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Profiles of ICT Business and Women Entrepreneurs in APEC Economies

APEC Policy Partnership on Women and the Economy

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Executive Summary

This report presents profiles of ICT business and women entrepreneurship of 21 APEC Economies. In recognition of the importance of promoting women' economic empowerment particularly in the ICT-based economy, APEC PPWE has taken the initiative in various agendas to this end. In alignment with this initiative, Asia Pacific Women's Information Network Center (APWINC) of Sookmyung Women's University (SMU), Republic of Korea (ROK), implemented APEC PPWE 01/2017A project titled "Women's Economic Empowerment and ICT: Capacity Building for APEC Women's Entrepreneurs in the Age of the 4th Industrial Revolution." The overall goal of this project was to inform APEC women of the current trends in the current digital economy and to promote their participation in the economic activities using ICT/smart technologies.

As part of this project, with the joint efforts with 21 researchers, APWINC conducted 21 case studies of successful women entrepreneurs from 21 APEC Economies, particularly in the field of ICT/smart technology business, to identify and disseminate best practices of women entrepreneurs. Individual researchers completed their case study report composed of two major sections: 1) economy profiles of the status of the ICT sector and women entrepreneurs, and 2) results of a case study.

The present report is a collection of economy profiles on *ICT* and *women entrepreneurs* in 21 APEC Economies. This report is designed to provide an overall view of the current status of the ICT sector and also the current status of women entrepreneurship in each APEC member.[1]

[1] There is a report on the results of case studies titled Case Studies of Successful Women Entrepreneurs in the ICT Industry in 21 APEC Economies.

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1.1 Current Status of the ICT Sector of Australia

Australia stands at the precipice between growth cycles. Behind us are the glory days of its traditional economic strengths based on mining, traditional manufacturing and farming. As we look around us, we see the old industries of mass production and traditional heavy manufacturing being decimated. Traditional manufacturing has declined from 20 per cent to 6 per cent of GDP in the last 30 years. Even those areas of significant strength and value – including financial services, law, consulting and media – are increasingly under threat from automation, from AI, from new technologies. There is a revolution underway and Australia's future – uncertain as it may be – depends not only on average Australians leaping into a new economic paradigm but for Australian entrepreneurs to imagine what that paradigm might look like, where tomorrow's jobs, careers and industries will be. One such future industry is the 'medtech' healthcare industry with medical technology systems and platforms considered to be a key engine of progress for Australia as well as for the entire APEC region.

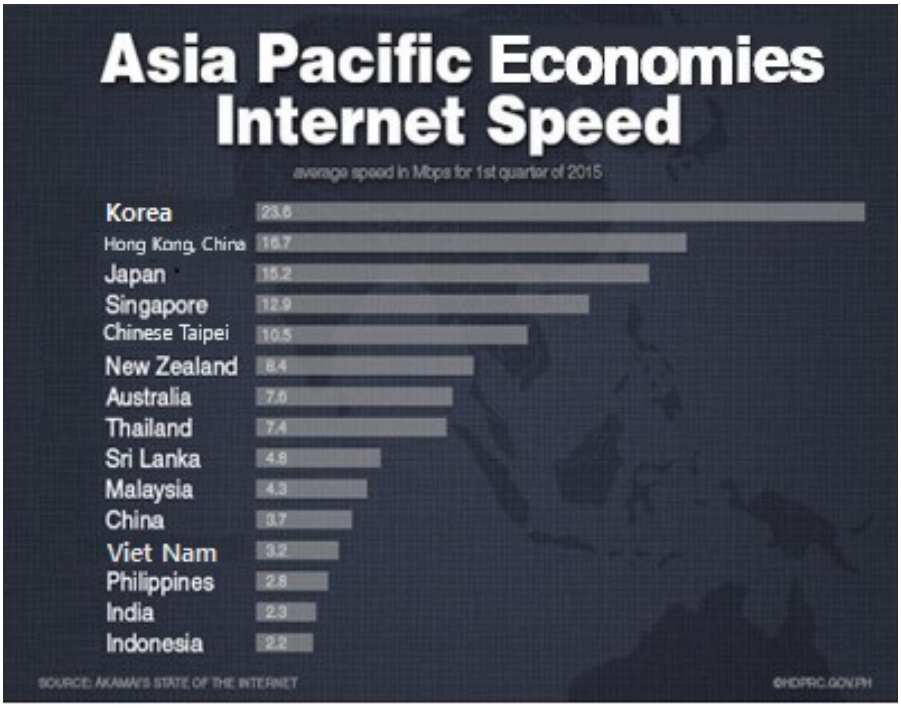
There are conflicting reports on the use of ICT and Smart Technology in Australia. Some websites report a penetration rate of over 85 per cent of the Australian population, which is currently just above 24 million. According to the Australian Bureau of Statistics (ABS), there were 13.7 million internet subscribers in Australia at the end of June 2017, representing an increase of 2.1% from the end of December 2016. Fibre connections grew by 49.8 per cent in the six months between December 2016 and June 2017. There were 2.1 million fibre connections in June 2017, an increase of 123.3 per cent for the year between June 2016 and June 2017.[3] In 2014-15, desktop and laptop computers still ruled the roost in terms of devices used to access the internet at home (94%). However, smartphones were not far behind (86%) and tablets were also gaining more of a foothold at 62 per cent indicating an increasing number of households are accessing the web via multiple devices.

Australian smartphone penetration rates are higher than the global average of 81 percent, with only a few economies, including Norway, Republic of Korea and the Netherlands, reporting higher ownership. Smartphone ownership rose to 84 per cent in 2016. Today the smart phone penetration in Australia is approaching its peak with rates likely to slow in the years after 2017. This is, in part, due to the fact that Australia's major mobile network operators are shutting down 2G services,

[2] This report was written by Patrice Braun, Professor, Research & Innovation Portfolio, Federation University Australia, Australia.
[3] ABS 8153.0 - Internet Activity, Australia, June 2017

forcing mobile users to upgrade to 4G speed or higher. More than three quarters of Australians now have a 4G connection with peak headline speeds approaching 100 Mbit/s across parts of the economy, which is much lower than the 360 Mbit/s mobile consumers have on offer in economies like Republic of Korea.

Figure 1. Asia Pacific Economies Internet Speed



Source: www.statista.com/statistics/381388/asia-average-internet-connection-speed-by-country/

The saturation of the smartphone market is a worldwide phenomenon and is most pronounced in developed economies such as Australia. Connected entertainment drives Internet of Things (IoT) spending but there is at present no notable surge in demand for connected home devices. Just under 30 per cent of Australians own Smart TVs or gaming consoles.

It is no surprise that younger mobile consumers are smartphone hungry, 94 per cent of mobile consumers are aged 18-24 old, showing an increase from 91 per cent in 2015 and highlighting the importance this demographic places on being connected and mobile[4]. The average number of hours per week spent on the internet for personal use across all Australians was 10, although averages vary between age groups. The 15-17 years bracket clock up the highest number of average hours per week (18 hours per week) and the 55–64 years and 65 years or over age groups were the lowest at 7 hours per week[5].

[4] Mobile Consumer Survey 2016 – The Australian Cut, Deloitte, 2016

5 https://www.roi.com.au/blog/australian-internet-social-media-statistics-2017

Australians are continuing to demonstrate they are quite comfortable with e-commerce. In 2014–15, 61 per cent – 9.7 million people – purchased goods or services online during a three month period. The most common purchases were music, movies, electronic games or books; followed by clothes, cosmetics and jewelry. While to date the internet retail figures only account for a small percentage of total sales, the online retail market is about to be shaken up with American giant Amazon going live in Australia as of late November 2017. The entry of Amazon may well be the moment when shopping behaviors in Australia swings decisively towards e-commerce with much increased competition for existing retailers. Offering customers an enhanced online shopping experience and competitive pricing across a wide range of products, the online retailer is expected to appeal to price-conscious Australians and the disruption will likely force current retailers to better leverage their relationships with customers.

Despite the substantial uptake of technology, there is still a considerable difference in ICT/smart technology uptake in Australia's major cities (88 per cent) vs. uptake in remote and very remote parts of Australia (79 per cent). The 'digital divide in the bush' remains a major challenge for Australia, particularly when it comes to access to fast broadband.

Australian Business Use of IT

There are no sex-disaggregated data available on the use of ICT and smart technology by Australian enterprises. Available key indicators of business use in IT include internet access, the use of broadband, web presence, social media presence and internet commerce (e.g., the placing and receiving of orders via the internet) are for all businesses regardless of gender or size.

For the first time, a web presence was reported by more than half of all Australian businesses (50 per cent). By industry, Arts and recreation services had the highest proportion of businesses with a web presence (76%), while the Agriculture, forestry and fishing industry had the lowest proportion of businesses with a web presence (12%). More than a third of Australian businesses had a social media presence (38%). The highest proportion of businesses with a social media presence was recorded in the 200 or more persons employed range (81%) followed by SMEs with 20 to 199 persons employed (63 per cent). During the year ended 30 June 2016, over half of all businesses placed orders via the internet (57 %). The proportion of businesses that reported having received orders via the internet was 37 per cent, with income obtained from these orders totaling an estimated $321 billion[6].

[6] ABS 8166.0 - Summary of IT Use and Innovation in Australian Business, 2015-16

Table 1. Business Use of Information Technology, Selected Indicators - 2013-14 to 2015-16

		2013-14	2014-15	2015-16
Estimated Number of Businesses	'000	757	776	799
Businesses with:				
Internet Access	%	94.7	94.8	95.3
Web Presence	%	47.1	48.6	50.1
Social Media Presence	%	30.8	34.0	38.2
Businesses with Internet Access:				
Broadband as the Main Type of Connection	%	99.2	99.2	99.3
Businesses that:				
Placed Orders Via the Internet	%	56.0	55.7	57.0
Received Orders Via the Internet	%	33.2	33.8	36.8
Internet Income	$b	266.8	285.5	321.4

1.2 Current Status of Women Entrepreneurs of Australia

Australian women's labour force participation has increased slightly over the past decade (from 62% to 65% of the population aged 20-74 years), while men's participation has remained largely stable (at around 78%). Although the gap between men's and women's participation rates has narrowed, it is still considerable (13% points at January 2014). Research estimates that closing this gap would boost the level of Australia's GDP by 11 per cent.

The number of Australian businesswomen has grown considerably over the past two decades. Just over a third of Australia's business operators are women (34%), and their numbers are rising[7.] This represents a substantial increase in the number of Australian women running their own business since the turn of the century (a 21.7% increase since 2000, compared to 8.2% for men). Although men are still more likely than women to start their own business, Australian women are increasingly becoming business operators, perhaps to gain economic independence, having trouble re-entering the workforce post bearing children, improve their family's social and economic wellbeing, remain attached to the labour force and better manage their work-life balance[8.]

There is a large, active group of women-led enterprises operating across a variety of industries and markets. These are typically young SME founded within the past four to eight years. These firms

[7] A profile of Australian Women in Business, Report prepared by the Australian Bureau of Statistics for the Office for Women, 2015

[8] ABS, *6105.0 Australian Labour Market Statistics*, July 2012.

have been quick to embrace global opportunities. Over two-fifth (42%) internationalised within 12 months of start-up, and 81 per cent within the first five years. A third of these enterprises (33%) earn more than 50% of their revenue through international sales[9].

While the number of Australian women operating their own micro or SME has steadily increased over the past 20 years, in line with other OECD members they remain substantially under-represented as entrepreneurs. As of June 2016, the number of actively trading enterprises in Australia increased 2.4% from 2015 to a total of 2,171,544 businesses, 60.7% of which had no employees[10]. MSME (micro enterprises are classified under small enterprises in Australia) make up the largest proportion of enterprises in Australia, so despite their under-represented numbers, women entrepreneurs are a significant force in the Australian economy.

Table 2. SME Classification[11]

Enterprise	**Category**	
	By Turnover	**By Number of Employees**
Small	< less than A$2 million	0 – 20 employees
Medium	> more than A$2 million	20 – 199 employees

Source: Australian Bureau of Statistics

Despite the growing numbers of women engaging in entrepreneurship, significant barriers remain, such as access to finance, resources and information. Of all the issues being tracked in regards to barriers experienced by women entrepreneurs, the barrier that has most consistently increased is lack of access to capital. Over 55 per cent of female entrepreneurs rate accessing finance as their biggest challenge. Much like most international women-led enterprises, Australian women entrepreneurs primarily rely on personal savings and reinvested profits to fund expansion.

Internationally, Australia's experience is similar to that of the United Kingdom, where in recent years the number of women in self-employment has been increasing at a faster rate than the number of men (although in both economies men still dominate the sector). In 2012, the OECD found that in Europe and the United States women were under-represented as employers, but the gender gap was smaller for own-account workers (sole operators). In June 2014, employed Australian women were almost half as likely to be employers (4.5% compared with 8.1% of employed Australian men), and two-thirds as likely to be sole operators (6% compared with 9% of employed Australian men). The OECD study also found that the number of women who were employers had remained stable over the last decade, while the number of men who were employers had been slightly

[9] Sammartino, A. & Gundlach, S. (2015). Women, Global Trade and What it Takes to Succeed. University of Melbourne.

[10] ABS 8165, June 2016

[11] Table 2: SME Classification

decreasing. In Australia, this proportion has decreased slightly for both women and men, with the proportion of women employers dropping slightly over the last decade from 5.2% of all employed women in June 2004, and the proportion of men who were employers dropping from 8.9% of all employed men in June 2004[12].

While women have played a significant role in business in Australia for the last several decades, many of their efforts continue to go unrecognised. When it comes to global business development, the role of women is even more undervalued. At a time when international engagement by Australian businesses and entrepreneurs is on the rise, Australian women entrepreneurs represent a valuable but underestimated resource driving greater Australian engagement in the global economy, while receiving minimal support and gathering little attention in media or government reporting. The relatively low profile of entrepreneurial activity among women signals a clear under-utilisation of entrepreneurial human capital in the Australian economy. Until it was folded in 2016, Australia's Women in Global Business (WIGB) program was the only program providing dedicated support to female entrepreneurs wishing to engage in international business, the most common mode of which is exporting goods and services.

Australian women entrepreneurs do not fit the stereotype of young brash entrepreneurs. Rather the female success stories generally are not young women entrepreneurs with 62% are over 50 years of age that go it alone. Thus the women running their own organisations tend to be 'baby boomers' while those in management roles within organisations are, on average, a decade younger[13]. This case study fits that profile.

[12] OECD 2013, 'Gender gaps in entrepreneurship are large and persistent', fact sheet in Entrepreneurship at a Glance 2013, OECD Publishing.

[13] Gundlach, S., & Sammartino, A. (2013). *Australia's underestimated resource: Women doing business globally*. Women in Global Business and University of Melbourne. Retrieved 09/08/14 from https://www.austrade.gov.au/ArticleDocuments/1414/Australias-underestimated-resource-women-doing-business-globally-exec-summary.pdf.aspx.

2. Economy Report of Brunei Darussalam[14]

2.1 Current Status of the ICT Sector of Brunei Darussalam

This report is the first of a three-part project entitled "Women's Economic Empowerment and ICT: Capacity Building for APEC Women Entrepreneurs in the Age of the 4th Industrial Revolution", authorized by Asia Pacific Economic Cooperation (APEC) Secretariat under the theme of 2017 APEC "Creating New Dynamism, Fostering a Shared Future".

This report presents a brief background on the status of ICT technology and women entrepreneurs in Brunei Darussalam and details an interview with a Brunei Darussalam woman ICT entrepreneur on how she started her business, the characteristics, success factors, challenges faced and her recommendations and advice for women entrepreneurs and startups.

A Brief on Brunei Darussalam

Brunei Darussalam, or Negara Brunei Darussalam meaning 'Abode of Peace', is a sovereign economy located on the north coast of the island of Borneo in Southeast Asia. With geographic coordinates 4.5353°N 114.7277° E, Brunei Darussalam consists of four districts spanning over a total area of 5,765 square kilometers.

Brunei Darussalam's population stood at 422,678 in 2016[15] with an annual growth of 1.4%, comprising 216,832 (51%) males and 205,846 (49%) females. The bulk of the population is at the most economically active age groups between 15 to 64 years old at 71.8% while 22.3% are below 14 years old and 5.9% are 65 years old and beyond. The male-female ratio is fairly distributed across all age groups. The majority of the population lives in the Brunei-Muara district where the capital, Bandar Seri Begawan, also lies.

The main ethnic groups are the Malays and Chinese. The Malays make up nearly two-thirds of the population (65.7%) which includes ethnic Malays and a number of indigenous groups, namely the Dusun, Belait, Kedayan, Murut and Bisaya. The Chinese make up about one-tenth of the population (10.3%) while the remaining 24% comprise other indigenous groups and temporary workers.

The official religion of Brunei Darussalam is Islam and its official language is Malay. Its main exports are crude oil and liquefied natural gas which contribute around 52% to GDP followed by

[14] This report was written by Sophiana Chua Abdullah, Researcher, Center for Strategic and Policy Studies, Brunei Darussalam.

[15] http://www.depd.gov.bn/SitePages/Population.aspx

the services industry, such as business, wholesale and retail trade, education, water transport and health services, at 42%[16].

Brunei Darussalam's Status on ICT/Smart Technology

Brunei Darussalam continues to make improvements in the ICT sector in terms of infrastructure, use and skills. In the recent ITU measure of the 2017 ICT Development Index[17], Brunei Darussalam ranks 53 out of 176 economies. ICT contribution to GDP shot from 1.9% in 2015 to 3.5% in 2016 at BND$291million, despite a slowing down of the overall economy of Brunei Darussalam from -0.4% in 2015 to -2.5% in 2016[18].

