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## Japan's Society 5.0: Going Beyond Industry 4.0

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### Abstract

The rapid evolution of Information and Communications Technology (ICT) is bringing drastic changes to society and industry. Digital transformation will create new values and is becoming a pillar of industrial policy in many countries. In anticipation of such global trends, "Society 5.0" was presented as a core concept in the 5th Science and Technology Basic Plan, adopted by the Japanese Cabinet in January 2016. It was identified as one growth strategy for Japan. Society 5.0 is also a core part of "The Investment for the Future Strategy 2017: Reform for Achieving Society 5.0" as part of its Fifth Science and Technology Basic Plan (FY16 to FY20), announced in April 2016, the Government of Japan aims to realize what it calls "Society 5.0," or "Super Smart Society." Society 5.0 provides a common societal infrastructure for prosperity based on an advanced service platform. The idea of progress has often been associated with modernity and social theory itself. In the bibliographical research carried out, as a curiosity the Wikipedia itself (in a consultation held on April 14, 2018) has referred to the concept of Industry 4.0, which raises interest worldwide in several, but it still does not have the concept of Society 5.0. In this paper, we can see that there is a lack of knowledge about the concept of Society 5.0. From a longitudinal perspective: "So, just what is Society 5.0? Taking a long view of history, I think we can define Society 1.0 as groups of people hunting and gathering in harmonious coexistence with nature, Society 2.0 as forming groups based on agricultural cultivation, increasing organization and Nation-building, Society 3.0 is a society that promotes industrialization through the Industrial Revolution, making mass production possible, and Society 4.0 as an information society that realizes increasing added value by connecting intangible assets as information networks. Society 5.0 is an information society built upon Society 4.0, aiming for a prosperous human-centered society." Society 5.0 achieves a high degree of convergence between cyberspace (virtual space) and physical space (real space). In the past information society (Society 4.0), people would access a cloud service (databases) in cyberspace via the Internet and search for, retrieve, and analyze information or data. In Society 5.0, a huge amount of information from sensors in physical space is accumulated in cyberspace. In cyberspace, this big data is analyzed by artificial intelligence (AI), and the analysis results are fed back to humans in physical space in various forms. In the past information society, the common practice was to collect information via the network and have it analyzed by humans. In Society 5.0, however, people, things, and systems are all connected in cyberspace and optimal results obtained by AI exceeding the capabilities of humans are fed back to physical space. This process brings new value to industry and society in ways not previously possible. It is a presentation that is based on very recent publications, but which also has a prospective component, which always generates some in determination and uncertainty. Also, for this reason, it is a contribution that seeks above all else to contribute to this very urgent and necessary discussion.

**Keywords:** Revolution; Financial; Monetary; Societal

### Introduction

Society 5.0 alludes to the new monetary society following the seeker gatherer, peaceful agrarian, modern, and data social orders. Society 5.0 is both Japan's development system and the outline for a general public that Japan expects to build up. It was drafted by the Council for Science, Technology and Innovation and affirmed by a Cabinet choice in January 2016. The objective of Society 5.0 is to make a human-driven society in which both financial advancement and the goals of societal difficulties are accomplished, and where individuals can appreciate a completely dynamic and agreeable high caliber of life (QoL). It is a general public that will go to in detail to the different needs of individuals, paying little respect to area, age, sex, dialect, or different elements, by giving important items and administrations. The way to its acknowledgment is the combination of the internet and this present reality (physical space) to produce quality information, and from that point, to make new qualities and answers for determination challenges.

While Society 5.0 is Japan's development system, it isn't restricted to Japan, as its objectives are equivalent to those of the UNDP (United Nations Development Program) Sustainable Development Goals (SDGs). SDGs are overall improvement objectives, in spite of the fact that the arrangements will vary contingent upon the financial circumstance or social foundation of the nation or district. As it were, Society 5.0 is Japan's way to deal with understanding a portion of the

SDG characterized objectives. In the meantime, the societal difficulties that Japan faces, for example, a maturing populace, declining birth rate, diminishing populace, and maturing foundation are difficulties that numerous different nations will in the end look also. From this point of view, Japan is one of the primary countries to confront these difficulties. Through the early goals of these difficulties through Society 5.0, and by offering those answers for the world, Japan can add to settling comparative difficulties worldwide and accomplishing SDGs (Figure 1).

