCar, TaskRabbit, Zaarly, EatWith (JP) Any +Times, Time Dollar System, CaSy, Cyta, TimeTicket, Visasq* **Pros.** Making real world connections in local. Utilising their experiences and skills. Works are socially contributing. **Cons.** Safety management. **Tech.** Work sharing between multiple workers. Chores are time consuming: matching, messaging, payment, commuting, etc.
Global	**Bargaining of Goods** **Selling one's properties or creations in E-commerce or auction websites** *(US) Amazon, eBay, iStockphotos (JP) Yahoo! Auction, mercari* **Pros.** Earn money with their hobbies. Enjoy shopping with other people's money. No work time, no commuting. Sending local staples to the world. **Cons.** Keeping unsold stocks at home. Quality control of creations. **Tech.** Controlling illegal acts: fraud, infringement.	**Online Crowdsourcing** **Performing micro-tasks online** *(US) Amazon MTurk, Upwork, UserTesting, Fiverr, Be My Eyes, 99 designs (JP) Lancers, Minnade-Daisy, Kokonara, Shufti* **Pros.** Work at anytime, in anywhere. Tasks are often easy to perform. Special skills in designing and writing. Personal background checks not required. **Cons.** Workers are underpaid. Many tasks are not socially contributing. **Tech.** Detecting stealth marketing and shill.

3.2 Platform Companies—Comprehensive or Market-Specific

The companies that provide a platform for on-demand services select one or more markets from the list in the previous section. We call comprehensive companies those that run their business in more than one field, and market-specific companies as the ones that focus on one area.

Comprehensive companies are popular among people with low IT literacy, like the elderly. A major example of comprehensive companies is Craigslist [15], the largest classified advertisements website with many sections like jobs, housing, personals, etc. Over 700 cities in 70 countries have Craigslist sites, where overall monthly page views exceed 2 billion. Jimoty [16], the Japanese Craigslist-like web service, has attracted many seniors; 62 % of its users are over 40. These services have traditional bulletin-board interfaces, resembling the dawn of the Internet.

It is ideal to build comprehensive companies employing senior workers because seniors can seek help for anything in one platform. However, comprehensive services pose certain challenges: they require a large number of users for help matching, the evaluation of workers is complex, and the search cost for jobs is relatively high. It is easier for new businesses to start out as target-specific companies for several reasons; it is easier to find users, match demand and supply, and design the website. Further, user satisfaction is more likely to be higher with target-specific services because the probability of matching users to skilled workers is higher.

Several services support startup platform companies in terms of assuring safety, collecting money, protecting privacy, preventing fraud, and company management. These services help startup companies build trust among users. Major services supporting platform companies are the following. Checkr [17] provides automatic background screening of the worker or user with web applications and API. PayPal [18] act as intermediaries for payment processing so that even the platform companies will not know customers' credits and accounts.

3.3 On-Demand Services that Focus on Locality

Several related services provide platforms for local work matching. In this section, we introduce a few services that provide insights into which functions are a prerequisite for successful services.

Flash Volunteer [19]. Flash volunteer is a platform where users can find information on volunteers. Users search for jobs on a map interface, in which the work location is pinned on a map, and a card interface, in which users can leaf through recruitment information by sliding on the screen. Separating information by cities has proven to be a good idea, but it had too little recruitment information for a comprehensive service, and people stopped using it.

Any + Times [20]. Any + Times offers a matching platform for specialized freelance workers. "Supporters" register on this website according to their specialty, like room cleaning, pet care, cooking, shopping services, etc. This company is a comprehensive service provider, but the services are limited, based on the supporters' specialty.

Time Dollar System [21]. Time Dollar System is a unique gamification metrics for local voluntary cooperation operated by a nonprofit organization called NALC. Users earn points—1 point per hour—for helping out elderly neighbors. In the future, they can use their points to get voluntary services from others. The service has been successful so far, it now has 125 satellite offices and 30,000 members.

Peuplade in Paris [22]. Peuplade in Paris is the world's largest community-based social networking service that enhances connections between local people. It has three main functions: (a) *rendez-vous*, where users call for someone to go along with them to events or gatherings; (b) *idées*, where users post their interests and ideas to take action or to seek help such as a classified service; and (c) location search, where users can check other users' location. It is a great example which citizens form real community from an online service.

4 Key Technologies that Support the Elderly to Work in On-Demand

As discussed above, services supporting local communities are a hopeful platform for senior labor forces to work in. The elderly can make the most of their knowledge, skills, and ownership. However, some challenges in providing these services still exist:

locality, work of long duration, community identity, and automated recommendation on matching.