The ICT sector can be broken down, but not limited, to the following activities:

- Publishing activities**,** including publishing of books, periodicals and software publishing;
- Motion picture, video and television programme production, sound recording and music publishing activities;
- Broadcasting and Programming Activities including radio broadcasting, television broadcasting and subscription programming;
- Wired and Wireless telecommunication activities, satellite and other telecommunication activities;
- Computer programming, consultancy and related activities; and
- Information service activities including data processing, hosting, web portals, news agency activities.

In line with meeting the goals of Vision 2035, that is, to aim for a highly skilled society enjoying a high quality of life amidst a dynamic and sustainable growth structure, the need to leverage on ICT technologies to meet these goals become more important than ever before. The Brunei Darussalam National ICT White Paper[19] by the Authority for Info-communications Technology Industry (AITI) laid out the economy's digital strategy for 2016-2020 to harness on ICT for economic and social development of Brunei Darussalam. AITI also formulated a National ICT Master Plan 2014[20] which identified strategic goals as important proxies to the proposed strategic target of 1,800 additional jobs from 4200 to 6000 jobs by 2020: making ICT as an attractive career option for Bruneians; developing highly skilled ICT professionals with industry relevant

[16] http://www.depd.gov.bn/DEPD%20Documents%20Library/DOS/BDSYB/BDSYB_2016.pdf (pp.xxix, xxx)

[17] http://www.itu.int/net4/ITU-D/idi/2017/index.html

[18] http://www.depd.gov.bn/DEPD%20Documents%20Library/DOS/GDP/2016/GDP_Q42016.pdf (p.8)

[19] https://www.aiti.gov.bn/downloadables/Downloadables%20Library/National%20ICT%20WhitePaper.pdf

[20] https://www.aiti.gov.bn/downloadables/Downloadables%20Library/National%20ICT%20ManPower%20MasterPlan.pdf

competencies; and creating a vibrant ICT industry in Brunei Darussalam as a source of employment.

AITI, through its publication of the National ICT White Paper[5] and ICT Household Survey 2016[21], also provided a snapshot of the status of ICT/Smart technology in Brunei Darussalam with the following indicators:

- Mobile penetration: 114%
- Mobile Internet penetration: 86%
- Fixed Broadband penetration: 46%
- ICT Development Index (2015): 71st place out of 167 economies
- Household with computers: 83%
- Household access to internet: 75%
- Households with both fixed and mobile broadband access: 9%
- Top 3 most popular social media applications used: Facebook, Instagram and Twitter
- Top 3 most popular messaging applications used: WhatsApp, Skype and Telegram

AITI is currently carrying out an e-Commerce survey[22] to study consumer attitudes and behaviors towards e-Commerce in Brunei Darussalam. With this study, it aims to formulate plans and regulatory framework to promote the effective use of the internet and e-Commerce, in particular to increase consumer confidence in making transactions, shopping and trading online.

In terms of commerce, international indicators have also shown Brunei Darussalam's improved standing. In the Ease of Doing Business index[23,24], Brunei Darussalam now ranks 56th place worldwide where the World Bank's Doing Business 2018 Report names Brunei Darussalam as the most improved economy in the world for the third consecutive year, in terms of making doing business in the member economy easier[25].

In terms of Global Competitive Index, the World Economic Forum (WEF) 2017-2018 Report[26] positions Brunei Darussalam at 46 out of 137 economies and is considered the most improved in

[21] https://www.aiti.gov.bn/downloadables/Downloadables%20Library/Household%20ICT%20Survey%202016%20Report.pdf.pdf

[22] https://docs.google.com/forms/d/e/1FAIpQLSdK3BkKszzse86UQBfRVvI4iFqZCv13o-keptpvH6qPtIk7Qw/viewform

[23] http://www.doingbusiness.org/~/media/WBG/DoingBusiness/Documents/Annual-Reports/English/DB2018-Full-Report.pdf

[24] http://www.doingbusiness.org/data/exploreeconomies/brunei

[25] http://business.gov.bn/SitePages/The%20Ease%20of%20Doing%20Business.aspx

[26] http://www3.weforum.org/docs/GCR2017-2018/05FullReport/TheGlobalCompetitivenessReport2017%E2%80%932018.pdf

ASEAN after jumping 12 places to enter the top 50 of Global Competitiveness Index[27,28]. Competitiveness is defined as the set of institutions, policies, and factors that determine the level of productivity of an economy, which in turn sets the level of prosperity that the economy can achieve. It is measured by the twelve pillars which capture concepts that matter for productivity and long-term prosperity such as institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation.

To help address the gaps and improve the business ecosystem, DARe (or Darussalam Enterprise)[29] was set up in 2016 as a lead agency in Brunei Darussalam for the development of micro-, small- and medium-sized enterprises (MSMEs). DARe works closely with the Ease of Doing Business (EODB) Unit under the Energy and Industry, Department at the Prime Minister's Office to help improve Brunei Darussalam's performance for the World Bank's Ease of Doing Business Index. It supports entrepreneurs by providing training and development to build capacity of local MSMEs, access to financing and markets for MSME growth, quality & ready-built facilities for business expansion and advisory services via their Business Support Centre. DARe has identified the following as the main challenges faced by Brunei Darussalam aspiring entrepreneurs:

- Access to financing;
- Access to affordable commercial sites;
- Lack of business knowledge;
- Lack of capable manpower; and
- Access to markets locally, regionally and internationally.

A step towards understanding the business climate in Brunei Darussalam was the setting up of an Online Business Reporting[30] platform where all companies in Brunei Darussalam are required to channel their business data and performance reports through the portal. This initiative is a collaboration between the Energy and Industry Department, Prime Minister Office (EIDPMO) with the Department of Economic Planning and Development, E-Government National Centre and Darussalam Enterprise (DARE) with the support from the other Government agencies.

[27] http://www.bizbrunei.com/brunei-jumps-12-places-enter-top-50-global-competitiveness-index-wef/

[28] https://borneobulletin.com.bn/brunei-jumps-12-places-in-global-index/

[29] http://www.dare.gov.bn

[30] http://www.business.gov.bn/SitePages/OBR.aspx

Table 3. Brunei Darussalam Workforce by Sector, Gender, Job Type (Owner, Full-time, Part-time) 2011

INDUSTRY GROUP	OWNER			FULL-TIME WORKER			PART-TIME WORKER			% of Female Owners	% of Female Full-Time Workers	% of Female Part-Time Workers
	Male	Female	Total	Male	Female	Total	Male	Female	Total			
Agriculture, Forestry and Fishery	110	52	162	1,267	204	1,471	71	50	121	32%	14%	41%
Mining and Quarrying	16	10	26	3,997	1,227	5,224	22	5	27	38%	23%	19%
Manufacturing	305	224	529	4,545	2,532	7,077	395	186	581	42%	36%	32%
Electricity,Gas,Water Supply and Other Industrial Activities	11	6	17	241	8	249	14	3	17	35%	3%	18%
Construction	673	186	859	18,450	1,682	20,132	1,659	69	1,728	22%	8%	4%
Wholesale and Retail Trade	1,185	641	1,826	12,444	7,497	19,941	493	490	983	35%	38%	50%
Accomodation and Food Service Activities	215	183	398	4,707	3,989	8,696	200	269	469	46%	46%	57%
Transportation and Storage	133	38	171	3,374	1,206	4,580	149	72	221	22%	26%	33%
Information and Communication	**55**	**23**	**78**	**1,271**	**868**	**2,139**	**100**	**28**	**128**	**29%**	**41%**	**22%**
Financial and Insurance Activities	55	31	86	1,203	1,886	3,089	54	139	193	36%	61%	72%
Real Estate Activities	27	18	45	328	238	566	37	27	64	40%	42%	42%
Professional,Technical,Administrative and Support Services	334	142	476	8,004	2,464	10,468	188	102	290	30%	24%	35%
Education	52	61	113	679	2,073	2,752	77	184	261	54%	75%	70%
Human Health and Social Work Activities	34	8	42	150	435	585	15	22	37	19%	74%	59%
Other Services Activities	129	107	236	1,159	1,195	2,354	61	39	100	45%	51%	39%
	3,334	**1,730**	**5,064**	**61,819**	**27,504**	**89,323**	**3,535**	**1,685**	**5,220**	34%	31%	32%

Source: 2011 Economic Census of Business Enterprises by the Brunei Darussalam Economic Planning and Development Department (JPKE)

2.2 Current Status of Women Entrepreneurs of Brunei Darussalam

The Global Gender Gap Report 2017[31] benchmarks 144 economies on their progress towards gender parity across four thematic dimensions: Economic Participation and Opportunity, Educational Attainment, Health and Survival, and Political Empowerment. Brunei Darussalam ranked 102th out of 144 in the global rankings. In the rankings by sub-indices, Brunei Darussalam ranked 61th under Economic Participation and Opportunity, 78th under Educational Attainment, 111th under Health and Survival, and 140th under Political Empowerment.

In terms of income disparities, the Labour Force Survey 2014 Report[32] by the Brunei Darussalam Economic Planning and Development Department (JPKE) indicated that at the economy's level, males are on average paid more than females at BND1958 per month for males and BND1650 per month for females. This is consistent across all industry groups with the exception of ICT, construction, accommodation and food service activities, public administration, human health and social work activities. For example, in the ICT industry, the average monthly income for females is higher at BND2080 than it is for males at BND1739.

The 2011 Final Report of the Economic Census of Business Enterprises[33] by the Brunei Darussalam Economic Planning and Development Department (JPKE) covers all registered enterprises in the member economy and contains key information relating to economic activities undertaken by enterprises during the reference year 2010. The data from the census is used in the compilation of the economy's accounts, particularly in the estimation of the Gross Domestic Product (GDP). This census does not cover the informal economy which consists of a diversified set of economic activities and unregistered enterprises that is not regulated or protected by the member economy. This implies that the size of ICT or ICT-related enterprises of the informal economy of Brunei Darussalam might be bigger than is documented.

In a coffee table book by B2B Magazine, entitled 'Entrepreneurship Rising – The Brunei Darussalam Edition 2017', it is encouraging to note a good number of young entrepreneurs taking the bold step to find their niches and create their businesses in ICT and non-ICT areas. However, it is observed that women-owned MSMEs are often of a smaller scope and scale compared to enterprises owned by men. This pattern is consistent across ASEAN members, as noted by 2017 OECD Report on women entrepreneurship[34].

[31] https://www.weforum.org/reports/the-global-gender-gap-report-2017

[32] http://jpke.gov.bn/DEPD%20Documents%20Library/DOS/Labour%20force%20survey_KTK/ES_LFS_2014.pdf (p.182)

[33] http://jpke.gov.bn/DEPD%20Documents%20Library/DOS/Economic%20Census/2011/final%20report/FINAL%20REPORT%20BE%202011.pdf

[34] http://www.oecd.org/southeast-asia/regional-programme/Strengthening_Womens_Entrepreneurship_ASEAN.pdf

Table 3 shows the Brunei Darussalam workforce by industry, gender, job type, drawn from the 2011 Economic Census of Business Enterprises[19]. A total of 5,566 registered enterprises were covered in the census with a workforce of 99,607 employees which includes owners, full-time and part-time employees. Small and medium enterprises (SMEs) made up 97.5% of the total number of active enterprises, where 65.1% or 3,623 enterprises are small, 32.4% or 1,804 are medium-sized enterprises and a mere 2.5% or 139 enterprises are large-sized enterprises.

In the ICT industry, there are 2,345 employees, consisting of owners, full-time and part-time workers, which make up only around 2.35% of the total workforce in Brunei Darussalam business enterprises. Owners of business enterprises, classified as working proprietors or active business partners, make up 3.3% of the total workforce in the ICT industry while 91.2% are full-time and 5.5% are part-time workers.

Females make up 29% or 909 of the 2,345-strong workforce in the ICT industry. Out of the 78 owners of ICT business enterprises, only 29% are women owners or entrepreneurs. Out of 2,139 full-time employees, around 41% or 868 females working full-time and out of 128 part-time employees, 22% or 28 females work part-time.

The proportion of women owning ICT or ICT-related enterprises at 29% is below the economy's average of 34% and ranks 12th out of 15 industry groups, overtaking only human health and social work activities (19%), transport and storage activities (22%), and construction (22%). The proportion of full-time female workers at 41% is above the economy's average of 31% and ranks 7th out of 15 industry groups while the proportion of part-time female workers at 22% is below the economy's average of 32% and ranks 12th out of 15 industry groups.

3. Economy Report of Canada[35]

As the information, communication and technology (ICT) sector continues to grow and expand around the world, Canada strives to maintain its position in an ever-growing and prominent tech economy. In order to maintain this position, Canada is attempting to be more productive and innovative within this sector (Lamb & Seddon, 2016). According to the Council of Canadian Academies, "innovation drives an economy's ability to create more economic value from an hour of work, thereby increasing economic output per capita. The resulting productivity growth creates the potential for rising wages and incomes, and thus a higher standard of living" (Nicholson et al., 2013, p. xi). However, according to the Organisation for Economic Co-operation and Development (OECD), Canada ranks only 20 out of 29 international economies in the amount of value added by the ICT sector to economy's income (OECD, 2015). Therefore, Canada has much room for improvement in order to be a global leader in the ICT economy while ensuring that the total Gross Domestic Product (GDP) for Canada is growing steadily from this sector. In order to achieve this goal, the Canadian government, institutions and society should focus more on the inclusion of female entrepreneurs and female success within the ICT sector. This report will focus on the current Canadian landscape of the technology industry concerning female entrepreneur involvement, participation, success, and barriers to entry.

3.1 Current Status of the ICT Sector of Canada

As of 2016, the technological sector of Canada contributed approximately $117 billion to the total GDP, representing 7.1%. This represented a lower percentage of GDP behind the real estate, manufacturing, mining and construction sectors; and a higher proportion than the finance and insurance industries (Lamb & Seddon, 2016). The technological sector can be further broken down into six subgroups and each represent a proportion of the 7.1% to the total GDP. These subgroups include, information and communication technology (61.2%), architecture, engineering and design (18.4%), chemical and pharmaceutical manufacturing (6.9%), aerospace (6.1%), scientific research and development (3.9%), and machinery and specialised manufacturing (3.5%; Lamb & Seddon, 2016).

Across Canada, there are approximately 71,000 technology sector firms, of which are employing over 864,000 Canadians, representing 5.6% of total employment. In addition, the technology sector employees earned an average annual salary of $67,000, compared to the Canadian economy's average of $48,000 in 2016 (Lamb & Seddon, 2016).

[35] This report was written by Veronika Moulton, Research Consultant, Institute of Education, University College London, Canada.

The Canadian government also continues to invest more money into digital learning in order to improve technology sector outcomes. The Ministry of Finance 2017 Budget proposed providing $50 million over two years to starting initiatives that will provide digital learning for boys and girls from kindergarten to grade 12. An additional $29.5 million was proposed over five years for a new Digital Literacy Exchange program (Government of Canada, 2017). Promoting science, technology, engineering and mathematics (STEM) has also been an important mission of the Canadian government. This is shown through their investment in PromoScience programs and by rewarding more STEM teachers. Another $950 million over five years will be invested on a competitive basis to support a small number of business-led innovations that have the greatest potential to accelerate economic growth and ideally enhance Canada's global competitiveness in highly innovative industries (Government of Canada, 2017).

The Canadian government has also proposed a new approach to supporting Canadian entrepreneurs and innovators. They are working to make it easier for entrepreneurs in ICT to access and benefit from governmental programs by reducing the amount paperwork required, giving more timely and relevant services, and investing more money into Canadian entrepreneurs. To ensure this progression, Innovation Canada, a new sector of the ministry, will be established in order to lead the creation of economic growth strategies and initiate a review of business innovation programs (Government of Canada, 2017).

3.2 Current Status of Women Entrepreneurs of Canada

In Canada, female entrepreneurs are thought to be a relatively untapped resource for economic growth. A Royal Bank of Canada (RBC) economics report found that female owned small and medium-sized enterprises (SMEs) contributed $148 billion to the economy in 2011. They also estimated that over the next decade this contribution would increase by 10% to an estimated $198 billion (RBC Economics, 2013b). However, a 2017 McKinsey report found that if female entrepreneurs were as equally as supported as male entrepreneurs, Canada could add an addition $150 billion in incremental GDP by 2026 or 0.6% increase in annual GDP growth (Devillard et al., 2017). This could also be represented as an additional 6 million jobs in North America over the next 5 years ("SheEO," 2017). This report also argues that at Canada's current rate to gender parity, it will take around 180 years to reach gender equality; therefore more significant action must be taken to reach Canadian gender goals (Devillard et al., 2017).

Female entrepreneurship has also been found to make a meaningful contribution not only to the economy but also to social spaces; these benefits include an increased economy's wellbeing and competitiveness; improved women's employability, gender empowerment and equality; and several benefits to the future generations as women entrepreneurs' invest more money into their

children's health and education (Saifuddin & Beckton, 2015). Businesses with more females have also been found to have less of a 'group think' mentality which results in a positive effect for the business team and improved innovation (MakePossible, 2017). Additionally, longitudinal studies have found there is a significant correlation between promoting females into executive positions and an increases in profit (Adler, 2009).

The number of female owned businesses in Canada has risen by 23% from 2001 to 2011, where male owned businesses only realised a 14% growth during the same timeframe (Saifuddin & Beckton, 2015). As of 2012, there were 950,000 self-employed females, representing 35.6% of all self-employed persons (RBC Economics, 2013a). A comparison of performance between female and male-owned SMEs has also been conducted in Canada. In this report, research found that profit per employee was less for female owned SMEs in 2011 but had no statistical difference as of 2014 (Statistics Canada, Centre for Special Business Projects, Rosa, & Sylla, 2016). This study also noted that female businesses tend to lag behind their male counterparts because of the industries in which they operate. For instance the majority of female businesses are concentrated in retail sales and services which tend to be characterised by small initial investments, and have lower growth rates compared to male concentrated business industries (Statistics Canada et al., 2016).