The objective of Society 5.0 is to understand a general public where individuals can appreciate life minus all potential limitations. Digital PC. Cyber-Proof-of-Concept, KPI: Key Performance Indicators simulate transportation frameworks. Approve framework practices. Assess KPIs. Monetary development and innovation advancement exist

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Figure 1: Society 5.0 for sustainable development goals. Source: Business 20 Tokyo Summit Joint Recommendations (2019).

for that reason and not for the flourishing of a chose few. As per this idea declared by the legislature, different exercises have been started in Japanese scholarly circles and in industry. The thoughts presented in this hand out are only one component of such endeavours, and there is much that is as yet reasonable; be that as it may, through open discourse with a wide scope of individuals, this methodology is developing day by day. Besides, despite the fact that Society 5.0 started in Japan, its motivation isn't exclusively coordinated at the thriving of one nation. The systems and innovation created here will no uncertainty add to settling societal difficulties around the world.

**Literature Review**

The monetary improvement of Japan has been a generally examined theme among researchers (there are around three million outcomes in Google Scholar) since Japan is the nation that could rapidly recuperate after the World War II and turned into the primary East Asian financial supernatural occurrence [1]. The Nation has experienced monetary modernization from the old customary agrarian economy to an innovative one out of a solitary age [2]. Japan delighted in practically continuous development from the 1960s until 1990s [3]. Not just the method for the improvement helped Japan to be related with "all cutting edge of our occasions"; however it likewise cultivated advancement of immature neighbouring East Asian Nations of that time [2,4].

The financial improvement of Japan and in this way the neighbouring Nations is frequently clarified through the flying geese hypothesis. This hypothesis was at that point presented in 1930 by Akamatsu, referred to by Ozawa [1], who recommends that the monetary improvement can't be contemplated without thought of common cooperations between cutting edge (educator) and in reverse countries (students). On account of East Asia, Japan is considered as the main goose (educator) that different countries followed in the improvement [1,4]. Notwithstanding, the Nation was itself following the modern way of the U.S., that had impacted the state conduct through its built up provincial predominance [5]. Gaining from the West was a basic part of the Japanese methodology [1]. As Japan was ascending the formative stages as far as propelling its businesses, it was

moving the generation to nations with lower cost of creation. The point of the strategy was to move from low-esteem added ventures to high-esteem included with the state bolster [1]. When the enterprises lost its aggressiveness and ended up disadvantageous, Japan moved them to neighbouring nations and concentrated itself on exceedingly focused businesses locally. In this way the local yield and fare beat import.

As per Ozawa [1], the financial improvement of Japan can be separated into four phases where every one of them is portrayed by various winning industry of that time, yet the enterprises covered. In the early post-war period between the 1960s (first stage), Japan concentrated on fare situated development through light assembling (material and electronic apparatuses segment) [4]. Innovative know-how was adjusted from the West so as to 'make up for lost time' inside the improvement [2,6]. In 1968, Japan was the third biggest economy after the U.S. what's more, Soviet Union [3]. Nonetheless, the ascent of wages and exchange gratings caused the absence of global intensity of the light-modern items [4]. The creation was moved to neighbouring nations so as to diminish the expense of the generation. The local generation was in this way changed from light to overwhelming assembling and synthetic compounds (second stage), which was subject to the import of crude materials [1,4]. Because of the way that worldwide exchange conditions were changing, Japanese economy was inspected amid the oil emergency in 1973 [4]. The financial downturn that was caused by the oil emergency [7] pushed Japan to the second rebuilding (third stage) towards large scale manufacturing of customer durables (autos and gadgets), which guaranteed that the nation resuscitated fare and yield development [4]. The accomplishment of Japan can be allocated to car and customer electronic enterprises that were bolstered and coordinated by the state financial model [5]. Japan was vigorously send out situated, which in blend with its protectionism crated exchange strains with the U.S [3,4]. This brought about 1985 in swapping scale changes pushed by Group Five (G5) including the U.S. so as to adjust the exchange-known as Plaza Accord [1,4]. Japan had no other decision than to figure out how to keep up the development. In the time of post-modern Japan (fourth stage), the center moved from items to administrations and along these lines, the innovation and data ended up imperative components of generation [2]. In the meantime,

