8. Country Report of Japan[1]

As previously stated, the overall purpose of this research study is to help inform female business owners from APEC economies of current entrepreneurial trends pertaining to the 4th Industrial Revolution. This case study will focus specifically on Japan and learnings culled from an in-depth interview with an established female founder of a successful startup. In line with the overall case study criteria, the founder interviewed in this report has been recognized for successfully launching and running a business for at least 5 years or more. Further details regarding the research design approach and case study participant & business information are included in the below section titled 'Case Study'.

Before delving into the case study details and findings, a brief background consisting of: (1) general country information, (2) an overview of ICT/smart technologies in Japan, and (3) the current state of Japanese women entrepreneurs will be presented in the below section.

The below figure provides a brief baseline of general statistics and information on Japan (CIA, 2018):

Figure 1. Japan Information

JAPAN
• Area of land: 377,915 sq km • 2017 Population: 126,451,398 people • 2016 Gross Domestic Product (GDP): $5.233 trillion • 2016 GDP per Capita: $41,200; an increase of $400 from 2015 • 2016 GDP Growth Rate: 1% • GDP Composition: agriculture 1.1%, industry 29.6%, services 69.4% • Industries: among world's largest/most technologically advanced producers of: motor vehicles, electronic equipment, machine tools, steel and nonferrous metals, ships, chemicals, textiles, and processed foods • 2016 Export Value: $634.9 billion / Import Value: $583.5 billion • 2016 Labor Force: 66.73 million • 2016 Unemployment Rate: 3.1%

As evidenced by the above statistics, Japan is a highly developed country whose economy is heavily reliant on services and industry, including sectors related to various ICT technologies.

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8.1 Current Status of the ICT Sector of Japan

Japan's History of Economic Development in Relation to ICT

Academics see ICT as an important component of national economic development, as it can lead to GDP growth through increased: competitiveness and productivity of private sectors, employment opportunities, and marketable innovations (Dragoi and Dumitrescu, 2014). Japan has been recognized as the first, formidable non-Western nation 'to fully benefit from the sustained technological advances that [have] characterized the 20th century' (Dragoi and Dumitrescu, 2014, p. 149).

After World War II, imported technologies were seen as a major contributing factor leading to Japan's rapid economic recovery (Takeuchi and Shibata, 2006). The economy was growing at such a rapid rate that by the mid-1960s, Japan's GDP was reaching the level of some European countries, and by the 1970s, the country was seen as a model for other developing countries seeking economic growth (Takeuchi and Shibata, 2006; Dragoi and Dumitrescu, 2014). Some of the strategies Japanese companies employed to produce expansive growth and productivity were: taking a 'learning by doing' approach, studying global brands, placing emphasis on foreign direct investment (FDI) throughout the Asia Pacific region, and increased access to markets (Yusuf and Nabeshima, 2005). In the 1980s, industrialized nations were even starting to seek out best practices they could learn from Japanese companies (Takeuchi and Shibata, 2006). But the tide turned in the 1990s and the country entered a lengthy period of financial/economic stagnation due to the 'resurgence of IT companies in the United States' (Takeuchi and Shibata, 2006, p. iv). Positive IT trends in the US prompted some global players to 'dismiss Japan as an important source of ideas' (Stenberg, 2004; Takeuchi and Shibata, 2006, p. iv). But by 2006, it appeared that Japan was ready to emerge from its long period of stagnation (Takeuchi and Shibata, 2006). Usage of computer and information technologies were seen as contributors to Japan gaining back market share (Yusuf and Nabeshima, 2005). In fact, after 2000, the country made a concerted national effort to invest in high-tech industries (Dragoi and Dumitrescu, 2014). This has positively impacted and fostered the development of Japan's ICT industry and continues to be a strategy that carries importance as the country focuses on future national growth plans (Yusuf and Nabeshima, 2005; Dragoi and Dumitrescu, 2014).

Japanese firms have traditionally excelled at process innovation. This now needs to be further reinforced by far reaching innovation in products, organization, business models, the use of IT and in the provision of services that complement the product offerings, thereby enhancing profitability without risking the loss of focus. (Yusuf and Nabeshima, 2005, p. 3)

The research from Yusuf and Nabeshima (2005) saw that technological advancement in relation to the energy industry, life sciences, and other nanotechnologies could be key in distinguishing Japan from other global competitors and in maintaining Japan's long-standing reputation of innovation. Japan's unique approach to the creation of knowledge/innovation, especially as it differs from Western styles, is outlined by six key characteristics outlined in the figure below (Takeuchi and Shibata, 2006, p. 3):

Figure 2. Japan's Approach to Knowledge Creation

1. Views a company as a living organism, rather than as a machine;
2. Focuses on justifying belief much more than on seeking truth;
3. Emphasizes tacit knowledge over explicit knowledge;
4. Relies on self-organizing teams, not just existing organizational structures, to create new knowledge;
5. Turns to middle managers to resolve contradictions between top management and front-line workers; and
6. Acquires knowledge from outsiders as well as insiders.