Demographically, female SMEs are distributed well across all of Canada, with the majority in Ontario (30.6%), Atlantic Canada (19.9%), Quebec (17.5%), British Columbia and Territories (14.8%), and Alberta (13.9; Beckton & McDonald, 2016). Of these SMEs, this study found that 19.1% of businesses were 2 years or younger; 17.1% were between 3-10 years, 16.8% between 10-20 years, and 13.5% were established over 20 years ago. Additionally, of these businesses, 17.4% had less than 5 employees, 14.7% had between 5-19 employees; 10.1% had between 20-100 employees; and only 4% had over 100 employees (Beckton & McDonald, 2016). Therefore, based on this data it is evident that the majority of female owned businesses are still in the early stages of development and therefore can only employ a more minimal amount of staff.

However, when looking solely at ICT companies, female entrepreneurs only represent 5% of companies and 13% of companies have a female or female and male co-founders; and only 5% of ICT companies have a female Chief Executive Officer (CEO; Move the Dial, PWC, & MaRS, 2017). Additionally, this report found that 53% of ICT companies have no women executives, 73% have no presence of women on their boards, and only 30% of venture capital firms have a female partner.

4. Economy Report of Chile[36, 37, 38, 39, 40]

4.1 Current Status of the ICT Sector of Chile

Chile has a population close to 18 million, 89 percent urban, population growth rate less than one percent and life expectancy is 80 years. Chile is today one of South America's most stable and prosperous economies, with a high-income economy and high living standards. It leads Latin American economies in rankings of human development, competitiveness, income per capita, globalization, and state of peace, economic freedom and low perception of corruption. It also ranks high regionally in sustainability of the state and democratic development. Chile is the only South American member of the Organization for Economic Cooperation and Development OECD (2010).

Currently in Chile, only around 0.6 % of the Gross Domestic Product GDP is invested in Science and Technology research, which is small in comparison to developed economies in which this number rises to about 2 - 3%. One of the main reasons for these low numbers is the little participation of private funds in science and technology R & D funding.

Currently, the Information and Communications Technology, ICT, industry in Chile represents 1.4% of the GDP. Although a somewhat low number, it must take into account that it is greatly influenced by the fact that very few physical ICT goods are produced in Chile. Another important factor in this number is the low participation of the state, given that, even though the state represents about 22% of the GDP, it consumes only a 6% of the ICT market.

State's funds may be invested in science and technology through three Institutions: CONICYT (www.conicyt.cl); CORFO (www.corfo.cl) and MIDEPLAN (www.mideplan.cl).

CONICYT was created in 1967 as an advisor entity for the government in science and technology matters. Its main responsibilities include defining science and technology policies, promoting and funding research, supporting the formation of human resources, supporting international cooperation on research, etc. Although, in the last decade, its contribution to financing research has grown in about seven time, Chile still need a better mechanism, to draw more private funds

[36] This report was written by Ansonia Lillo Tor, President, University Santo Tomás, Campus Arica, Chile.

[37] https://www.indexmundi.com/chile/demographics_profile.html

[38] https://www2.deloitte.com/content/dam/Deloitte/au/Documents/public-sector/deloitte-au-ps-social-progress-index-executive-summary-2015-90415.pdf

[39] https://web.archive.org/web/20090212140250/http://hdrstats.undp.org/indicators/25.html

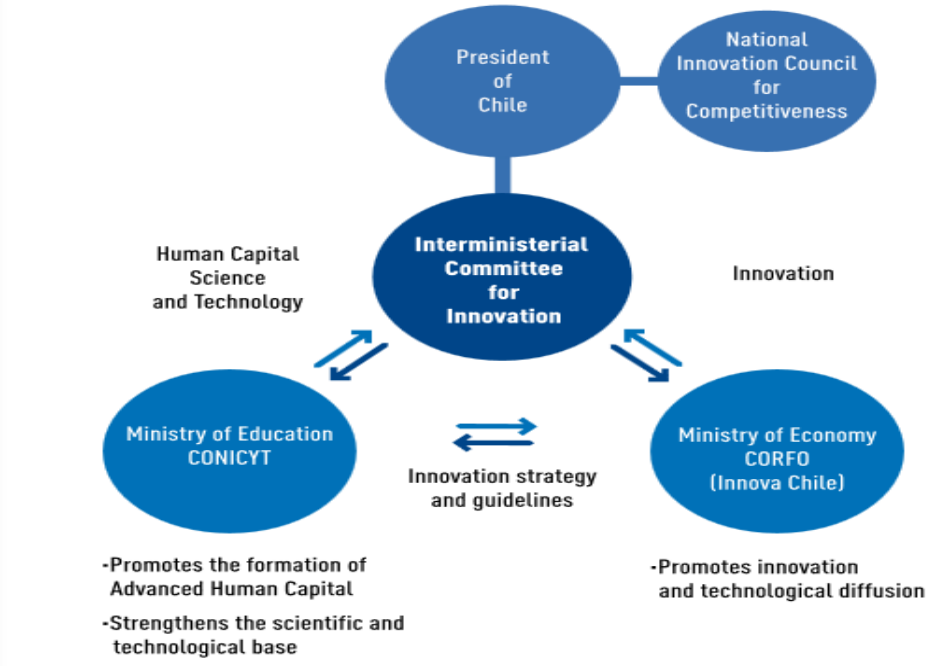
[40] http://sccc.cl/wp-content/uploads/2013/04/Information-and-Communication-Technology-in-Chile.pdf

into research activities and reach a funding scheme similar to that of developed economies, in which most of the spending is done by private enterprises.

Highlights from the OECD Science, Technology and Industry Scoreboard 2017 - the Digital Transformation: Chile Science, Innovation and the Digital Revolution[41, 42]

- Chile was amongst the OECD members with the most rapid adoption of mobile broadband subscriptions per inhabitant between 2010 and 2016.
- 75% of urban households in Chile have a broadband connection and, while rural coverage is lower at 56%, it increased by 20% between 2012 and 2015, nevertheless Chile has one of the greatest urban-rual divide in broadband access.
- The proportion of people in Chile using the internet almost doubled between 2009 and 2017, reaching 78% amongst those age 16-74; the digital divide between old and young is high: almost all aged 16-24 (98%) use the internet, but only 41% of 55-74 year olds do so (OECD average 63%).

Figure 2. The Economy's Innovation System in Chile



[41] http://www.oecd.org/chile/sti-scoreboard-2017-chile.pdf

[42] http://www.oecd.org/sti/scoreboard.htm

- From 2010 a 2016, Chile experienced net employment gains of almost 1 million jobs, a 14% increase; all sections of the economy contributed to employment growth.
- Domestic manufacturing activities in 2014 were a major source of value added in total exports (about 30%) for Chile, similar to China, Germany, Japan and Korea.
- Chile's tercetiary education spending accounted for 2% of GDP in 2015, the fourth highest proportion among OECD members; vocational education spending of 0.3% of GDP is, however, lower than the OECD average (0.5%).
- The median job in Chile had relatively low ICT task intensive in 2015, less than the intensity of an average job in Norway.
- Experimental indicators on the international mobility of scientific authors, based on bibliometric data, show that Chile has become increasingly attractive to international scientific authors, resulting in a net inflow of around 1330 authors between 2002 and 2016.
- In Chile around one of every thousand persons in employment is a researcher, up from 2005 (0.9) but below the OECD average of eight researchers per thousand workers. Gross Domestic expenditure on R&D is the lowest in OECD, at 0.38 of GDP (OECD average 2.4%).

In the world, the ICT sector is rapidly growing, creating around 120,000 jobs every year, yet due to differences in demands and skills, and despite soaring unemployment, there may be a lack of 900,000 skilled ICT workers in 2020. Women constitute just 30% of the around seven million people working in the ICT sector and female graduates of computing or related degrees are alarmingly low.

In order to reverse this trend and in turn boost the economy through allowing full participation in society, there must be a joint effort to encourage young people, and especially women, to take up ICT related career paths. Entrepreneurship, research and innovations, they can be done through education.

4.2 Current Status of Women Entrepreneurs of Chile[43, 44, 45, 46, 47, 48]

[43] http://www.unric.org/en/latest-un-buzz/30156-technology-is-booming-but-where-are-the-women

[44] https://www.itu.int/en/ITU-D/Digital-Inclusion/Women-and-Girls/Girls-in-ICT-Portal/Pages/Portal.aspx

[45] http://www.scielo.cl/scielo.php?pid=S0718-27242010000100009&script=sci_abstract&tlng=en Implications of Gender in the Information Society: An Analysis from the Determinants of Internet Use in Chile and Mexico.

[46] http://negocios.udd.cl/gemchile/files/2017/07/REPORTE-2016-UDD_baja.pdf

[47] http://www.girlsintechchile.com/

[48] https://americas.thecisconetwork.com/site/content/lang/es/id/5608

In 2015, around 20% of tertiary graduates in Chile especialised in natural sciences, engineering and ICTs; women represented 18% of the graduated in these fields (OECD average 31%).

Various studies present the gender differences in "*Internet use"* for some Latin American economies. One of these papers, a model of interaction effects applied to Mexico and Chile, in its main finding suggests that the positive effect of the income on the probability of use of Internet is greater for men than for women. This is one of the first papers that shows the status of gender indicators, and "Internet use", in the region. Additionally, this is the first empirical validation of gender gaps given by using models based on information from ICT households' surveys of Mexico and Chile.

The Girls in ICT movement is gaining momentum all over the world, as different organizations are uniting in a call for action to fix the ICT gender imbalance. According with "Non-profit organization Girls in Tech in Chile", only 5% of women work in technology. Besides only 5% of technological entrepreneurship are leaded by women.

Chile has implemented several initiatives by focusing on incorporating ICT into women's lives, especially for mothers and for women in vulnerable sectors.

Another important initiative is identifying and promoting good practices and lessons learned on the ways women and girls are using ICT. Ideas as "Girls in ICT Day", that it is development in Chile since 2012, must continue[49, 50].

As Economic Commission for Latin America and the Caribbean ECLAC showed in a recent paper, that ICT *per se* does not have anything on them that might keep women and girls from using it in developing countries. Notwithstanding, women continue to be discriminated in many other aspects of social life, including employment, literacy and income. These inequalities also throw their shadows on ICT usage. However, once having access to ICT, this vicious circle can be turned into a virtuous circle, whereas the identified positive attitudes of women toward ICT enable them to circumvent and fight existing inequalities. [51, 52]

[49] https://americas.thecisconetwork.com/site/content/lang/es/id/5608

[50] http://www.paisdigital.org/PD/tag/mujeres-en-las-tic/

[51] https://www.cepal.org/socinfo/noticias/paginas/0/30390/newsletter16ENG.pdf

[52] http://www.comunidadmujer.cl/2017/04/ingeniosas-2017-comunidadmujer-y-girls-in-tech-reuniran-a-2-000-ninas-en-torno-a-la-ciencia-y-la-tecnologia/

5. Economy Report of People's Republic of China[53]

5.1 Current Status of the ICT Sector of People's Republic of China

The Policy System Has Been Accelerated and the Industrial Scale Has Been Rapidly Growing

Innovation and industrial development of smart technology are highly valued in China. China is making efforts to keep pace with the global speed with the rapid growth of the global smart technology industry, no matter in the field of ICT and other subdivision fields like AI for instance. China has also promulgated policy documents on promoting smart technological innovation and industrial development based on the action plans of Made in "China 2025" and " Internet plus" as the United States and Britain have successively launched strategic plans to promote industrial development. "13th Five-Year Plan for the Strategic Emerging Industries Development" released by State Department also mentions that we need to foster the industrial ecology of smart technologies to promote the popularization and application of smart technologies in key economic and social areas.

Driven by both technological breakthroughs and application requirements, the new technology has rapidly increased its industrialization level to various fields in the industry. As software and Internet technology continue to advance in all walks of life, the related industries such as cloud computing, large data and Internet of Things are continuously being improved, which will make the market scale of the smart technology industry continue to expand. As a result, specialized and intelligent services for various industries can create new market space and is expected to create a group of new industry leaders.

Breakthroughs Have Been Made in Key Technologies and the Main Structure Has Been Continuously Evolving

As the awareness of smart technology continues to increase, collection of a large number of social capital and intellectual and data resources will continue to drive the research on technology go to next stage. On the one hand, the related core technologies continue to move forward under the joint promotion of major science and technology companies such as Baidu and key universities such as Peking University and Tsinghua University; on the other hand, related supporting technologies are also being transformed from scientific experiments to industries in the period of application, the Internet of Things technology with the data collection as the main direction will be more mature. The breakthrough of these technologies will promote each other's development and promote the following evolution of smart technologies.

[53] This report was written by Dr. Xu Li, Founder of Beijing Oriental HG, Founding Secretary General of China Female, VC Alumni Association, Beijing Oriental HG Venture Capital Co., Ltd, China.

As the innovation of technology is still in an active phase, the industrial development space is still large and the development direction is diversified. The main structure of industrial development will continue for some time in the future. The innovative subjects and the entrepreneurs who go deeper in this game, meet each other and build new cooperation model during this process, they become a new emerging force for the evolution. This evolution will continue to trigger opportunities and challenge the growth of traditional businesses.

With a large number of scientific research forces transferred from colleges and universities to key enterprises, the future of science and technology enterprises will be further strengthened in the intelligent technology innovation in the dominant position, the formation of enterprises and universities and other scientific research institutions, supplemented by the main body of intelligent innovation.

The core value of intelligent technology lies in the integration, including the integration with industry technologies and the integration of application scenarios. With the open source technology of smart technology, the leading players in major industries are expected to speed up the grasping of basic technologies and rely on the accumulated industry data resources to realize the integration and innovation of smart technologies and their own businesses. Meanwhile, it is expected to converge on a new integrated smart platform where new products and new formats will bring new force to our industrial development.

The Industry Application Has Been Continuously Deepened, and the Impact Has Been Greatly Enhanced

The significant spillover effect of smart technology will lead to continuous improvement in other related fields and will also promote the overall breakthrough in the transformation and upgrading of traditional industries and emerging industries. Diverse applications include education, finance, transportation, healthcare, sports, entertainment, public administration and other related fields.

Seeing form the industrial angel, the manifestation of the value of intelligent science and technology includes not only the economic growth brought by the development of its own industries, but also includes the supportive value of the development of other industries from the perspective of industrial development. It will change people's mode of production and way of life and profoundly affect the member's economic and social development. All these are the crucial links of the whole progress, they influence each other and support each other.

Still, seeing from comprehensive way, China's smart technology is still in its early stages, and its application scenarios are constantly being enriched. There are still bottlenecks in the technical level that need to be overcome.

5.2 Current Status of Women Entrepreneurs of People's Republic of China

Women Entrepreneurs and Startups

In the statements of "women entrepreneurs" and "women startups", some feminists showed their objection to such additional attention, they refused to label gender because the concept of women was highlighted. With a shift in social development and social values, we can see things from a neutral way, for most of the time the minority will attract more attention only because they are the minority. In the group of entrepreneurs and startups, women are less than men, the minority is the main reason for the gender label. And this label got positive value which cannot be ignored.

Social differences in roles and social division of labor for men and women are based on the physical basis of gender. When a woman leave her family and set up a new one, when a woman give birth to her baby and welcome the new family member, the life structure of individual woman is slowly undergoing major changes. The prevailing social expectation is to expect women to focus more on their own family or to maintain a balance between work and life. Women need to be responsible for a relatively large intra-household division of labor and she needs to devote more time and effort in a more direct way as she becomes a mother, she need to spend more spirit from the time their children are born to the time they grown up. This social expectation is consistent with the fact that children seem to be more attachment to their mothers in their early childhood.

In fact, women professionals are different from men. We need to know that there are differences between men and women in terms of social division of labor, social psychology, social resources, education and training, and income gaps. So whether women are out of their personal will or family needs to choose to begin their own career. Whether she is working relatively easily or as busy as a male professional, she suffers from the needs of the family and public opinion under the same conditions. On this basis, for a female entrepreneur, there will be another leap forward for her to change her identity from female professionals to female entrepreneurs.

At this time, naming the group as such gender labels, whether in term of female entrepreneur or female startups can be seen as a warm consideration for this group.

Group Characteristics about the Female Entrepreneurs in People's Republic of China

At present, the proportion of Chinese women entrepreneurs is about 25% of the total number. The scale of the enterprises of women entrepreneurs is continuously expanding, the quality is constantly improving, and the overall trend of developing shows that more and more younger generation join in.

In terms of scale and attributes, the overwhelming majority of female entrepreneurs belong to the category of private-owned enterprises. The overall size of the enterprises is small but the overall development is on an upward trend.

In the assessment of the satisfaction of Chinese female entrepreneurs in their job satisfaction, 70% were satisfied and less than 2% were unsatisfied which show a good overall indicator.

Talking about the working style of female entrepreneurs, they work hard, mental endurance and tenacity, they got their ability to deal with pressure.

To see from the perspective of the female entrepreneur's management style, the unique gender characteristics of women make the day-to-day management of women entrepreneurs more emotional, showing good communication skills, keen insight, delicate emotion, flexibility and inclusiveness.

With the development of the times, women entrepreneurs in the new era are more likely to gain the advantage from both gender. They will retain those of their own gender characteristics such as keen insight, a better way of communication, at the same time they will get stronger in some other characteristics which may have been considered masculine features such as logical rigor, macro strategic thinking skills and so on.

With the development of China's economy, the contribution of Chinese women entrepreneurs in China's social economy has been growing with increasing influence.

Group Characteristics about the Female Startups in People's Republic of China

Women choose to start businesses in more diversified ways and cover a wider range of industries. According to relevant surveys conducted in 2016, women entrepreneurs are more concentrated in the internet, services, finance and foreign trade sectors as well as in life sciences, new agriculture, automobile, environmental protection, consulting and some other fields. A new generation of female entrepreneurs has also begun to enter the male-dominated area even in hardware technology industry.