Japan's monetary arrangement rotated around remote direct venture to its Asian neighbours, 'Keynesian medication' of cash supply (land and money related markets) and Government consumption [7].

Such advancement system helped Japan and East Asia to be perceived by the World Bank as 'phenomenal' [1,5]. All things considered, because of the shortcomings in money related direction and corporate administration, the nation has been hit by the emergency [5]. The legislature aligned with the private segment so as to increase political power, which was later outperformed by the business control. Since the 1990s, Japanese economy has recorded poor execution, which was not caused by the 'make up for lost time' model of mechanical updating yet rather by the arrangement of macroeconomic stuns [8]. This is another motivation behind why the advancement of Japan is among the most famous subjects as researchers have different suppositions on what caused the Japanese supernatural occurrence just as the fiasco. One normal position spins around the job of the state in the Japanese advancement.

Auxiliary institutionalist researchers are among the ones that underscore the significance of state intercessions so as to clarify the market achievement [4]. Chalmers Johnson, as one of the significant backers of the achievement of state intercessions, characterized Japan as development situated formative state where the financial development was advanced through legislative organizations that upheld development arranged monetary strategies [2]. He is an adherent to the positive job of the mechanical arrangement on Japanese development [5]. In actuality, this view isn't shared by Ozawa [1] and Hart-Landsberg and Burkett [4]. These researchers censure the flying geese hypothesis since it precludes the mandate job of the organizations (particularly the budgetary perspective), which they trusted that developed the financial battle of Japan.

According to Ozawa [1], there are four institutional components that caused both wonder and catastrophe of the Japanese economy. To start with, the state-based bank framework was in charge of keeping loan costs low, controlling the promoting rivalry and the stream of funding to chosen areas and activities. The banks were advancing bank advances and along these lines supporting high-chance speculations. Second, the keiretsu framework made ties between huge partnerships and the banks that were firmly tied with the administration. The business condition has been characterized as iron triangle, which alludes to coordinated effort between the state and enterprises through concentrated organization [9]. The Ministry of International Trade and Industry (MITI), which controlled and managed the 'external centered' division comprising of cars and hardware likewise assumed a job in the improvement of the Japanese economy [1]. Third, there was built up exceedingly directed and secured dualistic industrialization. The less effective 'inward reliant' division described by horticulture, administrations and assembling, was in the focal point of the state consideration through whatever is left of Ministries. Because of the state intercessions lined up with the decision Liberal Democratic Party in Japan that prompted debasement, the area is known as 'pork-barrel' division [1,5]. In addition, limitation of imports by means of settling conversion scale while vigorously sending out to different nations bolstered development however later caused the exchange surplus and along these lines pressures between the U.S and Japan [1,4,5]. In conclusion, the administrative framework in Japan that depends on participation and steadfastness to gatherings and subordinates has made chiefs hazard disinclined and uncertain because of their commitments. Ozawa [1] recommends that these four viewpoints are in charge of making Japan's favorable position yet it likewise later brought about its greatest inconvenience.