While Japan has been widely praised for how it approaches and creates new knowledge, methods seem to fall short (in comparison to Western nations like the US) in the rate at which academics & researchers are able to convert knowledge into applied industry innovations (Stenberg, 2004). The national government is trying to proactively address this concern and plays a major role in promoting a continued culture of innovation in hopes that such efforts and investments in ICT will lead the country to new global breakthroughs (Dragoi and Dumitrescu, 2014). There is growing research around how policy efforts in Japan can help support ICT innovations to promote technical and economic growth (Dragoi and Dumitrescu, 2014). More detailed information concerning national ICT-related policy efforts will be discussed further in the 'ICT Sector and Policy Development' sub-section.

R&D, Innovation, and Knowledge Creation

As previously discussed, Japan is a country that places a lot of focus on R&D activities and generating patents. This is evidenced by the below table which outlines the number of patents produced in 2003 by various countries, including Japan (Yusuf and Nabeshima, 2005, p. 45):

Table 1. 2013 Patent Information

Rank in 2003	Number of Patents in 2003	Share of All Patents in 2003	Country*	(Rank in 2002)	(Number of patents in 2002)	(2002 to 2003) (Change in Number of patents)
1	37,250	19.9%	Japan	(1)	(36,340)	(2.5%)
2	12,140	6.5%	Germany	(2)	(11,957)	(1.5%)
3	6,676	3.6%	Taiwan	(3)	(6,730)	(-0.8%)
4	4,132	2.2%	South Korea	(6)	(4,009)	(3.1%)
5	4,127	2.2%	France	(4)	(4,421)	(-6.7%)
6	4,031	2.2%	United Kingdom	(5)	(4,196)	(-3.9%)

Source: U.S. Patent and Trademark Office

Despite Japan's accomplishments in innovations and patents, recent publications pertaining to the impact of Japan's R&D activities have cited some growing problematic concerns. For instance, in a 2017 Japan Policy Brief (OECD) it was noted that 3.5% of Japan's GDP was spent on R&D in 2015, making it one of the top countries globally, and 3rd highest among OECD countries, in terms of investment in science and innovation activities. However, some critics have noted that the emphasis and focus on R&D activities has not led to marked increased productivity or growth and such efforts have generally not produced expected or desired results (OECD, 2017).

Some contributing factors to Japan's lackluster ICT and R&D results are seen as: (1) low levels of collaboration between corporations and universities, (2) a general aversion to foreign collaborations in terms of technology and knowledge creation, and (3) a lack of representation and participation by women in the field (OECD, 2017). In an attempt to address the aforementioned issues and public research gaps, the government has outlined actions the country needs to take in its S&T Basic Plan (2016-20) (OECD, 2017).

Moves by the government are not only important in addressing the aforementioned issues related to lagging ICT and R&D results but are also critical in helping to address the country's problems with an aging population, lagging labor productivity levels (among top OECD countries), and high national debt (OECD and World Bank, no date; OECD, 2017). As previously mentioned, improvements in ICT and other innovations are seen as key drivers that can help to increase overall industry productivity levels, create new employment opportunities for the country, and provide local businesses with new competitive advantages (Dragoi and Dumitrescu, 2014; OECD, 2017).

Current State of ICT in Japan

ICT has long been seen as a critical component of the government's overall economic strategy. It is estimated that the ICT industry accounted for 9% of all industry activity in 2011, amounting to approximately 82.7 trillion yen (Dragoi and Dumitrescu, 2014).

According to ICT Development Index (IDI) statistics published annually by the Measuring of Information Society by the International Telecommunication Union (ITU), Japan ranked 10 out of 176 countries in 2017, which represented an increase of one spot as compared to the country's 2016 ranking (ITU, 2017). Regionally, Japan came in 3rd in 2016 IDI rankings.

The below table further outlines and compares the sub-index components of IDI access between world figures and Japan, and highlights the advanced state of ICT in Japan as compared to the rest of the world (ITU, 2017):

Table 2. IDI Access Comparison (World VS. Japan)

IDI Access Sub-Index Components	World	Japan
IDI Access Sub-Index	6	9
Fixed-Telephone Subscriptions per 100 Inhabitants	14	51
Mobile-Cellular Telephone Subscriptions per 100 Inhabitants	102	123
International Internet Bandwidth per Internet User (Bit/s)	74,464	83,010
% of Households with Computer	47	81

In terms of Networked Readiness Index (NRI), a ranking that is published by the World Economic Forum (WEF), Japan placed 10 out of 139 countries in 2015, which again reinforces the advanced state of Japan's overall infrastructure (WEF, 2016). While the global report praised the country's strong infrastructure (especially in terms of Internet bandwidth and servers), it did state that the overall impact of such gains is diminishing due to the high rate at which other countries/peers are moving forward and gaining momentum.