The survey shows that the driving force of women's entrepreneurship is more pragmatic. Common motivation is family business heritage, a breakthrough personal career bottlenecks, the driving force of fun and value, social responsibility and so on. They may be more value-oriented, they care more about the growth in the entrepreneurial process.

At present, among the difficulties and obstacles faced by women's entrepreneurship, the potential prejudice of male-dominated business world, the traditional concept that women need to take care of their families and the dual pressures from working families are still the top three.

The female entrepreneurs hope to improve the ability of the main strategic capabilities of the macro, such as psychological quality of self-confidence and resilience, network and resource integration capabilities, sustained entrepreneurial momentum, learning ability and sociability.

6. Economy Report of Hong Kong, China[54]

6.1 Current Status of the ICT Sector of Hong Kong, China

The overall purpose of this research case study is to help inform policymakers and female business owners from APEC Economies of current entrepreneurial trends pertaining to the 4th Industrial Revolution. The focus economy of this case study is Hong Kong, China and will feature two successful female entrepreneurs and their startup journeys. More details about the founders and their businesses will be detailed in later sections.

The overall research criteria and design was mainly dictated by APWINC. Interview requests were sent to female entrepreneurs in Hong Kong, China through LinkedIn, Instagram direct messages, and e-mail. Google searches, LinkedIn searches, and startup communities were used to find possible candidates for the research case study. In total, approximately 30 female founders in Hong Kong, China were identified as potentially meeting the case study's criteria. In the end, the search was narrowed down to two prominent female founders from Hong Kong, China and interviews were conducted with both.

Section I will provide foundational information on Hong Kong, China and explain the role and current state of ICT at an economy's level. Section II will further explain the current state of female entrepreneurship in Hong Kong, China.

Economy Information

The below figure provides an overview of ten general informational points about Hong Kong, China and its economy (CIA, 2018):

Figure 3. Hong Kong, China Information

HONG KONG, CHINA
• Area of Land: 1,108 sq km
• 2017 Population: 7,191,503 people
• 2016 Gross Domestic Product (GDP): $430.1 billion
• 2016 GDP per Capita: $58,400; an increase of $700 from 2015
• 2016 GDP Growth Rate: 2 percent
• GDP Composition: agriculture: 0.1 percent, industry: 7.2 percent, services: 92.8 percent
• Industries: textiles, clothing, tourism, banking, shipping, electronics, plastics, toys, watches, clocks
• 2016 Export and Import Value: $502.5 billion / $520.1 billion

[54] This report was written by Stephen Ham, Researcher & Editor, and Teri Ham, Researcher.

- 2016 Labor Force: 3.915 million
- 2016 Unemployment Rate: 2.7 percent

Using additional data from the CIA, it can be seen that the majority of residents (92 percent) are ethnically Chinese, while only 2.5 percent are Filipino and 2.1 percent are Indonesian. Additionally, 44.68 percent of the population is aged 25 to 54, of which 1.3 million is male and 1.8 million is female (CIA, 2018). The member economy government has attempted to brand the economy as 'Asia's world city' and present it as 'an open, tolerant and pluralistic community, and a city rich in culture and tradition' (Law and Lee, 2012, p. 117). Another strength of the economy is its skilled and educated workforce, as recent member economy workforce statistics show that 82.9 percent of females and 95.9 percent of males in a prime working-age bracket have obtained a post-secondary level of education (Department, 2017).

Hong Kong, China's Development of the ICT Sector

During the 1960s and 1970s, the member economy government adopted a 'laissez-faire' (free-market) approach to the economy that was credited with helping to create an entrepreneurial culture within the economy (Chu, 2004). This was a markedly different approach from other economies during the time, such as Singapore which had a much more active role in regulating and controlling the economy. After 1997, however, when the sovereignty of Hong Kong, China was transferred to China from Great Britain, the member economy government became much more active in shaping the state of the economy and established new policies and programs to modernize the state of the economy (Chu, 2004). This included the Innovation and Technology Commission (ITC), which was formed in 2000 to encourage development in technology (Wang, 2018). In 2004, the member economy government established the Steering Committee on Innovation and Technology to coordinate policies and initiatives, and in 2006, the ITC established five research & development centers in the areas of automotive parts & accessory systems, ICT, logistics & supply chain management, nanotechnology & advanced materials, and textiles & clothing (Wang, 2018). In 2012, it was found that this had led to the dominant industries within Hong Kong, China becoming trade, accommodation, food service, and finance. New research was also being conducted in the areas of electronics and ICT. In fact, the top five companies being awarded patents from innovative research included some of Hong Kong, China's largest ICT-related companies, such as SAE Magnetics, Johnson Electric, and ASAT (Wang, 2018).

Hong Kong, China established its ICT network relatively early. In January 2002, it was found that more than 95 percent of households and 100 percent of all commercial buildings had broadband Internet access. At that time, Internet service providers were providing high-speed transmission lines and a fiber-optic network overseas to other areas including Japan, Europe, and the United States. This allowed entrepreneurs and SMEs to better serve their customers around the world (Chua, 2003).

As recently as 2016, Hong Kong, China had one of the highest ratios of Internet users to the population throughout the Asia-Pacific region, and reached 85 percent (CIA, 2018). The only other major developed economies with a higher ratio of Internet users were Korea at 89.9 percent and Japan at 92 percent. Notably lower were Singapore at 81 percent and China at 53.2 percent. Similarly, Hong Kong, China had one of the higher ratios in the Asia-Pacific region for mobile phone subscriptions, with 234 such subscriptions for every 100 inhabitants. Singapore trailed at 145 subscriptions for every 100 inhabitants, followed by 130 in Japan, and 120 in Korea. The lowest was China at 99 mobile phone subscriptions for every 100 inhabitants, despite China having significantly more mobile phones in total (1.36 billion) versus Hong Kong, China's 16.7 million total of mobile phones. Thus, this data indicates that ICT in Hong Kong, China today (through the form of mobile phones and the Internet) has reached a penetration factor comparable to—and in some cases higher than—the other major developed and emerging economies throughout the region.

The following statistics provide additional context on the most recent status of ICT in Hong Kong, China compared to other economies in the Asia-Pacific region:

Hong Kong, China and China were ranked together at 6 on the ITU's 2017 ICT Development Index (IDI) with a value of 8.61, indicating a positive increase in value from 8.47 (ITU, 2017) in the previous year. In comparison, Korea had a rank of 2 with a value of 8.85, while the top economy on the list at a rank of 1, Iceland, had a value of 8.98 (ITU, 2017).

Hong Kong, China ranked at 12 with a value of 5.6 (out of a 6.0 total) on the World Economic Forum's Networked Readiness Index (NRI) in 2016, below Singapore at 1 (value of 6.0), the United States at 5 (value of 5.8), and Japan at 10 (value of 5.6), but above Korea at 13 (value of 5.6), and China at 59 (value of 4.2) (World Economic Forum, 2016).

6.2 Current Status of Women Entrepreneurs of Hong Kong, China

Section 2 will now attempt to provide foundational understanding of both the overall and female entrepreneurial landscape in modern day Hong Kong, China.

Entrepreneurship in Hong Kong, China

Unfortunately, since neither the Hong Kong Trade and Industry Department nor the Census and Statistics Department currently provide official reporting or statistics specifically on entrepreneurs (whether disaggregated by sex or not) on their respective official websites, limited economy's data

is available on metrics or composition pertaining to entrepreneurship in Hong Kong, China (Chu, 2004).

Therefore, in order to gain deeper insight and additional context on Hong Kong, China's entrepreneurial landscape, some common global rankings for entrepreneurship have been incorporated and referenced. In particular, the Global Entrepreneurship Index (GEI) which 'measures the health of the entrepreneurship ecosystems in each of 137 economies' and is calculated by The Global Entrepreneurship and Development Institute (GEDI) is currently 67.3 for the year 2018, at a rank of 13—the highest rank for all economies in the Asia-Pacific region. Additionally, the Global Entrepreneurship Monitor (GEM) figures can be used to gain detailed insight on entrepreneurial self-perceptions and activities within a particular economy. For Hong Kong, China in 2016, the Perceived Opportunities Rate was 56.76, but this showed to be relatively tempered by an unusually high Fear of Failure Rate which was 37.30. On the other hand, the Total early-stage Entrepreneurial Activity (TEA), defined as 'Percentage of 18-64 population who are either a nascent entrepreneur or owner-manager of a new business' was 9.44, which was not too far from the global average of 12.33.

Detailed information on SMEs (small and medium-sized enterprises with at most 100 employees) in Hong Kong, China was likewise difficult to find. However, it was published by Chua (2003) that 290,000 SMEs in Hong Kong, China accounted for 98 percent of all local businesses in 2003. These SMEs employed more than 1.36 million people at the time, or approximately 60 percent of all private-sector employees and 90 percent of these SMEs had fewer than 10 employees. To provide a more up-to-date figure, the Hong Kong Trade and Industry Department last reported that there were 330,000 SMEs employing 46 percent of private sector employees as of 2017 (Trade and Industry Department: SMEs and Industries, 2017). Given this high concentration of SMEs, it can be extrapolated that there must be minimal barriers to entry in Hong Kong, China, which is further supported by the below excerpt:

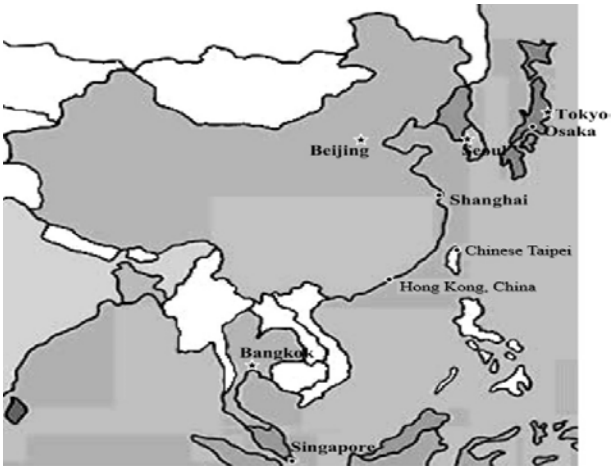
> 'Starting a new business in Hong Kong, China is simple. One has only to register the company with the required documents within one month of commencement of operations. The GEM economy experts identified this as one of the strengths that promotes setting up enterprises in Hong Kong, China' (Chua, 2003, p. 11).

As stated in Section I, the member economy's laissez-faire approach can be seen as having a positive impact on the development and growth of entrepreneurism in Hong Kong, China. It should be noted however, that in the years immediately following the transfer of sovereignty to China (1997), the member economy government began to take a more active role in creating various programs and funds specifically for entrepreneurs and SMEs, such as the Applied Research Fund,

Innovation and Technology Fund, Small Entrepreneur Research Assistance Program, SME Export Marketing Fund, SME Training Fund, SME Development Fund, and TechMart (Chua, 2003). Some of these programs, including others not mentioned, are currently listed as available resources from the member economy government by the Hong Kong Trade Development Council (HKTDC), an organization that is officially affiliated with the government (SME Finance | HKTDC, 2018). In addition, the member economy government recognized in 2007 the need for greater access to education and used HK$5 billion to create the Continuing Education Fund (CEF) (Chan and Lo, 2007). Although not specifically intended for entrepreneurs, this fund subsidizes costs for working adults who are interested in further education and training courses and can be certainly utilized as a resource for entrepreneurs looking to grow their skill base.

Owing in part from its free-market laissez-faire policy, Hong Kong, China's geographical location has allowed it to act as the main hub for both passengers and cargo in Asia for a number of decades (Zhang, 2003), which is reflected in Figure 4 below.

Figure 4. Asia's Main Cargo Airports



Source: Adapted from (Zhang, 2003)

This aspect of Hong Kong, China's geographical/geopolitical location is an asset for entrepreneurs today, as it is considered to be a gateway city to China which can provide access to larger markets (Lee, Wong and Foo, 2007). And Hong Kong, China's reputation for being a testbed for trends, a hub for high fashion, and garment sourcing center also make it a desirable location for entrepreneurs to launch businesses (Chu, 2004).

As far as specific data explaining the current state of female entrepreneurship in Hong Kong, China, little was available. As reiterated throughout the report, there appears to be a lack of official government reporting on entrepreneurs and even less data about female entrepreneurs. Therefore it is difficult to postulate with much certainty the current state of female entrepreneurship in Hong

Kong, China. Without such data, key questions such as: (1) 'Are there enough women entrepreneurs engaged in the ICT sector?' (2) 'Are women in Hong Kong, China well equipped for entrepreneurship?' (3) 'What skills do women entrepreneurs lack?' and (4) 'What resources or programs are most highly leveraged by female owners?' are all difficult to answer. These are just a sampling of questions that this report would have liked to include but found difficult to pinpoint given the lack of regular, consistent, and publically available economy's reporting concerning such topics.

Fortunately, some third-party data is available, and it was reported as recently as 2015 that 45 percent of entrepreneurs in Hong Kong, China are female. This percentage is higher than nearly every other economy in the world, except for India which has a 49 percent ratio (Knott, 2015). This is supported by the 2016 GEM ranking previously cited regarding the Female/Male TEA ratio, which indicated that there was approximately one female entrepreneur for every male entrepreneur. This implies that there is an active and fair environment for women entrepreneurs in Hong Kong, China. Furthermore, researchers have found that most female entrepreneurs in Hong Kong, China are concentrated in the middle to upper-class, while male entrepreneurs tend to be concentrated primarily in the middle class – this class standing is measured based on personal or family wealth (Chu, 2004). In general, women entrepreneurs tend to have greater financial assets compared to men founders in Hong Kong, China. The exact reason for this was not explicitly provided in the research, but may be related to the member economy's cultural trait of being averse to failure as previously stated above.

In terms of barriers to entry for entrepreneurship in Hong Kong, China, below are two of the most cited reasons. While they are not specific to females, the barriers mentioned can be seen as both impacting and affecting female entrepreneurs.

Fear of Failure

This stems from the Chinese culture's tendency to fear failure due to a concern with 'losing face,' which leads to a widespread lack of self-confidence among would-be entrepreneurs. Naturally this has caused a negative association towards entrepreneurship, which are seen as riskier ventures in Chinese culture (Lee, Wong and Foo, 2007). This barrier is also supported in the GEM's Fear of Failure Rate of 37.30 that was previously cited.

Lack of Financial Capital

There was no definitive research to support that women have more difficult access to funding than men, but research did convey that in general, access to capital and funding for startups is not as easy in Hong Kong, China as maybe other economies like Singapore (Lee, Wong and Foo, 2007).

Research claims that SMEs have had minimal access to financing in Hong Kong, China in the past and typically relied on either personal savings or money borrowed from family or friends to start their businesses (Chua, 2003). Venture capital was typically unavailable for those pursuing light manufacturing, retail, wholesale, and services, and instead was usually reserved for ventures involved in computers or ICT (Chua, 2003). Due to the lack of formal venture capital for most ventures, most entrepreneurs depended on some amount of government largess (Moy, Luk and Wright, 2003). Today this issue has been mitigated to an extent through InvestHK's StartMeUp website, which is not officially affiliated with the government but offers information and resources on angels and venture capitalists, as well as government funding and programs (Resources – GOVERNMENT SUPPORT | StartMeUp HK, 2018).

However, these resources/programs may not be well-advertised and therefore not as well-known among modern entrepreneurs. From a public funding perspective, the member economy government does provide some funds, grants, and programs to support SMEs in general; however, none appear to be for females specifically, at least according to the aggregate information available from StartMeUp HK (SME Finance | HKTDC, 2018) (Resources – GOVERNMENT SUPPORT | StartMeUp HK, 2018). The lack of government programs specifically geared towards women entrepreneurs or entrepreneurs in the latter stages of business is a definite area of concern, considering that many startups tend to fail after a few years, when entrepreneurs begin to face issues with scaling (and funding) (Mitchell, 2011).

In the remainder of the report, the background information that has been provided on Hong Kong, China, ICT, and entrepreneurs, and more specifically female entrepreneurs, will be used to underscore the analysis of the case study findings below. Topics and themes from both parts (research & case study findings) will be analysed to support policy recommendations and further debated in the summary and discussion section to present an overall viewpoint of the state of ICT and female entrepreneurship in Hong Kong, China.

7. Economy Report of Indonesia[55]

7.1 Current Status of the ICT Sector of Indonesia

Indonesia is one of a developing technological society. This is reflected by the government act to provide and distribute more Internet access to Indonesia. For example, in 2014 the government have announced the internet access program across Indonesia. (https://id.techinasia.com/fyi-pemerintah-luncurkan-programakses-internet-cepat-indonesia/), also at 2015, the new minister Rudiantara was going to continue the plan to 2019. (http://www.cnnindonesia.com/teknologi/20151001102928-217-82041/carapemerintah-agar-internet-cepat-dan-merata/).

Indonesia has more than 17,500 islands spanning the length of 3,997 miles. The population of this member economy is more than 248.8 million people. Indonesia has 34 provinces; 514 districts; 74,093 villages and scattered rural areas. The total population of men is 5,115,357 and women is 5,062,567. A considerable larger amount of men than women are in employment, with 3,068,100 holding jobs, compared with 2,016,430 women[56].

The economy has made impressive development gains in recent decades, surpassing some of its commitments under the Millennium Development Goals (MDGs). For example, far beyond half the percentage of the population who living with less than $1 a day, Indonesia has reduced that percentage from 21 percent in 1990 to 6 percent in 2008. At 2013, the member was on track to achieve 100 percent enrolment in primary education by 2015, and to achieve its targets under MDG3 relating to gender equality and empowerment of women. For example, the economy had all but eradicated gender disparities in education enrolment by 2011[57].

Indonesia is one of the biggest internet markets worldwide, with more than 72 million internet users in 2013, growing to a projected 102 million by 2016. Yet the internet penetration is relatively low for the region, at only 28 percent, according to the Indonesia Internet Service Providers Association (although this number differs from the International Telecommunication Union's figure of 16 percent)[58].