Also, Ikeda [7] considerations about the reasons for the Japanese disaster are fairly lined up with the ones from Ozawa. He contends that money related segment, mechanical part and the Japanese Government are in charge of the misinformed approaches that lead to over limit, wiped out advances and decline of shopper request. By the by, he underlines that neoliberal philosophy was the item implemented by the U.S and its universal offices, for example, International Monetary Fund and World Trade Organization. Along these lines, the U.S., is seen as a hegemon that administers the worldwide financial framework including Japan. Japan was subject to the U.S., through capital and innovation exchange [1,7]. On the other hand, the blend of outside innovation and residential advancement lead to Japan's mechanical quality [6] and it could barely be envisioned that the nation would have the capacity to grow so quickly without it [5]. The U.S. was dependably the pioneer in bringing new innovation and worldview however Japan could change it into new well known items [2].

Innovation is characterized as a usage of new blends of existing assets. As indicated by Schumpeter, it is tied in with making or thinking of new items, new innovations, new association structures or new markets [10]. Considers development as a basic wellspring of the upper hand since it permits being in front of adversaries that don't react to a change. On the off chance that organizations and countries cultivate advancement, all things considered, they will have the capacity to make due in an exceedingly focused universal natural [10]. In this manner, advancement should be an impetus for development [10]. Be that as it may, advancement needs an uncommon situation. As indicated by the requirements for development to happen are as per the following:

- Labour force with technological skills;
- Economic structures allowing autonomy and entrepreneurship;
- Economic system that encourages new technological approaches and market opportunities;
- Easy access to venture capital;
- Connection between scientific and technological community;
- Good communication between users and developers of the technology;
- Strong protection of IP rights; and
- Strategies and structures of firms to capture return on investment (ROI).

With regards to exchange in regards to the advancement in Japan, it spins around innovation since it has a separate place in the improvement of the nation. As per Goto and Odagiri [11], innovation was a noteworthy wellspring of the accomplishment of the high-innovation firms in Japan. As of now in 1956, there was built up Science and Technology Agency that was controlled by MITI [2]. Karan [2] contends that by the mid-1980s, Japan got up to speed to the U.S. as far as innovation level. The real changes were done in the creation of vehicles and sound visuals, which expanded the efficiency that helped Japan to manage a few emergencies [2]. The wellspring of the expanded efficiency and enhanced quality was concentrated R&D5 spending all through the 1980s and contribution of innovation from the West [11]. In any case, Japanese method for development is viewed as gradual as opposed to radical that would upset the businesses [11]. The one reason of Japan being effective in mechanical improvement is that the determinants of the upper hand (factor conditions, request conditions, firm methodology, structure and competition, related and supporting

businesses) functioned admirably as a framework in certain focused on enterprises. As it was referenced before, a few researchers, (for

example, Porter and Ozawa) concur that the state concentrated just on the advancement in specific enterprises and in this manner, different businesses fizzled. In the season of monetary emergency, the blend of lacking political reactions and disappointment of delivering radical advancement uncovered during the 1990s that the framework in Japan can't adapt and bolster development in different territories and little firms [12].

However, Porter [13] gives another view on the achievement of Japan through his hypothetical model of upper hand. He characterized the ventures with the upper hand dependent on the offer of the world fare in 1985. Among the best ventures were gadgets items, substantial hardware, and steel and transportation [13]. Regarding factor conditions, Japan needed to manage a few impediments, for example, absence of normal assets and restricted capital after the World War II [14]. Unexpectedly, the most critical quality of Japan was HR [15]. Japan put an accentuation on science and math in instruction, which helped the nation to have proficient, taught, exceedingly talented just as restrained and persevering individuals. Organizations likewise centered on preparing to create explicit aptitudes applicable to the business. The local contention was upgraded on the grounds that organizations shared their financial data, which empowered them to continually gauge against their rivals. In any case, none of these elements added to development as much as issues that Japan needed to manage. For example, mechanization of the generation occurred because of rising wages and lifetime work, which made the expense of creation high. Likewise, advancements in coordinations, for example, Just-In-Time were invigorated by the geology of Japan (remote island with constrained land for extra space for capacity) [16].

Thanks to the fact that Japan is one of the most populated countries, the domestic demand was another engine for innovation [13]. The domestic buyers were sophisticated and required high quality products; hence they were eager to buy domestic electronics, which also signified their status. Homogeneity of the market helped the companies further in terms of purchasing power but made other industries such as furniture or food incapable to penetrate to international markets [17].