The first problem is that many of the current services do not focus on locality, although the physical proximity between the client and the worker is the important factor in sharing services and real-world-skill services. In many services, search is limited to large geographical units. On the other hand, some successful services like Uber [4] and Airbnb [5] offer information on places using map interface with GPS data. Craigslist [15], which is a service that the elderly commonly use, runs separate services in each city. We suggest these matching services have a search function where the search can be limited to the user's vicinity, or a map interface.

The second problem is that current services only match jobs one by one. Many are not built to request the same worker for the same kind of job; hence, the customer royalty is pretty low. In addition, many real-world tasks are complicated and require long-term work involving many people, but there are no major services to support that. Thus, we propose functions that group workers and assign tasks to them in reference to their registered schedule—all in one application.

The third problem is that in the current service setup, workers tend to feel isolated. They usually work alone and do not have the chance to communicate with other freelance workers, which may harm workers' state of mind. As we saw in the example of Peuplade in Paris [22], providing community functions increases worker engagement and improves worker satisfaction.

Finally, the fourth problem is the still high search cost for both workers and clients, especially in comprehensive services. In many services, users need to skim through irrelevant bulletin board posts, which is very time-consuming. We can optimize the search result by filtering according to location and skills. The way the search result is displayed could be modified—from the traditional list of results to map-based or calendar-based display, in line the requirements of the jobs.

5 GBER—On-Demand Help Matching Platform Supporting Seniors Working Locally

In this chapter, we introduce the design philosophy and the basic functions of our system GBER. GBER stands for "Gathering Brisk Elderly in the Region." It is an on-demand C2C market platform, where the elderly can find jobs and connect to each other. Each city will own its GBER service, because locality is an important factor in senior workforce engagement. To reduce search cost, we support map-based and calendar-based job search, and job or worker recommendation. We introduce scheduling functions with multiple workers for introducing more complicated macro tasks (Fig. 1).

The Comprehensive Help-Matching System. GBER supports a pure consumer-to-consumer platform, where users can seek help by simply choosing their location from the map, and typing the date, price, the number of helpers, and the specification of the help they need. The content of the request can be anything from the classification of the on-demand markets above: real-world skills, property sharing, and bargaining of goods. Those workers who live in the vicinity, or have registered skills or interests

similar to the content of the request will receive a notification. Those who do not receive notifications can also find requests on an easy map interface, or on a card interface. When there are multiple offers from the users, the requestor can choose among the applicants After the service, the requestor rates the helpers on a scale from one to ten, The ratings are displayed on each user's profile page.

The Specialized Freelancers-Matching System. GBER offers a platform where the registered freelance-workers groups can receive requests from the customers. The interface is similar to the previous comprehensive help matching, but users can only seek help for certain jobs. First, the administrator of the workers group receives a job request from the user. Next, the administrator and the requestor make a contract specifying the price and dates. The administrator selects workers from the group and employs them on the agreed dates. Finally, after the job is completed, workers receive money from the requestor and the ratings of each worker are registered. GBER has a scheduling system, where the administrator can easily select workers for specific tasks.

This system is aimed to cater to the requirements that the elderly place on jobs. Some elderly have the desire to try new things in the second career of their lives. Hence, each group occasionally holds lectures and trainings to welcome new registered workers. In addition to what workers already know, this system creates new job opportunities. Moreover, elderly people like to work in teams for several reasons: they can complement their skills with the help of co-workers; it is easier to take a leave if

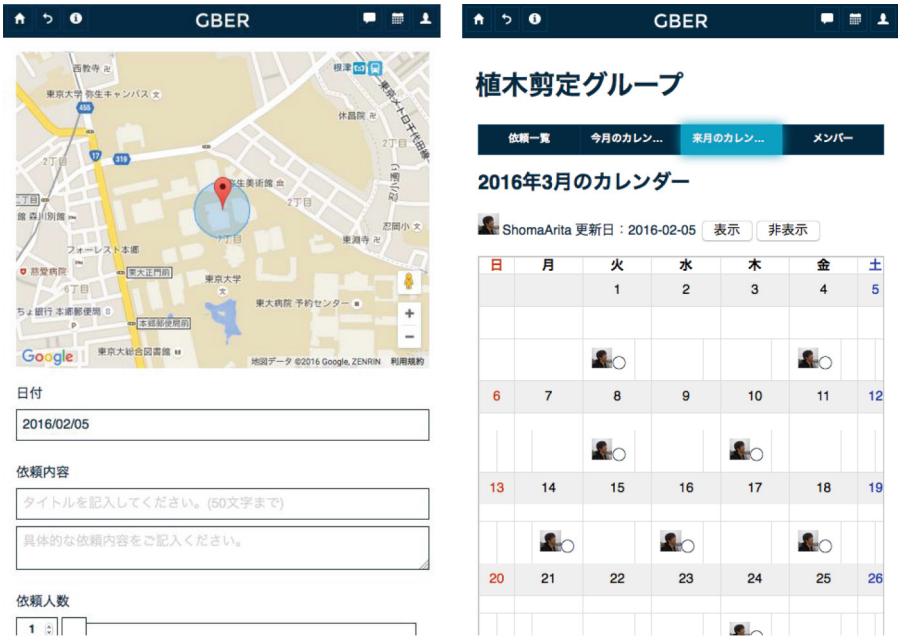

Fig. 1. (Left) Map-based interface for uploading job information. Workers can search for jobs with similar interface. (Right) Calendar-based interface that support workers' scheduling.

health issues arise; they can control how long they work; they can make friends with the co-workers.