As early as 2001, the Indonesian government recognized the need to overcome the “digital divide” and prioritize the uptake of information and communication technologies (ICTs) in the member

[55] This report was written by Olivia Deliani Hutagaol, Head of Corporate Reputation Department, The London School of Public Relations-Jakarta, Indonesia.

[56] https://everyone.savethechildren.net/sites/everyone.savethechildren.net/files/Indonesias%20progress%20on%20the%202015_July2013.pdf

[57] http://www.id.undp.org/content/indonesia/en/home/mdgoverview/overview/mdg3/

[58] https://freedomhouse.org/report/freedom-net/2014/indonesia

economy. Based on Presidential Instruction No. 6 / 2001, the government adopted a five year action plan for the development and implementation of information and communication technologies in Indonesia[59]. At the expiration of the Action Plan, the National ICT Council (Dewan TIK NasionalDETIKNAS) was established in 2006 to accelerate ICT growth through government policies. As of the end of 2007 there were 298 licensed ISPs, 44 licensed Network Access Providers, and 25 multimedia companies[60]. Many internet users (an estimated 50 percent of all users in 2007) access the internet through access centres or telecentres. This differ widely but, in their simplest form. The forms of access centre or telecentres could be varied, but mainly the form of kiosks providing public telephone, fax and/or Internet services. In Indonesia, these are called Wartel (Public Telephone Kiosk/Warung Telepon) provided by small/micro enterprises and Warnet (Internet Access Kiosk/Warung Internet), and are run for example on a family telephone connection in a spare room of a house, or in a pair of portable booths by the roadside. There are over 200,000 Wartels and 2500 Warnets in Indonesia. A number of government initiatives are geared towards providing public access centers or telecenters, including Warinteks (Warung Informasi & Teknologi/ Information and Technology Kiosk) of the Ministry of Research and Technology, and Warsi (Warung Informasi Konservasi/ Information Conservation Kiosks). Information Kiosks of the Ministry of Industry and Trade for SMEs. The Community Electronic Information Network (JIMIE) National Information Agency (LIN), provides government information to commercial Warnets; while the Community Tele-Service Center (BIM) was developed by the Indonesian Information and Communication Society (MASTEL). There are also the Community Learning Centers of the Ministry of National Education, and the Microsoft-sponsored Community Technology Learning Centers (CTLCs) etc.

There remains a significant imbalance in the provision of telecommunications infrastructure and services between urban and rural areas, and access and affordability of internet services remain a challenge. The Government has articulated that its policy objective is to ensure that every citizen has reasonable and affordable public access to communications services by this year, 2015. Sector reforms in recent years have rapidly extended the reach of telecommunications to urban areas. Government and industry associations and corporations have tried to establish multipurpose community telecenters to provide ICT access to rural un-served communities. The Indonesian Constitution enshrines the right to non-discrimination (Article 28 I). In 2012 the UN Committee on the Elimination of Discrimination against Women (CEDAW) expressed concern about several discriminatory by-laws, there are many active civil society organisations in the member economy, and a National Commission on Violence Against Women. Law No. 2 of 2011 on political parties

[59] http://www.sdnbd.org/sdi/issues/IT-computer/policy/indonesia.pdf

[60] http://eurosoutheastasia-ict.org/files/2010/03/ICT_policies-programmes_priorities_SEA.pdf

established quotas for women in political party structures at the economy's and regional levels; and Law No. 8/2012, on general elections.

CEDAW embraces three main principles: substantive equality, non-discrimination, obligation of the state. CEDAW promotes substantive equality as an opposite to sameness equality and protectionist. Sameness means, that women and men is equal, and because of that reason women should be treated same as men. Indonesia has supported CEDAW through draft of Laws about Justice and Gender Equality which is belonging to Prolegnas 2015-2019. Through this Law, Indonesia expects that there are no more discrimination in economy's level and supports the use of ICT by women.[61]

7.2 Current Status of Women Entrepreneurs of Indonesia

Growth and development of SMEs are proven to contribute benefits and enormous contributions to the economy of the member. In the other hand, the progress of information and communication technology becomes a factor driving success of SMEs in their work. Although percentage the number of SMEs managed by women is very high, however the utilization of ICT by women perpetrators of SMEs is still minimal.

The world today believes that supporting women entrepreneurs is vital for economic growth. As economic opportunities increase, unprecedented numbers of women are entering the world of business and entrepreneurship. The number of women entrepreneurs has risen in global economy including in developing countries. However, the majority of women entrepreneurs in developing countries are still operating in small and micro enterprises with very little growth. Most women entrepreneurs run businesses in the informal and traditional female sectors. There is still prevalence of gender gaps in critical skills to run successful businesses. While education for women is making major progress along the years, women often still lack vocational and technical skills, as well as work experience to enable them to run large businesses. Women are also reported to be less likely to have access to information and communications technology (ICT) which plays a significant role in the highly integrated global market. The other constraint, that is major, is the lack of finance.

Regarding with the utilization of ICT, various studies have shown that the application of ICT innovation by SMEs owned and run by women, lower than men because: limited resources i.e. human, financial and resources technical, socio-cultural, education (Melhem & Tandon, 2009)[62],

[61] http://www.ictd-asp.org/usoforum/wp-content/uploads/2015/03/Session-2a-p2- MiraTayyiba-Indonesia-Broadband.pdf

[62] Melhem, S., and Tandon,N., (2009), Information And Communication Technologies For Women's Socio-Economic Empowerment, World Bank Group Working Paper Series.

their role in the family causes time constraints to use ICT (Kennedy, et al., 2003) and ICT competencies limited because of the lack of relevant knowledge (Liff & Shepherd, 2004). Women also differ significantly from men in attitude and motivation in using ICT (Hargittai & Shafer, 2006).

The absolute number of women entrepreneurs in Indonesia is very high. In 2011, the Ministry of Women Empowerment and Child Protection estimated that there are 55,206,444 micro, small, and medium enterprises (MSMEs) in the member economy, of which 60%, or 33 Million, are owned by women, representing almost a quarter of the active labor force (Melissa et al, 2015)[63]. The 2014 Global Entrepreneurship Monitor estimated that of Indonesia's total adult female population of 85 Million, approximately 26%, or 22 Million are active entrepreneurs (GEM, 2015). While estimates vary due to different classifications of women entrepreneurs and incomplete data, all approximations suggest a high absolute number of female entrepreneurs in Indonesia, and a very high proportion of the adult female population engaged in entrepreneurship.

In Indonesia, traditionally, women who are actively involved as entrepreneurs or business owners are found mainly in micro and small enterprises (MSEs). While, total number of women owning/managing medium and large enterprises (MLEs) in Indonesia is relatively small. By economic sector, they are mostly found in trade and services, managing/owning e.g. small shops, food stalls, beauty salons, boutique/fashions, and catering. In rural areas, women doing own businesses are mainly as petty traders operating in traditional market centers. In industry, they are mainly found in small-sized handicraft, food and beverages, and clothing industries. As their number continues to rise, women entrepreneurs in Indonesia have been designated therefore as the new engines for economic growth to bring prosperity and welfare in the economy. Indeed, worldwide, in the past, say, two decades, many stakeholders have pointed at women entrepreneurs as an important untapped source of economic growth and development in developing countries[64].

Based on data available from the State Ministry of Cooperative and SME, as January 2015, total number of entrepreneurs is 1.65 percent of the economy's total population of 253.61 million people, which is the lowest in comparison with many other economies in Asia and in the United States of America (USA). With respect to women entrepreneurs, despite studies and economy's data on entrepreneurship development by gender in Indonesia are limited, available evidence suggests that the development of women as business owners/managers in the member economy

[63] Melissa, E., A.Hamidati., M. Saraswati., and A.Flor. 2015. "The Internet and Indonesian Women Entrepreneurs: Examining the Impact of Social Media on Women Empowerment." Impact of Information Society Research in Global South.

[64] Tulus Tahi Hamonangan Tambunan. Women Entrepreneurs in MSEs in Indonesia: Their Motivations and Main Constraints. International Journal of Gender and Women's Studies. June 2017, Vol. 5, No. 1, pp. 88-100

shares the same features as women's entrepreneurship development in many other developing economies.

Table 4. Estimates of Women Entrepreneurs in Indonesia

Estimated Total Number of Women Entrepreneurs in Indonesia			
Number	33 Million	22 Million	13.3 Million
Source	Ministry of Women Empowerment and Child Protection, 2011	Global Entrepreneurship Monitor, 2015	National Socioeconomic Survey, 2013

In addition to being high in number, the proportion of women entrepreneurs in Indonesia is growing. The proportion of women entrepreneurs as a share of all SMEs in Indonesia was estimated at 23% by a 2014 study, but this figure is deemed to be increasing rapidly, with women-owned enterprises expanding at a faster pace than their male counterparts (Asia Foundation 2013)[65]. The vast majority of women entrepreneurs, like Indonesian MSMEs in general, are operating in the informal sector, or in some middle ground between formality and informality (IFC 2015)[66]. Compared to other economies, entrepreneurial prevalence amongst female entrepreneurs in Indonesia is high, and the gender gap in total numbers of male and female entrepreneurs is low.

Table 5. Entrepreneurship Prevalence Rates by Gender in Indonesia and Selected Economies

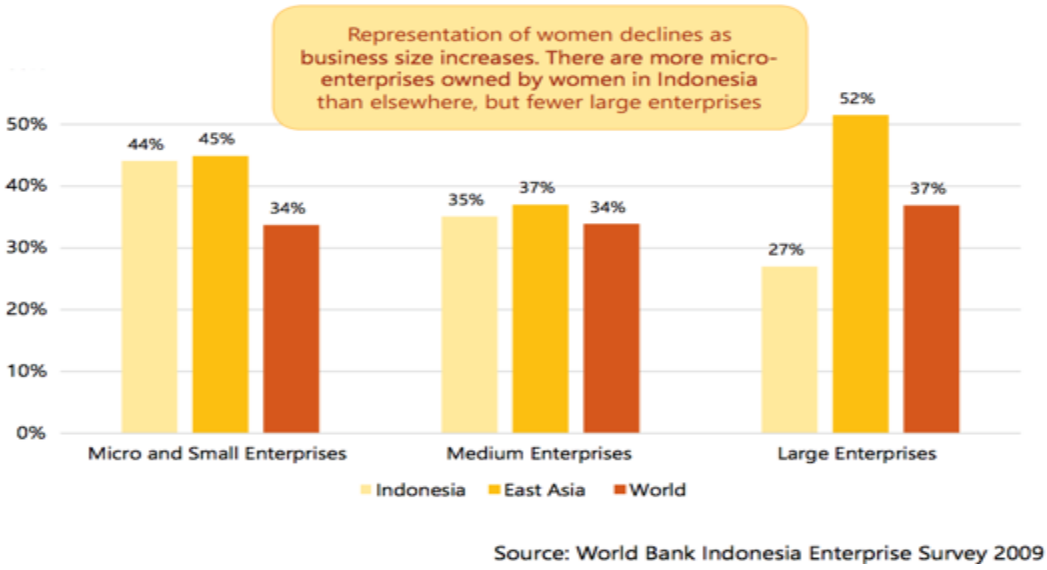
Source: Global Entrepreneurship Monitor, 2014

[65] Asia Foundation. 2013. "Access to Trade and Growth of Women's SMEs in APEC Developing Economies." The Asia Foundation, Jakarta.

[66] International Finance Corporation and AXA. 2015. "She for Shield: Insure Women to Better Protect All." International Finance Corporation and AX, Washington, DC.

The high absolute number of women entrepreneurs and the high proportion of women engaged in entrepreneurship in Indonesia is most likely indicative of large entry costs, especially of women, into formal labor markets (Hallward-Drimeier, 2013)[67]. Most women entrepreneurs in Indonesia turn to entrepreneurship out of necessity for example due to lack of employment opportunities – rather than in pursuit of profit and employment opportunities. As the figure below demonstrates, Indonesia has a very high concentration of women-owned enterprises in the micro and small sector. This is due to a very high population of women micro-entrepreneurs. Representation of women declines as business size increases.

Table 6. Firms with a Listed Female Owner, by Firm Size



Source: World Bank Indonesia Enterprise Survey 2009

An important and often overlooked consideration for any concerned policymaker is that women entrepreneurs in Indonesia are not a homogenous group. Programs targeting entrepreneurs and women entrepreneurs in Indonesia in the past have often been sub-optimal precisely because of their inability to target the right entrepreneurs (Tambunan, 2010)[68]. Evidence globally suggests that segmenting the market of women entrepreneurs into distinct categories can help to better meet individual needs (World Bank, 2010)[69]. While we know that the majority of women owned enterprises in Indonesia are micro and small enterprises, the demands and growth trajectories within these groups are quite different, and better understanding of the distinct needs of different types of entrepreneurs can help ensure well designed policies, programs, and intervention.

[67] Hallwart-Driemeier Mary, Hasan Tazeen, and Rusu, Anca B. 20113. "Women's legal rights over 50 years: what is the impact of reform?. Policy Research Working paper; No.WPS 6617.

[68] Tambunan, T. 2010. "Women Entrepreneurship in Indonesia: Determinants, Motivations and Constratints." Trisakti University, Jakarta.

[69] The World Bank. 2010. "Enhancing Acess to Finance for Indonesian Oversess Migrant Workers: Evidence from a Survey of Three Provinces." The World Bank, Jakarta.

8. Economy Report of Japan[70]

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 economy 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 5. 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%

[70] This report was written by Stephen Ham, Researcher & Editor, and Teri Ham, Researcher.

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

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 economy's 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 economy '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 member economy was seen as a model for other developing economies 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 economies 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 economy 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 member made a concerted economy's 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 member focuses on future economy's 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 6. 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 economies like the US) in the rate at which academics & researchers are able to convert knowledge into applied industry innovations (Stenberg, 2004). The 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 economy 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 the economy's 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 an economy 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 economies, including Japan (Yusuf and Nabeshima, 2005, p. 45):

Table 7. 2013 Patent Information

Rank in 2003	Number of Patents in 2003	Share of All Patents in 2003	Economy*	(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%	Chinese Taipei	(3)	(6,730)	(-0.8%)
4	4,132	2.2%	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 economies globally, and 3rd highest among OECD members, 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 economy 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 economy's problems with an aging population, lagging labor productivity levels (among top OECD members), and high government 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 economy, 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 economies in 2017, which represented an increase of one spot as compared to the economy'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 8. 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 economies in 2015, which again reinforces the advanced state of Japan's overall infrastructure (WEF, 2016). While the global report praised the economy'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 economies/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 an economy, 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 an economy 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 economy'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 member economy tends to be weak in: overall ICT architecture, solution services, global business development, and IP systems. A 2013 study found that among Asia-Pacific economies, 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.

8.2 Current Status of Women Entrepreneurs of Japan

The Evolution of Female Entrepreneurship in Japan

Much like ICT, entrepreneurship is also seen as a driver of economic growth (Minniti, 2010; Futagami and Helms, 2017). And academics, as well as research, have relayed the message that 'female entrepreneurship does matter for development' (Minniti, 2010, p. 295). In higher GDP countries, it is generally believed that the entrepreneurial sector has a greater propensity to grow, as it is presumed that individuals should have more resources and education to start businesses than citizens from lower GDP countries (Minniti, 2010). Research has also shown that, generally speaking, women from higher and low GDP countries, as a group, tend to explore entrepreneurship opportunities more so than women from middle-income countries. The reason for this is that women from middle-income countries tend to choose more stable employment opportunities in large, well-established manufacturing plants or companies rather than engage in entrepreneurship, which can be perceived as being more risky (Minniti, 2010). Based on such opinions, and given that Japan is a highly innovative, developed, and advanced economy in terms of ICT, some may argue that Japan would present a good environment for female entrepreneurship. However, other research pertaining to Japan points to some problematic areas for women when it comes to entrepreneurship.