Fruitful Japanese businesses were described by agreeable long haul connections inside bunches. The providers have been situated in closeness, which made it simple to share data. Henceforth, new businesses became out from the current ones, for example, semiconductors from purchaser gadgets and cameras. As to organizations themselves, Porter [13] characterized their structures as progressive, taught, steadfast inside participation and with talented specialists at the best. This mirrors the accentuation on HR as factor conditions.

On the other hand, Porter [13] argues that the cooperative research directed by MITI was focused on private research, which did not benefit the cluster participants. This also enhances the domestic competition because companies did not want to share their best ideas. MITI further stimulated the industry development by introducing standards. The role of the government is evident even from Porter [13] work in which he emphasizes that the government was not only the regulator but also the buyer in some industries.

This area talked about the financial advancement of Japan and what was behind the accomplishment until the 1990s. By and large, the benefit of Japan was the 'trick up' industrialization demonstrates arranged towards development by means of fare. Japanese Government

had mandate job so as to invigorate the mechanical improvement [1,7]. Be that as it may, because of the set up structures, the state meddled into the advancement with wrong financial and money related strategies, which has spoken to impediments for Japanese economy to recoup from the emergency. In the wake of illuminating existing talks with respect to the monetary improvement in Japan, the creator moved to another edge concerning advancement and upper hand of best performing businesses in Japan. This gives a decent premise to seeing how development in Japan was examined. In view of Porter [13] discoveries, Japan made the upper hand fundamentally through HR, household contention and request weights. This added to upgrading advancement together with a few weaknesses, for example, constrained land and separation from different nations. In any case, Porter [13] likewise conceded to the impact of the administration. At long last, it was stressed that Japan is losing the situation in current noteworthy parts, for example, IT in spite of the presence of significant preconditions for increasing upper hand there. In this manner, there is space for breaking down how focused Japan can be in the area that is crucial for 'making due' in innovation advancement on the worldwide scale.

## Challenges Facing Japan

There are numerous societal difficulties that Japan should survive. Notwithstanding, there are few main drivers of these issues or maybe, they are inescapable social changes that Japan must acknowledge and are considered as specialists driving the societal issues. For instance, "*maturing of the populace*" is one such operator that will prompt societal difficulties, for example, rising standardized savings costs and decreased assessment income for the administration. Such societal difficulties can be managed productively by recognizing the operators and moderating their immediate impacts. This will along these lines abstain from intensifying the issues or making extra ones.

The agents driving these societal challenges in Japan, i.e., the changes that Japanese society will face, are a shrinking labor force, aging population, dispersed consumer population, aging infrastructure, and environmental issues, all of which will influence each other and have a detrimental effect on society.

### Shrinking labor force

The current labor force comprises more than 77 million people but is expected to shrink to about 70% of this number-53 million-by the year 2050. This decrease comes from an aging population and may be further exacerbated by the increasing number of people who may leave the workforce for reasons such as having to look after elderly relatives.

While the general work power will keep on contracting, the harmony between work free market activities will create provincial differences and add to proceeding with precariousness. With the past financial development show that depended on monozukuri (generation, craftsmanship), common monetary development was accomplished by building up plants and making work in remote areas, furnishing framework interfacing those locales with substantial cities, and bringing down the expense of moving individuals and things. From that point forward, the structure of industry has moved from an assembling to an administration economy. Moreover, because of migrating processing plants abroad, manufacturing plant work in remote locales is diminishing, and the adolescent from those areas are moving to the urban communities. The deluge of the work drive into urban areas, in any case, isn't adequate for the interest of administration businesses. This is getting to be clear in the fields of retail (e.g. comfort

stores) and dispatch administrations, where issues, for example, long work hours have turned into an issue, and the capacity to keep up the dimension of administration itself is turning into an issue.