We include specialized tasks as well because it secures the highest number of active users. Comprehensive services fail mainly due to lack of active users and lack of requests, resulting in a negative feedback loop. Workers registered for specialized tasks manifest high loyalty to this service and help the service prosper.

6 Conclusion

The world is aging rapidly. Engaging senior workforces is essential in order to cover the increasing cost of social security and to give a purpose in life to workers. Senior workforces are, however, not commonly employed, although many are willing to work despite of their waning strength and skills. We argued that the on-demand economy is a promising platform for the senior workforce as it allows seniors to work anywhere and anytime.

First, we classified on-demand services into four groups according to several criteria—local vs. global, and material vs. immaterial. We pointed out the importance of local services, mainly in the context of sharing of properties and real-world skills, as a suitable platform for elderly workers.

Next, we discussed key technologies that need to be developed in order to support the senior workforce in an on-demand economy. Senior-oriented services should support locality, work of long duration, community identity, and automated recommendation on matching.

Finally, we built an online consumer-to-consumer matching platform, GBER, where senior workers find jobs locally. GBER consists of two functions: a comprehensive help-matching function, and a specialized freelancers-matching function.

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References

1. United Nations: World Population Prospects the 2015 Revision. http://esa.un.org/unpd/wpp/Publications/Files/Key_Findings_WPP_2015.pdf
2. Cabinet Office, Government of Japan: Annual Report on Aging Society. http://www8.cao.go.jp/kourei/whitepaper/index-w.html
3. The Japan Institute for Labor Policy and Training: Research on Hiring Senior Workforce. JILPT Research Series No. 67 (2010)
4. Uber: https://www.uber.com/. Accessed 12 Feb 2016
5. Airbnb: https://www.airbnb.com/. Accessed 12 Feb 2016
6. Itoko, T., Arita, S., Kobayashi, M., Takagi, H.: Involving senior workers in crowdsourced proofreading. In: Antona, M., Stephanidis, C. (eds.) UAHCI 2014, Part III. LNCS, vol. 8515, pp. 106–117. Springer, Heidelberg (2014)
7. Kobayashi, M., Arita, S., Itoko, T., Saito, S., Takagi, H.: Motivating multi-generational crowd workers in social-purpose work. In: Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing, pp. 1813–1824 (2015)

8. Hana-navi: http://flowertourism.net/. Accessed 12 Feb 2016
9. Gorotto-Yacchiro: http://www.gorotto.com/. Accessed 12 Feb 2016
10. State of the on Demand Economy Report October 2014. http://kungfu.co/wp-content/uploads/2014/10/on-demand-economy-2015.pdf
11. Spacemarket: https://spacemarket.com/. Accessed 12 Feb 2016
12. Nakayama, M., Hiyama, A., Miura, T., Yatomi, N., Hirose, M.: Mosaic-type work support system using touch screen computers for senior people. In: Proceedings of the 2013 Conference on Computer Supported Cooperative Work Companion, pp. 235–238 (2013)
13. Amazon Mechanical Turk: https://www.mturk.com/. Accessed 12 Feb 2016
14. Baba, Y., Kashima, H., Kinoshita, K., Yamaguchi, G., Akiyoshi, Y.: Detecting inappropriate crowdsourcing tasks using machine learning. In: The 5th Forum on Data Engineering and Information Management, Fukushima, Japan (2013)
15. Craigslist: https://www.craigslist.org/. Accessed 12 Feb 2016
16. Jimoty: http://jmty.jp/. Accessed 12 Feb 2016
17. Checkr: https://checkr.com/. Accessed 12 Feb 2016
18. PayPal: https://www.paypal.com/. Accessed 12 Feb 2016
19. Flash Volunteer: http://www.flashvolunteer.org/. Accessed 12 Feb 2016
20. Any + Times: https://anytimes.co.jp/. Accessed 12 Feb 2016
21. Time Dollar System: http://nalc.jp/jikan/jikan.htm. Accessed 12 Feb 2016
22. Peuplade in Paris: https://peuplade.fr/. Accessed 12 Feb 2016