Traditionally, Japanese cultural rules and pressures led women to sacrifice career aspirations in favor of familial obligations, therefore leading many women to drop out of the labor market after marriage (Guth, 2000). However, over time, some of these cultural and societal beliefs and rules are now changing, which has also led to more acceptance and open attitudes towards entrepreneurship in Japan, especially among women. Early research dating back to 2004

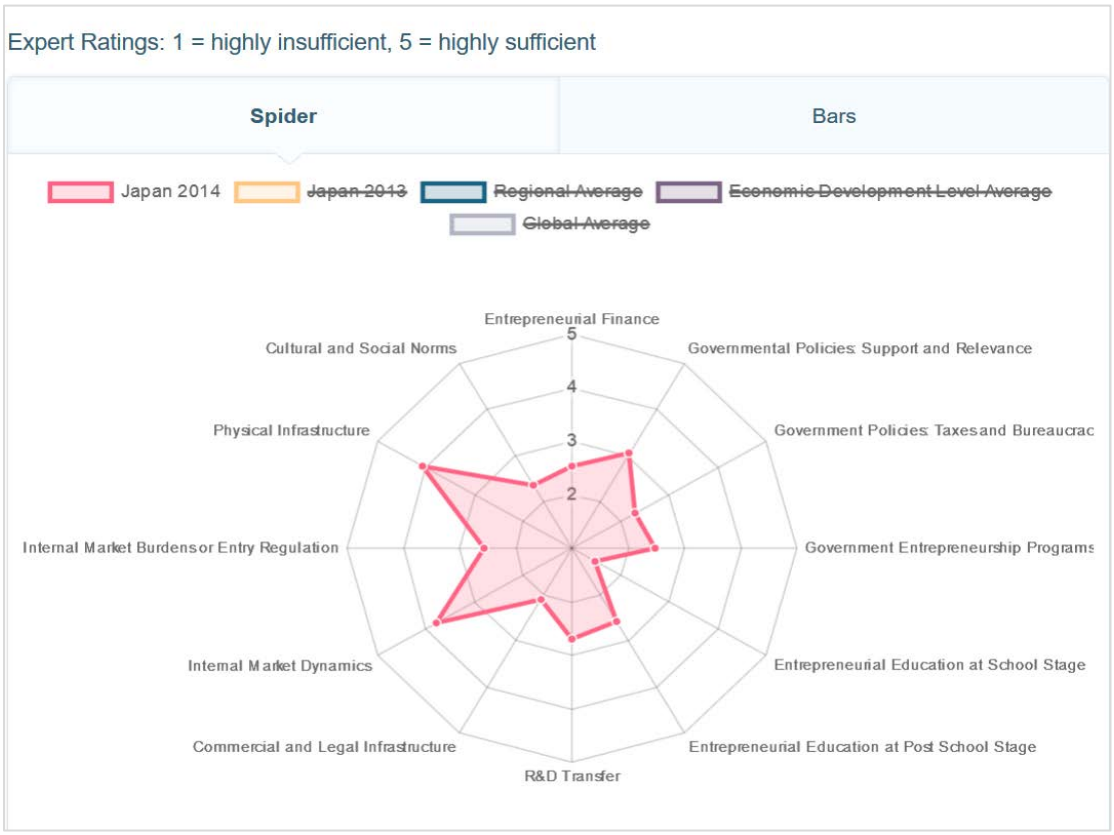
highlighted the dearth of female entrepreneurs as compared to male counterparts but held the position that economic and socio-cultural changes were beginning to shift and open the door for women to explore more entrepreneurial opportunities (Debroux, 2004). Some societal and cultural factors which influenced the growing trend of women business owners were attributed to Japanese women either marrying later or needing to support themselves financially as divorce rates grew, and women in general seeking more satisfying career choices (Debroux, 2004). Additionally, rising living costs also pushed some married women to explore employment opportunities outside of the home to supplement household expenses. Furthermore, in 2006, member economy laws removing minimum requirements (in terms of capital) to register a joint stock company made it easier for citizens to launch businesses and hence become entrepreneurs (Ishiguro, 2009). Even though the new legislation may have helped to make launching a business more attractive and easier, women at this time still struggled. In 2007 government data, it was reported that more than 20 percent of female entrepreneurs (double that of men) were forced to close their businesses (Jiji Press, 2007). Among the reasons cited by women for closing their businesses were: insufficient business skills & training, gaps in management skills, and weak networks/personal connections. Issues with balancing motherhood/family obligations and work was also cited as a major factor in leading women to leave entrepreneurship. Other research also pointed out issues with discrimination, as women entrepreneurs often found it more difficult than male peers to get financing & loan from banks and suppliers (Debroux, 2004).

Entrepreneurship Entry Barriers in Japan

Before examining some of the added complexities gender brings into the equation when looking at the current status of women entrepreneurs in Japan, this study will first briefly overview some general and relevant economy related barriers to entry in entrepreneurship.

In the latest 2018 report for the Global Entrepreneurship & Development Index (GEDI), Japan ranked 28th out of 137 economies (GEDI, 2018). The Global Entrepreneurship Monitor (GEM) report may shed more light onto Japan's ranking, and help explain the economy's lower global position. In a 2014 GEM report, Japan was found to be lacking in the below areas in terms of an economy's ability to provide favorable entrepreneurial conditions (GEM, 2015, fig. Entrepreneurial Framework Conditions):

Figure 7. Entrepreneurial Framework Conditions



Other GEM data from 2014 also reported that the rate of entrepreneurial activity (early-stage) for Japan was 3.85 percent, placing the economy nearly at the bottom of all economies surveyed (Futagami and Helms, 2017). Therefore, from the research and statistics reviewed, it can be postulated that the entrepreneurship climate in Japan is not exactly thriving.

Some experts have attributed and explained such statistics to the following:

- Limited funding sources
  Angel funding is found to be more difficult in Japan than economies like the US. While the venture capital industry is growing, it is still considered to be small in size (Ford, 2016). In fact, one article relayed the following quote, 'One entrepreneur stated that the eco-system in support of entrepreneurship in Japan is "less than 1% of that in Silicon Valley."' (Karlin, 2013, para. 9).
- Legal system
  'Japan's legal environment emphasises both personal liability and director's liability. Therefore, many individuals are hesitant to start new businesses knowing that failure could have significant personal consequences' (Ford, 2016, para. 3).

- Fear of failure

  As an economy, Japan's citizens tend to shun change, risk, and uncertainty (Karlin, 2013; Terjesen and Llyod, 2015). These attitudes have only been perpetuated and magnified by recent natural disasters that have plagued the member. The economy's disasters including the Tohoku earthquake, tsunami, and nuclear incidents have made younger generations even more risk averse when it comes to career choices.

- Culture

  Like many other Asian societies, Japan is still a culture where parents encourage their children to pursue stable career paths that appear to be more prestigious in nature and tend to pay well (Karlin, 2013). There is still a prevalent trend among young people who are considered to be top talent to pursue careers at large, international corporations, legal firms, or government agencies.

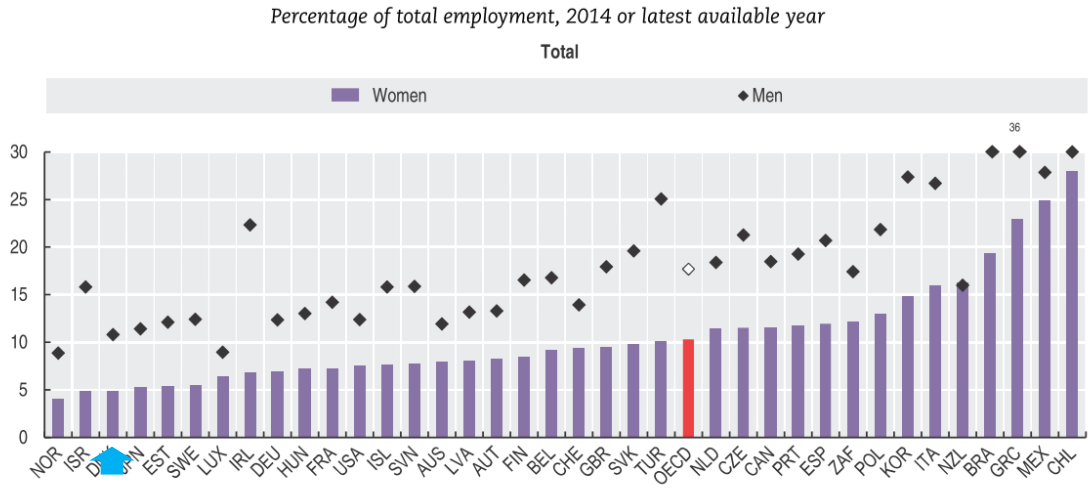
The Status of Women Entrepreneurs in Japan

Benchmarking progress and identifying gaps in female entrepreneurship can be both difficult and complex. One powerful tool for policymakers to assess the current state and predicament of female entrepreneurship in their economy is through the Female Entrepreneurship Index (FEI). This index is defined as the 'barometer of an economy's current situation relative to a group of other economies with respect to the conditions present that will fuel high potential female entrepreneurship development' (Terjesen and Llyod, 2015, p. 9). In 2015 results of Female Entrepreneurship Index rankings, Japan came in 44th out of 77 economies accessed and was categorized as being in the 40-60th percentile, thus highlighting the dire conditions of female entrepreneurship in Japan (Terjesen and Llyod, 2015). The report goes on to state that Japan, as well as other East Asian economies, are often better at encouraging women to go into entrepreneurship than at creating conditions that make such options feasible for women, which is also in line with the above findings from the GEDI and GEM rankings and information previously mentioned.

Gender can certainly be seen as a multiplier when it comes to barriers to entrepreneurship. Overall, Japan is a very male-dominated society, scoring a '95 on the masculinity scale' – making it 'one of the most masculine societies of the world' (Futagami and Helms, 2017, p. 42). This culture of male dominance can be seen as a contributing factor to discouraging women from pursuing entrepreneurial opportunities. Further research shared in the 2014 GEM report supports such suppositions. The GEM report found that the average entrepreneur in Japan is in fact male, middle-aged (approximately 45 years old) and holds a university degree (Futagami and Helms, 2017). The disparity between males and females was also captured in a 2016 study by OECD on

Entrepreneurship. The below table captures self-employment percentages by gender for member economies (OECD, 2016, p. 123):

Figure 8. Share of Self-Employment by Gender



As highlighted by the above figure, Japan's rate of self-employment is well below the OECD average, and the number of male business owners in Japan is more than double that of female owners. What is startling is that even though Japan is considered to be one of the most educated economies in the world, in 2015 OECD reported that only 67.5 percent of the population was employed in a full-time or part-time job (Futagami and Helms, 2017).

'Estimates are that if women in Japan would work at the same rate as men their economy would grow by 18%, which could offset the member economy's low birthrate and aging population.' (Futagami and Helms, 2017, p. 41)

The low participation of women in the job marketplace could be reflective of other deeper issues. In connecting research between the predicament of Japan's ICT strategy, entrepreneurship, and gender issues, an additional dimension that may be considered is the economy's issue with the low participation of women in research. Recent statistics from 2016 show that only 15.3 percent of researchers in Japan are female, which mostly likely stems from an issue with low levels of female entrants in STEM at the graduate level (OECD, 2017). Policy research on Japan has suggested that increased participation by women in STEM fields will likely lead to new research, innovations, and much-needed increases in market/business/economic activity (OECD, 2017).

Overall the research points to a need for an increase of female participation in STEM, research, and entrepreneurship, to stimulate economic growth and cites that the underutilization of women

in the job market is not only an isolated trend, but one that needs to be addressed swiftly and quickly before larger economic factors like the member economy's aging population, low birthrate, and high government debt present major challenges for the economy.

9. Economy Report of Republic of Korea[71]

9.1 Current Status of the ICT Sector of Republic of Korea

The Advent of the 4th Industrial Revolution

Recent technology has developed to a level that it can carry out even some intellectual judgment as well as human physical labor with minimized human intervention. It is said that a new revolutionary period of the fourth industrial revolution has arrived. Until now, humanity has so far experienced three revolutionary changes by means of versatile technology. The first was by steam engine technology, the second by electricity, and the third by computer and internet technology. Revolutionary change means that the technology with universality affects the industry, and as the successive ripple effect increases, it changes the whole society and life including the industrial structure, income distribution and lifestyle.

In the case of the UK, where the first industrial revolution occurred, the UK steadily developed technology for the mass production of textiles, with the textile industry as the economy's growth engine at that time. As a result, machinery industry and steel industry developed. In addition, with the invention of the steam engine technology, which is the general technology of the first industrial revolution, the supply of energy sources for machinery and steel industry, and the revolution of transportation, the UK reached a remarkable economic growth period due to technological progress and changes in industrial structure.

If the first industrial revolution was triggered by steam engine technology, the second industrial revolution was due to electric technology, and the economies leading the second industrial revolution era were Germany, France, the USA, Japan and Italy. The United States once overtook British industrial production.

Meanwhile, Korea responded late in the period of the second industrial revolution, but during the third industrial revolution period, which is referred to as the computer and Internet technology revolution, the government has made preemptive efforts to grow the information and communication industry as the main industry of the member economy. First, it established the world-class network infrastructure with the economy's informatization and ranked first in the ICT development index announced by ITU in 2016 and 2017. Based on this, Korea has secured world-class ICT accessibility and usability. In addition, the information and telecommunications industry has grown into the member's flagship industry, enabling the mobile phone and memory

[71] This report was written by Kyungmi Kim, General Manager, Asia Pacific Women's Information Network Center (APWINC), Sookmyung Women's University, Republic of Korea.

semiconductor display fields to gain a high market share in the global market.

So, the global market share of mobile phones was the second highest in the world at 22.9%, followed by memory semiconductors at 57.5% and display at 46.9%, the world's highest market share in 2016. As a result, Korea's ICT industry is the fourth largest ICT export economy in the world, accounting for 10.4% of GDP and about 30% of total exports, making it the driving force behind economic growth through the industrialization and informatization.

As mentioned earlier, human beings are facing the fourth industrial revolution in recent years. Many experts anticipate that the fourth industrial revolution will be accelerating more rapidly than the previous industrial revolutions and will have a greater impact. Economies around the world are taking keen interest in the key features of the fourth industrial revolution and trying to prepare for the new revolution for their survival and growth. However, there will be a wide gap between the economies that lead the fourth industrial revolution and those that do not.

The Current Status of Korea's Digital Technology

The universal technology of the fourth industrial revolution is called digital technology, which includes network (IoT, 5G), data (cloud, Big data), and AI (machine learning, algorithm).

Korea's Institute for Information and Communications Technology Promotion (ITTP) conducts Information and Communication Technology level survey every year to diagnose the current level of ICT and to identify areas that are in need of backward technology and government support. The ICT technology areas covered by the survey are 10 in total, including convergence services, mobile communications, networks, telephone, satellite, broadcasting, smart media, software, digital contents, and information protection and ICT device, which are subdivided into 141 technologies. The questionnaire focused on technical importance (importance, urgency, and ripple effect) and technical level (relative level, gap period) of those technologies, and the survey is conducted on 5,000 domestic related experts.

According to the results of the survey in 2016, the level of ICT technology in Korea was 80.5% of that of developed economies (USA), which was slightly lower than in Europe (89), and the period of technological gap was 1.5 years behind, the highest level in the United States (0 years). The technology levels of IoT, artificial intelligence, cloud, big data, and computing systems, which are digital technologies related to the fourth industrial revolution, among the 10 ICT fields are as shown in Table 9[72].

[72] Information and Communication Technology level survey report, 2016, Institute for information & communication technology Promotion

Among the four technologies, IoT and AI showed high technology level in application field, but big data showed high level of technology in basic field.

Table 9. Relative Technology Level and Technological Gap

	Relative Level (100%)						Technology Gap(0year)	
	Korea			the USA			Korea	America
	Basic	Applied	Commercialization	Basic	Applied	Commercialization		
IoT	80.7	81.5	80.8	100	100	100	1.2	0
AI	73.6	74.5	73.5	100	100	100	2.2	0
Cloud	70.4	74.9	71.9	100	100	100	1.6	0
Big data	79.0	73.0	71.2	100	100	100	1.7	0

The technology gap with the US was the largest in artificial intelligence, followed by the big data cloud and the Internet.

Government Policy Direction for the Fourth Industrial Revolution

The Korean government has taken note of the fourth industrial revolution as a momentum for providing new opportunities to overcome the current structural and complex economic crises. In November of 2016, the Fourth Industrial Revolution Commission, which consists of 20 civilian members and 5 government members, was launched under the direct control of the President. The Fourth Industrial Revolution Commission is responsible for deliberating and coordinating matters related to the Fourth Industrial Revolution in accordance with the provisions for the establishment and operation of the Fourth Industrial Revolution Commission.

There are four things related to the Fourth Industrial Revolution Commission.

- Comprehensive government strategy for the Fourth Industrial Revolution
- The implementation plans and major policies of each ministry related to the Fourth Industrial Revolution.
- Matters on securing key technologies such as support for technological development, artificial intelligence, and ICT, which are the basis of the 4th Industrial Revolution, and strengthening the creation of technological innovation type R & D performance
- Fostering new industries and new services through intelligent promotion of all industries

To this end, the committee selects industries with high economic impact from intelligence by industry and social sectors. In the industrial sector, medical, manufacturing, finance, logistics,

energy, and agriculture and fisheries industries were selected. In the social sector, cities, transportation, welfare, environment, safety and defense sectors were selected.

Focusing on selected sectors, the specific direction is as follows: First, to secure the required growth engine technology, a total of 2.2 trillion won will be invested in intelligent technology R & D, and researcher-oriented R & D system will be established for creative challenging research.

Next, to establish an industrial ecosystem, major industry big data centers will be established, regulatory sandboxes will be introduced, and an innovative venture fund will be set up for $ 10 billion. Also, the proportion of the prospective products of the fourth industrial revolution will be included in the list of priority items for public institutions. Finally, the committee plans to nurture 46,000 smart workers to cope effectively with the new future, to strengthen job retraining in response to changes in the employment structure, and to expand job safety nets such as expanding employment insurance.

9.2 Current Status of Women Entrepreneurs of Republic of Korea

Status of Woman Entrepreneurs[73]

According to the data of the National Statistical Office (NSO) in 2014, there are 1,378,000 women entrepreneurs in Korea, which accounts for 38.9% of all enterprises. In terms of the size of enterprises, 90.4% of women entrepreneurs are less than 5 persons and 98% of all women are SMEs.

Table 10. Status of Woman Entrepreneurs

(Unit: 1,000, %)

TYPE	Less than 5	5-49	50-299	300 or More	Total
Total	3,063.0 (86.4%)	377.6 (10.6)	101.7 (2.9)	3.1 (0.1)	3,545.5 (100.0)
Number of Woman Entrepreneurs	1,245.7 (90.4%)	110.8 (8.0)	21.7 (1.6)	0.2 (0.01)	1,378.3 (100.0)
% of Woman Entrepreneurs	40.7%	29.3%	21.3%	6.0%	38.9%

As for the status of women's enterprises by industry, food and lodging account for 32.1%, followed by wholesale and retail businesses for 29.5%.

[73] The basic plan for promoting women's business activities in 2017, Ministry of SMEs and Startups,

Table 11. Status of Women Entrepreneurs by Industry

(Unit: 1,000, %)

TYPE	Total	Food and lodging business	Wholesale and retail	Personal service	Education service	Manufacture
Total	3,545	701(19.8)	987(27.8)	301(8.5)	149(4.2)	393(11.1)
Number of Woman Entrepreneur	1,378	442(32.1)	406(29.5)	155(11.3)	85(6.2)	79(5.7)
% of Woman Entrepreneur	38.9	63.0	41.2	51.	57.2	20.1

However, the number of women's businesses in the knowledge service industry has increased recently. In particular, the number of female entrepreneurs engaged in the professional, scientific and technical services industry, which is highly related to the fourth industrial revolution, increased from 10,200 in 2012 to 12,700 in 2014. Publishing, video, broadcasting and information service industries also increased from 44,300 in 2012 to 2014 Increased to 58,000 per year.