Computerization by man-made brainpower (AI) and mechanical technology is required to reduce this work lack, yet in the event that radical robotization ought to happen as unmanned comfort stores and mechanized driving, this thusly will result in further loss of business. This will put weight on the adolescent in remote districts to acknowledge occupations with lower compensation, making it progressively hard to get ready for a family, and accordingly further fuel the populace decline. Urban communities can retain movement from remote locales however won't have the capacity to add to expanding the populace. Subsequently, Japan will compound the issue of a declining populace without having the capacity to determine the present issue of progressively overpopulated urban communities (Table 1).

### Aging population

On the off chance that profitability decays and the economy backs off, national and local assessment incomes will decrease. Moreover, the expense of government disability will increment because of the maturing populace. Natives should acknowledge diminished administrations relating to the decline in expense income or face a more prominent taxation rate to keep up the present dimension of social administrations. A decline in expense income will likewise involve lost income to redress social inconsistencies or give alleviation to the financially impeded; making a settled monetary divergence that will traverse ages. This won't just deliver social agitation yet will likewise deny those caught in the lower financial strata from satisfying their maximum capacity, diminishing Japan's aggressiveness and along these lines further decreasing efficiency (Table 2).

### Dispersal of consumer population and aging of infrastructure

While tax revenues decrease, the consumer population will become increasingly dispersed, and infrastructure will deteriorate. The dispersal of the consumer population is one challenge that will result from a declining birth rate and aging population, and it will lead to a reduction in population density in regional cities and their suburbs. This will present a situation where basic infrastructure services including energy, water, education, and medical services will need to be provided to large, sparsely populated areas, which will also result in higher infrastructure service costs.

Much of the basic infrastructure in Japan was established as part of large scale development during the period of high economic growth from 1950 to 1970. Now, over fifty years later, much of the infrastructure such as roads, bridges, and water pipes is deteriorating, and it is expected that a total budget of over US\$2.5 trillion will be necessary over the 50 years from fiscal year (FY) 2011 to FY 2060 to

Year	Shrinking labor force	
	15-64 years old	65 years+
2015	77 million	34 million
2050	53 million	44 million

Table 1: The capacity to determine the present issue of progressively overpopulated urban communities.

Year	Increasing social security cost
2015	US\$1.1 trillion
2020	US\$1.2 trillion
2025	US\$1.4 trillion

Table 2: Aging population.

Year	CO <sub>2</sub> emissions
2013	1.4 billion tons (100%)
2030	1.0 billion tons (26% emission cut)
2050	0.3 billion tons (80% emission cut)

Table 3: Environmental issues.

replace it. However, it will be necessary to switch to an infrastructure suitable for a smaller population rather than maintaining the existing infrastructure as the population decreases.

### Environmental issues

Having ratified the Paris Agreement at the United Nations Climate Change Conference COP 21, Japan will be making the transition to renewable energy. The challenges will be to lower the price of renewables; increase energy conservation or control demand in the large metropolises where consumption will be concentrated, and deliver low-cost energy to sparsely populated regional cities and suburbs. If a stable supply of energy cannot be provided as it is today at a reasonable price, this will not only inconvenience consumers but also rob industry of its competitiveness, inhibit Japan's economic growth, and lead to a further decline in productivity (Table 3).

### Conclusion

The Society 5.0 is a proposition for human and social advancement with deference for maintainability being a national structure in Japan. Despite the fact that we trust that this idea (or possibly the fundamental goals) will be reached out to different nations. For the usage of Society 5.0 not exclusively be a political-ideological idea, it is by all accounts important to coordinate a few measurements, for example:

1. Innovation Policy (from Government side),
2. Entrepreneurial soul (from Society Side), and
3. Entrepreneurial Skills (from common society and organizations).

It is an issue with the future open (i-SCOOP, 2018): *“Whether such a vast societal change will work, and the wall of social acceptance will be broken down is a question that will be answered in the future. Making predictions in this regard would be Western arrogance from our part and a big mistake. So, who knows? And is this a model we could envision in other parts of the world?”*

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