ICT Sector and Policy Development

While statistics and rankings give an overall view into the state of ICT in a country, they do not always provide a full picture of the complexity and challenges that policymakers still need to consider.

Some concerns that research has highlighted is the need for Japan to develop 'next-generation infrastructure, especially in relation to cyber-space uses and the spread of the Internet of Things' (IPP, 2017, p. 3). And while Japan is considered to be a country that is specialized in ICT, the competitive advantage it has previously enjoyed from related patents has vastly diminished within the past decade.

Regardless of ICT-related challenges and downward trends, Japan still hopes to be the 'World's Most Advanced IT Nation' and 'a leading digital economy by 2020' (IPP, 2017, p. 3). In research published in 2015, it was estimated that 'ICT investment represents about 25% of total investment in Japan' and is 'one of the fastest growing components of total investment, having almost doubled

over the last 15 years' (Ishida, 2015, p. 80). Some of the country's strengths when it comes to ICT include: high-speed bandwidth (including FTTH or Fibre to the Home technologies), high-definition image technology, home networking systems, mobile related technology, and data processing & analysis technologies (including: software development, robotics, & voice recognition technology) (Dragoi and Dumitrescu, 2014; IPP, 2017). Optics and imaging technologies (used in mobile phones and digital devices) are a core competitive advantage of Japan's innovations (Dragoi and Dumitrescu, 2014). Japan enjoys a large market share of ICT technologies in the following product areas: 69% in DVD recorders, 54% in plasma TV displays, and 74% in the digital camera arena (Dragoi and Dumitrescu, 2014). Conversely, the country tends to be weak in: overall ICT architecture, solution services, global business development, and IP systems. A 2013 study found that among Asia-Pacific countries, Japan is the leader in leveraging cloud computing technologies (Dragoi and Dumitrescu, 2014).

'According to Japan's Minister of Internal Affairs and Communication, the multiplier effect of ICT investment in 2015 may be as high as 1.98 in contrast with 1.19 for general investment and the ICT industry's economic spillover effects induced 87.6 trillion yen in added value and 7.713 million jobs in 2011.' (Dragoi and Dumitrescu, 2014, p. 152)

As emphasized throughout this study, public policy and intervention has been seen as a key factor in Japan's ICT development strategy. Encompassed in this strategy is E-government, which is a key initiative that Japan plans to leverage as policymakers continue to build out their ICT strategy for the future (IPP, 2017). Additionally, the National Institute of Information and Communication Technology (NICT) has also been credited for generating positive ICT developments in Japan, through the facilitation of collaborative opportunities between universities, corporations, and international research organizations (Dragoi and Dumitrescu, 2014).

Abenomics is a buzzword that often appears in strategy or policy discussions, including those related to ICT matters.

'Abenomics is the name given to a suite of measures introduced by Japanese Prime Minister Shinzo Abe after his December 2012 re-election to the post he last held since 2007. Abenomics' aim was to revive the sluggish Japanese economy with "three arrows": a massive fiscal stimulus, more aggressive monetary easing from the Bank of Japan, and structural reforms to boost Japan's competitiveness.'(Dragoi and Dumitrescu, 2014, p. 152)

Analysts hope that 'abenomics' will increase the demand for ICT professionals by creating up to 11,500 new IT-related jobs (Dragoi and Dumitrescu, 2014).

At the government level, the Cabinet has also assembled a group of subject matter experts to prepare the 5th installment of the S&T Basic Plan for 2016-2020 (which was previously mentioned) (IPP, 2017). The plan has set out a course of action to address challenges in the following areas: energy, health, infrastructure (next-generation), local resources, and reconstruction from natural disasters and is focused on increasing the number of knowledge assets produced. As a way to support knowledge asset creation, amendments to the patent law were made in 2015 to assist in harmonizing IP systems across Japan. The S&T Basic Plan also strives to maintain Japan's position as a leader in nanotechnology. To complement the S&T plan, the government also created the Comprehensive Strategy on STI, which took effect in May of 2016 and is focused on policy initiatives to further Japan's goal of becoming a 'super smart society' (IPP, 2017, p. 1). Through these measures, the government hopes that there will be increased knowledge creation and transfer between academia and industries, as opposed to innovations only predominantly being circulated within the private sector.