Table 12. Number of Female Enterprises in Knowledge Service Sector

(Unit: 1,000)

TYPE	2012	2013	2014
Health and Social Welfare Services	41.7	43.0	44.6
Business Facilities Management, Business Support Service Business	10.4	11.2	12.6
Professional, Scientific and Technical Services	10.2	10.9	12.7
Publishing, Video, Broadcasting, Communication and Information Service	4.3	4.7	5.8
Total	66.6	69.9	78.7

On the other hand, if female labor force participation rate of female companies in all industries is 41.7%, the ratio of female employment in female manufacturing enterprises is 34.4%. Considering that 26.5% of all SMEs are women, the ratio of female workers is high for female firms.

The annual number of female employees has increased steadily since 2010, and in 2014, the share of female employment in total employment is 23.9%, and the average number of female employees per female employee is 2.77.

Table 13. Employment Rate of Female Enterprises

(Unit; number, %)

	All-Women Business		Women's Manufacturing		Small-Sized Manufacturing	
	Number of People	%	Number of People	%	Number of People	%
Total	660,618	100	141,769	100	2,375,864	100
Male	384,833	58.3	93,009	65.6	1,745,533	73,5
Female	275,785	41.7	48,760	34.4	630,331	26.5

Table 14. Employees of Female Enterprises

(Unit; number, %)

	2010	2011	2012	2013	2014
Total Employee	14,135,234	14,534,230	14,891,162	15,344,860	15,962,768
Employees Female Enterprise	3,139,163	3,305,761	3,520,694	3,634,727	3,822,362
Contribution Rate of Female Enterprise Employment	22,2%	22.7	23.6	23.7	23.9
Average Number of Employees per Female Enterprise	2.61	2.64	2.70	2.72	2.77

In addition to the employment of female enterprises, female entrepreneurship is also on an increasing trend. While the average female occupation rate of OECD members is 6.3%, Korea's female occupation rate is only 3.9%

Table 15. Female Entrepreneurial Growth Rate

	2010	2011	2012	2013
Female Entrepreneur Ratio	2.1%	3.8%	2.3%	3.9%
Male Entrepreneur Ratio	10.0%	11.7%	10.8%	9.7%

Status of Government Policies to Promote Women's Business Activities

The Korean government's support for women's businesses is based on the Act on the Promotion of Women's Activities in 1999. According to the law, women enterprises can receive support for funds, information, technology, manpower, and marketplaces in the start-up and operation of enterprises.

In particular, since 2000, a Balanced Growth Promotion Committee has been established under the

Ministry of SMEs and Startups(former, Small and Medium Business Administration), composed of related government agencies, the President of the Korea Women Business Association and Vice President of Small & Medium Business Corporation(SBC). The government budget for women businesses was set at $5,000,000 for the first time in 2012 and increased to $ 7,000,000 in 2017. The budget for female enterprises is being used to support female entrepreneurship and business activities. Specifically, it has been used to support 203 women-only day care facilities in 16 regions across the economy and to support funds, information, technology, manpower, and landscape.

Since more than 98% of women are SMEs, most of them can be ideally supported by the Ministry of SMEs & Startups, but, in reality, only 8.6% of them received support from the Ministry in 2014. Since 2014, the government has introduced mandatory rate system for preferential purchase of products for women entrepreneurs in the public sector. This system requires public institutions to purchase goods, services, and construction of women's enterprises preferentially, with annual purchases of 5% for goods and services, and 3% for corporations. As a result, the proportion of women's products purchased by women companies increased from 4.0% in 2013 to 7.1% in 2016

In the future, it is necessary that government should make paradigm shifts from policies for supporting existing women enterprises to policies for fostering new women enterprises and also promoting global competitiveness. With this policy support, women enterprises can create jobs and become the mainstay of economic growth.

To achieve this goal, government needs to divide women companies into three groups - women business, female venture business, and technology-based women business startup – and establish different policies and targets relevant to each group in order to maximize policy impacts through ongoing management.

The next step is to strengthen women's capabilities, so that a virtuous cycle structure, in which women's entrepreneurship and female recruitment are activated, can be established. In addition, efforts should be made to strengthen the human resources capacity of female companies by expanding the training infrastructure of women's enterprises and establishing business networks.

This policy direction is in line with the policy in other advanced economies. In other words, it recognizes women's enterprises as a new entrance for creating women's employment and fosters women's entrepreneurship and female employees as a support for women's businesses.

From this point of view, it is necessary to promote support for women's entrepreneurship and to enhance women's competencies through management consulting, exhibitions, seminars, mentoring, and education and training.

10. Economy Report of Malaysia[74]

10.1 Current Status of the ICT Sector of Malaysia

The digital revolution of a country is no longer an option but a much-needed necessity when it comes to uplifting a nation. It is undeniable that broadband and the internet have an impact on a nation's economy. Many countries have embraced the Internet and have spent billions on building the infrastructure. There is a unique synergy between the growth of a country's economy and the development of its information and communications technology (ICT) sector. Hence, Malaysia has placed a great importance on the development of its ICT sector by actively injecting investments and spearheading programmes and efforts to boost the ICT talent and market in all parts of the economy. The member economy's ICT sector is currently standing at an interesting crux of its cycle, whereby it is mid-way through its charge forward into a new and faster digital world. Smart devices are no longer a thing of luxury for the average-income Malaysians. Personal computers are in almost every urban household in Malaysia, and faster internet connection is constantly in demand by the economy's discerning consumers. "The ICT industry has been charting an impressive 10 per cent average growth yearly for the last five years, and is now an industry worth RM55 billion and is targeted to hit RM100 billion by 2017". Hence, the growth of the ICT industry will, in turn, drive the demand for robust digital infrastructure which is fundamental to Malaysia's competitiveness where accessibility and affordability are equally critical in uplifting the economy and narrowing the socio-economic gap through the provision of digital opportunities

Originating with National Broadband Initiative (NBI) and High Speed Broadband (HSBB) the primary goal was to achieve a broadband household penetration of at least 50% by 2010 with intended outcome of 1% contribution to GDP for each 10% broadband penetration. Malaysian government has undergone various efforts to step up its game in the ICT sector which include efforts to push the economy's data centre sector in order to make Malaysia a regional data centre hub. Within the business world, local organisations have been receptive and experimental in some cases, towards 'transformational technologies' such as cloud computing and analytics to harness the big data, the ICT developments that fueled by the on-going enterprise mobility trend. MDEC recently launched an alliance for data center industry called the Malaysian Data Centre Alliance (MDCA) in line with the government's development of the Entry Point Project 3 (EPP3) which aims to position Malaysia as a world class data centre hub. The data center industry is thriving with the current trends and push for it that are so pervasive in today's businesses, with its services for enterprises and consumers that include social media, cloud, big data and mobility.

[74] This report was written by Parveen Kaur, Senior Lecturer, University Malaysia Sarawak, Malaysia

Digital Malaysia is an economy's agenda that draws huge opportunities created by the digital world to harness the economy's ICT capabilities. It is built upon a vibrant domestic ICT industry, transformative use of digital solutions by government, businesses and citizens, as well as a robust enabling ecosystem. Malaysia sailed into the first wave of IT economy the wave of IT transformation which automated individual activities in the value chain, from order processing to manufacturing resource planning. Productivity increased dramatically and also saw the standardization of processes across companies. The second wave represented the Internet economy to which unleashed the second wave of IT-driven transformation. Consumers have access to computers and computers are all connected, changing how we communicate and transact. Malaysia now stands at the brink of the third IT transformation, the Digital Economy after the rate of adoption of new technologies has accelerated over the past decade, we have 3 times the economic opportunity now through the digital economy than what have seen over the last 20 years. Against today's borderless global economy, Malaysia and enterprises have the opportunity to further leapfrog ahead over other economies if we are able to reimagine our business models and proactively evolve to stay relevant. The Eleventh Malaysia Plan focuses on ICT as an imperative enabler for a knowledge economy, especially in the areas of industry, infrastructure, human capital and digital inclusion (Malaysia: The Digital Economy Empowering the Digital Wave to Enhance National Competitiveness and Productivity Global Competitiveness, 2015).

10.2 Current Status of Women Entrepreneurs of Malaysia

Based on the 2011 statistics of the Small and Medium Corporation Malaysia (SME Corp. Malaysia), there were 645,136 SMEs in Malaysia. Out of that, 80.3% were owned by men and only 19.7% were owned by women. The figure of women entrepreneurs is much smaller than men, though the global trend shows an increasing number of women (Musaa, Shuib et al., 2016).

The percentage of women involved in entrepreneurial jobs is still consider small (Syed, Mohd. Fauzi & NorAsiah, 2011). In Malaysia, of 10.8 million workforces, only 37% are women and in regard to entrepreneurial jobs, women are less than the men. Women make 50% of the total population, but only 15% of them own business enterprises in Malaysia (Syed, Zizah & Fauzi, 2012).

11. Economy Report of Mexico[75]

11.1 Current Status of the ICT Sector of Mexico

The present research paper has the purpose of providing light about the obstacles, success factors and other relevant circumstances that may have an impact on women entrepreneurs in Mexico.

The document particularly refers to the experience of Dr. Guillermina Cabral, an interesting, hard-working and successful woman who decided to launch her IT company 20 years ago and who has thrived in that endeavor.

The research paper is organized as follows. Section I presents background information about the member economy in terms of its ICT sector as well as some insights about women economic empowerment in the corporate world and as entrepreneurs. Section II contains the study case of Dr. Guillermina Cabral; it provides information about her career, her business, Intranetslab, success factors and obstacles she has overcome throughout these years. The paper also incorporates some policy recommendations relevant for the ICT sector and women entrepreneurs in Mexico.

This research paper is part of the project titled 'Women's Economic Empowerment and ICT: Capacity Building for APEC Women Entrepreneurs in the Age of the 4th Industrial Revolution', mandated by Asia-Pacific Economic Cooperation (APEC) Secretariat to the Asian Pacific Women's Information Network Center (APWINC) in Republic of Korea.

Dr. Cabral´s case was chosen based on the criteria requested by APWINC (particularly in relation to years in the market; over five years) and was referred by the National Institute of Women in Mexico (Inmujeres). Intranetslab is a small company with more than 20 years of experience in business and its growth has and will be steady in the years ahead.

Regarding methodology, two interviews were conducted by phone with Dr. Cabral (one in early December 2017 and another one mid-February 2018) as she was travelling outside Mexico City. A visit to the premises of Intranetslab was done at the end of February as well as a short interview in person to Alberto Serrano, Chief of Operations of the company.

[75] This report was written by Perla Buenrostro Rodriguez, CEO, Bolder Group, Mexico.

ICT in Mexico

In 2013 Mexico engaged in a Constitutional and legal reform on Telecommunications for fostering more competition in the industry, guaranteeing access to broad band and implementing a National Digital Strategy for incorporating ICT in the life of Mexicans, the private sector and government, and other stakeholders.

The reform implied major political and economic changes for the economy. In 2014 and 2015 fees on roaming, interconnection and long distance were eliminated so the overall cost of telecommunications started to significantly decrease. Mexico, which ranked at the bottom of OECD indexes on accessibility, prices and infrastructure for telecommunications, began to improve the competition conditions for ICT consumers.

In 2015, the Global Information Technology Report by the World Economic Forum ranked Mexico at the 69 position (previously 79) out of 143 economies, mostly due to the improvement on fees and data. The 2016 and latest edition of that same report mentions that mobile broadband subscriptions are increasing and that individual usage is catching up with business and government usage. Government in particular keeps a good level of interaction with population through technology (35 position)[76].

However, Mexico still has room for improvement on the effectiveness of the judicial system and legal mechanism for procuring IT related rights as well as on the incorporation of technology and innovation in businesses, particularly provided the challenges of Fourth Industrial Revolution.

In Mexico, 99.8% of established companies are micro, small or medium size; they represent 52% of GDP and generate 72% of employment. Unfortunately, only 6% of them take advantage of ICT on a regular basis for their operations, which has an adverse impact on their competitiveness and productivity.

11.2 Current Status of Women Entrepreneurs of Mexico

Although women graduate more than men from undergraduate and graduate studies and are half of the global talent, there is a gender gap in the workforce of 34 percentage points in Mexico, which is above global average (25 percentage points). The participation rate of Mexican women in the workforce is of 45.5% vs. 79.5% of Mexican men[77].

[76] WEF (2016). The Global Information Technology Report 2016. Geneva: WEF.

[77] ILO (2017). World Employment and Social Outlook: Trends for women 2017. Geneva: ILO.

If women were equally represented in the workforce as men in Latin America, the region could experiment GDP growth of US$ 2.5 trillion by 2025, as highlighted by the McKinsey Global Institute[78]. In the case of Mexico, the economy's GDP could grow by 43%, or US$ 810 billion by 2025.

Levelling the playfield on gender equality requires a proactive multi-stakeholder agenda and a real sense of urgency. Women in Mexico only occupy 18% of senior management positions, 4 of CEOs seats and 5.8% of boards´ slots[79]. Women demand mentoring & sponsoring support, equal pay and flexible work schemes for advancing their careers and preparing a diverse talent pipeline in the corporate world[80].

As entrepreneurs or business owners, the situation is slightly different. Around 30% of formal employers in Mexico region are women, and 1 out of 4 entrepreneurs is a woman. However, they face some internal barriers associated to gender stereotypes, and others which are common to SMEs such as professionalization, access to mentors and business opportunities, internationalization, consistent growth, funding at accessible rates, etc.

Mexico has a long way to achieve gender parity and effectively integrate women in its economy and decision making. Although in 2014 the economy elevated parity in candidacies to National Congress and Local Legislatures to a constitutional rank, which had a positive impact on political empowerment of women, it is quite behind in gender indicators.

The Global Gender Gap Report 2017 produced by the World Economic Forum ranks Mexico in the 88 position out of 144 economies. Together with Brazil, Mexico registered the widest reversal in its progress since 2013, particularly in the Health and Survival Gender Gap and equal pay for equal work (gender pay gap is about 17%, but it increases up to 50% in the financial sector, for example)[81]. Women dedicate 28.8 hours per week to care work, whereas men only spend 12.4 hours a week, according to the 2014 Mexico´s National Survey on the Use of Time.

The ´macho´ culture is very much embedded in Mexico, in daily and family life, and gender stereotypes and bias are very much present in the business and corporate world. Mexican top business associations (ie. Consejo Coordinador Empresarial, Consejo Mexicano de Negocios) and big Mexican companies are still organized in a very patriarchal manner, which informs how they take decisions for including (and mostly not) women talent.

[78] McKinsey Global Institute (2015). The power of parity: How Advancing Women´s Equality can add $12 trillion to Global Growth.

[79] ACT/EMP (2017). La mujer en la gestión empresarial: Cobrando impulso en América Latina y el Caribe. Geneva: ILO.

[80] Strategy& PwC (2016). Mujeres ejecutivas. Lo que ellas quieren de las empresas en México. Mexico: Strategy&.

[81] WEF (2017). Global Gender Gap Report 2017. Geneva: WEF.

The landscape is gradually changing, and there is growing awareness on the need of mainstreaming gender on public policies, including budgets, and advance women in the corporate pipeline as well as guaranteeing their quality participation in the economy provided the implications of the Fourth Industrial Revolution.

It its 2017 Skills Strategy Policy Note: Mexico, the OECD recommended Mexico to intensify efforts on educating and developing the necessary skills for the workforce given the technological change, where women have a key role to play.

However, the main challenge relates to effective implementation and measurable actions. Nowadays there are not real incentives for advancing women in decision making in the private sector nor robust legal obligations towards that purpose.

In March 2017, for example, a modification to the Law on Stocks Market was introduced for requesting listed companies to apply a gender perspective and have at least 20% of women on boards. The modification was not accepted as such. However, from August 2017, listed companies, following up recommendations by OECD, have to publicly inform the gender composition of boards and decision making bodies.

Regarding women entrepreneurs, they are increasingly participating in the Mexican economy but one of the biggest challenges they face is growth. In 2010, a study by the World Bank and the IDB found out that micro and small companies run by women were less productive than those run by men but that the playfield was levelled when they enter the next level.

In Mexico, 29% of companies led by women are micro, 19% small, 6% medium and 7% big, according to the 2015 National Survey for Enterprise Financing. In the ICT sector, for example, only 9 out of 100 technological startups have a woman CEO and only 20% have a partner woman.

Talent diversity and women are a valuable asset for seizing equality, sustainable development and economic growth in the 21st century. Redefining traditional work structures, distribution of unpaid care work and parental policies as well as fostering women in STEM careers and providing quality business opportunities and access to finance for entrepreneurs and business women are some of recommended actions for accelerating the potential associated to women´s economic empowerment.

12. Economy Report of New Zealand[82]

12.1 Current Status of the ICT Sector of New Zealand

The information and communications technology sector in New Zealand is growing at a rapid rate. ICT service and software exports have doubled from 2008 to 2014 (The Ministry of Business Innvation and Employment, 2017). A recent report from New Zealand Digital Skills Forum shows that the demand for individuals skilled in the ICT sector is already high, is increasing at significant rate, and is projected to continue to grow (Nation, 2014).

Figure 9. New Zealand's Digital Skills Shortage

Source: Digital Skills for a Digital Nation - NZ Digital Skills Forum

The immediate concern is that the current situation and the forecasted growth presents notable digital and ICT skills shortages. Simply put, the number of ICT jobs is growing at a faster rate than the number of new employees entering the tech sector. Digitalisation continues to spread, and

[82] This report was written by Mahsa Mohaghegh, Lecturer, School of Engineering and Mathematical Sciences, Auckland University of Technology, New Zealand.

entirely new ICT roles are continually being created. ICT roles are now the most commonly posted job at median salary level. Perhaps the most striking figure is that in 2016 alone, there were 14,000 new jobs created within the ICT sector.

Digital Nation lists the ICT sector as the third largest and fastest growing sector in New Zealand, with about 28,000 companies and over 100,000 employees in these fields (Ministry of Business Innovation and Employment, 2017). Despite these figures, the gender gap is significant: women make up less than a quarter of those currently in ICT roles. Of those studying tertiary ICT-related fields in 2016, only 36% were female, and the gender gap in STEM (Science, Technology, Engineering and Mathematics) fields is still significant.

2016 NCEA data shows that female secondary school student levels of participation and achievement across science and math is equal to or greater than that of male students. Despite, this only 3% of high school girls surveyed by the report in 2017 considered STEM fields as possible career choices.

There are several groups and companies in New Zealand making notable efforts to both promote the ICT sector and provide education and professional development opportunities to fill skills shortages.

Figure 10. NZTech

Source: nztech.org.nz

NZTech[83] is a non-profit, membership-funded, non-government organisation which represents over 500 ICT organisations and companies in New Zealand, and collectively over 100,000 individuals. Members of NZTech vary, from small startups to multinational ICT firms, from banks and financial institutes to government agencies.

NZTech's aim is to assist economic growth in the ICT sector by promoting and advancing New Zealand's technology ecosystem, and creating an environment where technology can facilitate higher productivity. One of the key ways it does this is by promoting the benefits of technology, and reporting successes and potential opportunities for New Zealand general public, and also the rest of the world.

[83] www.nztech.org.nz/

In May 2017, NZTech, in association with the New Zealand Ministry of Business, Innovation and Employment, ran Techweek'17[84], an economy's programme consisting of a week of technology-inspired events held at various locations across New Zealand. Techweek was initially an Auckland-only event, however previous years saw so much success and popularity that running an economy's event quickly became feasible, and what was initially TechweekAKL became TechweekNZ, and in 2017 was hosted or run by NZTech partners, government agencies, ICT organisations and smaller networking groups. In total, 287 individual events were held in 24 locations around the economy, with over 20,000 registered attendees. NZ Tech and the Ministry of Business, Innovation and Employment partnered again in 2018 to run Techweek.

NZTech has also been involved in efforts to bridge the gender gap in ICT, and in 2017 partnered with New Zealand Ministry of Youth Development to run ShadowTech Day, a programme allowing high school girls to shadow women in ICT roles in various companies to gain first-hand experience of the ICT industry.

Tech Futures Lab

Figure 11. Tech Futures Lab

Source: www.techfutureslab.com

In January 2016, New Zealand entrepreneur and education innovator Frances Valintine, CNZM, launched Tech Futures Lab[85], a specialised professional development and education facility in Auckland, New Zealand. The primary aim of Tech Futures Lab is to provide organisations and innovators the skills necessary to adapt to the emerging and disruptive technologies that are appearing across multiple industries on a daily basis, and to use these technologies to further their own professional value. Tech Futures Lab primarily focuses on fields such as automation, machine learning, artificial intelligence and cognitive computing – fields which are finding a place in industries not previously envisioned.

[84] www.techweek.co.nz/who-is-techweek/

[85] www.techfutureslab.com/

Since launching, Tech Futures Lab has worked with organisations from multiple industry sectors. This reflects the organisation's vision to build capability and applied knowledge for organisations from all backgrounds, as the technology wave reshaping business is and will affect everyone and every field. In July 2016, Tech Futures Lab officially partnered with industry giants IBM, Microsoft, IAG, Xero, Air New Zealand, and Datacom.

She Sharp

Figure 12. SHE#

She Sharp[86] is a non-profit networking group for high school girls, female tertiary students and industry professionals that was founded in June 2014 by Dr. Mahsa Mohaghegh. The group's goals are to connect technology students to ICT companies by creating networking events where they can meet, and to promote STEM fields to high school girls, and help them to make contact with female role models in the industry. The events allow high school students to see what it's really like on the inside of a tech company, what kind of people are really there (as opposed to who they think is there by stereotype), and encourages them to think about possible future careers.

There is also mutual benefit between the companies and tertiary students: companies have the chance to promote positions to prospective future employees, and the students have the opportunity to make valuable industry contacts. The motivation for these events lies in the belief that an effective way of addressing the gender imbalance is to create an atmosphere where female high school students can see how exciting and relevant technology is to their lives, and provide them with the opportunity of gaining first-hand insight into the industry, meeting their employees and networking with female role models in the industry.

Being able to draw on experience from women in the field is an advantage that should be utilised as far as possible. Hearing from other women in the field sharing their experiences, challenges and successes presents significant encouragement to students either studying computer science or considering it as a career choice (Margolis & Fisher, 2002)

[86] www.shesharp.co.nz

12.2 Current Status of Women Entrepreneurs of New Zealand

The number of women entrepreneurs in New Zealand closely follows global trends, with men making up a significantly larger proportion in startups, small and growing businesses, and growth-oriented entrepreneurship in general. This gender imbalance is widely recognised across the entrepreneurial world (COMPASS, 2015).
This gender gap closely resembles the gender gap evident in computer science and ICT fields. There are numerous opinions surrounding the cause for the gender gap in ICT, from misconceptions of what this area entails, to preconceptions of who is expected to work in this space, all of which appear to be based on an ingrained stereotype for the field that is unattractive to most females (Kendall, 2017). Many speculate that popular culture fosters a subconscious acceptance of STEM fields as male-only fields, while fields such as arts or design are female fields. Unconscious bias towards these mentalities is strong, particularly in Western economies. New Zealand is no exception.

There may be similar underlying reasons for the gender imbalance across entrepreneurs, and business startups in New Zealand. Whatever the reason, it is clear that these two gender gaps compound in the case of technology-related startups. The result is that ICT start-ups and young businesses have a significantly low ratio of women to men.

While in New Zealand it is (formally, at least) encouraged for women to break free of stereotypical career choices, and to take advantage of the growing opportunities that exist in the ICT startup space, women often encounter barriers in the entrepreneurial world that men do not.

There are currently several groups and initiatives in New Zealand which have taken steps to actively promote entrepreneurship to females, or provide support and assistance to women interested in finding out more about entrepreneurship opportunities.

Lightning Lab by Creative HQ

Figure 13. Lightning Lab by Creative HQ

Source: www.lightninglab.co.nz

One initiative supporting growth of female entrepreneurship is Lightning Lab, a business acceleration programme which takes startups through four months of intensive support and growth fostering.

Lightning Lab is a programme initiated by Creative HQ[87], an organisation which runs incubation and acceleration programmes dedicated to furthering high-growth businesses in New Zealand. Creative HQ itself obtains a significant amount of its financial support from WREDA[88], the Wellington Regional Economic Development Agency, which supports economic performance in the Wellington region in New Zealand.

As a programme, Lightning Lab is a member of GAN[89], the Global Accelerator Network, an international community of organisations aimed at providing support to startups and young businesses. Through this connection, Lightning Lab supports startups with high-end mentoring, over $1M worth of free services, introductions to investors, and access to a worldwide network of soft landing spaces.

Figure 14. Lightning Lab XX

Source: www.lightninglab.co.nz

While the Lightning Lab programme does not exclusively focus on promoting entrepreneurship to women, it has proposed significant efforts to this end.

In 2015, Creative HQ, which runs Lightning Lab, proposed the next startup accelerator programme to focus on startups led by women (those with at least one female founding member on the executive team). According to Creative HQ, this initiative is inspired by a study released by the Kauffman Foundation[90], which indicates that focusing on advancing the number of female entrepreneurs and female-led startups could transform the impact of women on the economy, with positive effects on the same scale as the 20th century's shift in gender balance in the workforce in general (Stangler, 2014).

[87] www.creativehq.co.nz

[88] www.wellingtonnz.com/about-wreda

[89] www.gan.co

[90] www.kauffman.org

To this end, Creative HQ invited public contribution to thoughts on how to develop and evolve an initiative to increase the presence and impact of women in ICT fields and ICT startups. The initiative, referred to as Lightning Lab XX[91], ran for the first time in March 2016 in Wellington, New Zealand, and saw 9 teams from across New Zealand participate. After the 14 week support and development period, the 9 teams presented their startups at the Lightning Lab Demo day, to other entrepreneurs and over 700 investors.

Creative HQ holds that team diversity (in any company, as well as startups) creates a more balanced atmosphere and ecosystem, and ultimately stronger teams and companies. This position is becoming more widely accepted to be true, and results from numerous reports and studies show higher company and organisational performance where the executive team is more gender-balanced.

Not just in New Zealand, but on the international stage, the importance of gender-balanced teams is now widely recognized. The 2015 Global Startup Ecosystem Ranking report shows an 80% increase in female founders in the last three-year period (COMPASS, 2015). In 2015 First Round Capital, a Silicon Valley venture capital firm, released a report showing the ten main lessons learned about startup investment in the first ten years since initiation in 2005. The first lesson addressed in the report states that female founders outperform their male peers, and that startups with at least one female on the executive team achieved results 63% better (from an investment/return perspective) than those with only males (Round, 2005). Catalyst, the non-profit diversity advocate, found that of Fortune 500 companies, those with women in leadership roles increased the return on company equity by 53% (CATALYST, 2013).

Many other investors have openly stated that as a rule, they will only invest in startups with gender-diverse executive teams, since statistics show that this generates a better investment return (Quinton, 2015), (Cooney, 2015).

WE Network

Figure 15. WE Network

Source: www.wenetwork.co.nz

[91] www.lightninglab.co.nz/xx

Another New Zealand network supporting women entrepreneurs and women-led businesses is WE Network[92]. Founded by Rachel Lewis in 2016, WE Network is essentially a platform to provide and facilitate peer mentoring for women in business, provide them opportunities to promote to a network of over 10,000 other New Zealand businesswomen, and lead workshops aimed at developing business marketing, branding, and growth strategies aimed at achieving results faster.

WE Network also assists women who are in very early stages of entrepreneurial effort, or are only just considering starting up their own business. Many of their workshops cover topics such as business plan development, maximizing productivity, marketing strategies at early startup stages, and the expertise that most women will not have been able to develop in a corporate environment. The primary objective for these workshops is to equip prospective female entrepreneurs with the necessary business skills before investing large amounts of capital.

According to Rachel Lewis, while there may be numerous reasons for women deciding to start their own business, many women become frustrated with being employees in a corporate world, battling glass ceilings and striving to succeed in a world which, though some may deny it, still favours males over females. This can lead them to a decision to pioneer their own business without the corporate limitations (Iles, 2017).

Lewis also acknowledges there are also many women who would break away from the corporate world, but lack the funding, resources, and support, or find that their lifestyle or family environment prevents them, which can lead to a lack of confidence and discouragement. This is where WE Network is able to help in offering peer support, encouragement and skill development (Iles, 2017)

Ministry for Women

Figure 16. Ministry for Women

Source: women.govt.nz

In 2017 the New Zealand Ministry for Women published Decoding Diversity[93], a guide for educators about how to attract and retain young women and girls into technology-based education and careers.

[92] www.wenetwork.co.nz

[93] http://women.govt.nz/documents/decoding-diversity

The Ministry for Women has also published *Inspiring action: Action plans and research to help you attract and retain talented women (2014)*[94] – a quick reference to resources that assist oranisations to address unconscious bias and identify practical steps to improve women's career pathways.

Curious Minds

Figure 17. Curious Minds

Source: www.couriousminds.nz

Curious Minds, a New Zealand Government initiative, has a ten-year goal of encouraging and enabling better engagement with science and technology for all New Zealander. It has developed a series of profiles of innovative New Zealand women of all ages and backgrounds, who work with science, technology and engineering[95].

[94] http://women.govt.nz/documents/inspiring-action-2014

[95] https://www.curiousminds.nz/actions/community/women-and-girls/

13. Economy Report of Papua New Guinea[96]

13.1 Current Status of the ICT Sector of Papua New Guinea

Papua New Guinea is an economy culturally rich and diverse with a population of over 8 million people and with over 800 languages and is the largest island economy in the South Pacific with a land mass of 462,840 square kilometres[97]. With its geographic position as the gateway to the Pacific and Asia, it can become a thriving example of fast paced development if undertaken well where critical sectors like Information and Communications Technology (ICT) can be delivered as an economic and social enabler in enriching and empowering state development based on its challenges.

The Information and Communications Technology (ICT) sector has since grown in Papua New Guinea and has made progress over the last decade. The Digicel telecommunications and satellite TV service reach into rural areas has shown the development impact with the use of ICT and Mobile. However ICT continues to remain as one of the many greater challenges in proving its useful and valuable contribution to economic and social development and to overall GDP due to Papua New Guinea's large disconnect areas and rugged terrains that make Telecommunications reach expensive and inaccessible and the required policies to promote ICT and its full adoption as a key change driver for economic and social development.

It was only two decades ago that the Internet was introduced to the economy around 1993 followed by the rapid uptake of Mobile Telecommunications and Broadband to public which has enabled ICT to reach population both in the urban and rural settings through the use of Mobile phones, internet and applications. It is estimated that 90% of all internet usage is currently conducted over Digital broadband and Mobile networks. Progress in Telecommunications has come primarily from mobile networks, where accessibility has expanded from less than 3% population coverage in 2006 to over 80% by early 2016[98]**.** However major challenges still remain in other areas such as collecting real time accurate data and statistics in ICT demographics and its impact on gender particularly women and youth and underrepresented groups due to the ongoing high cost of access, lack of electricity and energy grids in communities and the comprehension, use, accessibility and education of ICT by the general population and by policy and decision makers.

[96] This report was written by Priscilla Kevin, Researcher Contractor, In4Net Ltd., Papua New Guinea.

[97] https://en.wikipedia.org/wiki/Papua_New_Guinea

[98] https://www.prnewswire.com/news-releases/90-of-internet-usage-in-papua-new-guinea-is-conducted-over-digitals-broadband--mobile-networks-300543547.html

In an unpublished report presented at the recent ICT Stakeholder workshop[99] in Port Moresby on 27 November 2017 hosted by PNG's telecommunications regulator NICTA and by the Ministry of Communications, Information Technology and Energy sector, policy development for ICT receives under 0.1% consideration in Government budget planning which is way less than Fiji island economy in the Pacific. With this reported minimum focus on ICT by governance, it can contribute to missed opportunities on how ICT can be an empowerment tool and platform for economic and social development for PNG's population which includes women. From the researched unpublished report by the Ministry, recognition and emphasis has been given to ensure ICT is considered and strategized as a cornerstone for development in alignment with the United Nations Sustainable Development goals (SDGs) and the upcoming APEC 2018 agenda on Digital economies as a member economy and to achieve the economy's Vision 2050.

Whilst policy is being discussed for ICT and APEC dialogue, the interest on knowledge and use of smart technologies and their emergence on the market in Papua New Guinea is also taking place and causing disruption around the awareness, understanding and the acceptance into society. For example Block chain technologies[100] dialogue has reached PNG shores and its learning may have begun as early as 2015 which has caused uprising queries around use of current banking systems and policies and the impact on domestic and international trade both for formal and informal businesses in PNG. It has also raised queries around security of financial information and Insurance when trading online with Digital currencies and how PNG will be trading using the digital platform.

However the primary lacking engagement is the education around these new and upcoming disruptive technologies and level of comprehension by general population including women. It is assumed that the majority of the population are yet to understand what these technologies will bring and how to engage with them in their day to day lives as we know that majority of the population still live in the rural areas and have low literacy rates. We are learning that just across the borders in Australia and New Zealand, PNG's neighbouring economies, technologies like Artificial Intelligence (AIs) are taking over jobs usually done by humans, Driverless cars[101], Drones technology and Internet of Things (IoTs) are now in operation in homes and cities and these will soon reach PNG shores and the challenge remains as to how smart technologies will impact the lives of PNG population and how policies will shape their use and adoption.

[99] http://bernardosbagofbeans.com/2017/11/nicta-host-stakeholder-workshop.html

[100] https://bitcoinmagazine.com/articles/central-bank-papua-new-guinea-adopts-blockchain-technology/

[101] http://www.abc.net.au/news/2017-09-11/driverless-cars-job-losses-hacking-issues-and-ethical-questions/8893384

One technology we can also look at is the technology in the rural classroom and learning environments where most students and teachers do not use tools such as Electronic white boards, or general white boards and or interactive tablets and computers to conduct teaching and learning but continue to use Chalk and Duster environments. With new emerging ways of learning both with student and the teacher, we can also see that the conventional classroom and way of learning as changed so much over the decade with the use of technology now available in teaching and learning environments. PNG has yet to move its classroom learning in the Digital Age and to embrace smart technologies and these are some of the challenges in smart technology adoption.

As the world moves to more digitized platforms for economic and social engagements, it is increasingly becoming important for PNG to drive ICT and digital ways as this will have an impact on business, governance and education and how population will engage in social and economic developments.

13.2 Current Status of Women Entrepreneurs of Papua New Guinea

In a market research report by Tebutt Research prepared for the Government of Papua New Guinea on a SME Baseline survey for the Small-Medium Enterprise Access to Finance project, key findings estimate that there are between 28,223 and 32,692 formal SMEs in Papua New Guinea which collectively turnover PGK20.8 billion and provide employment for 434,634 paid staff and 33,868 unpaid staff. The findings also estimate that there are 2,549 SMEs with majority female ownership and 22,578 owned by indigenous Papua New Guineas[102].

The Papua New Guinea's 2050 vision states 'We will be a Smart, Wise, Fair, Healthy and Healthy society by 2050'[103] and under the Strategic Focus Areas in the Human Capital Development, Gender, Youth and People empowerment area, women comprise some 50 percent of the member economy's population, but are underutilised. At present, women comprise some 30 percent of the work force, fewer than 40 percent of the combined gross enrolment ratio for primary, secondary and tertiary education, and 50.9 percent of literate adults aged 15 and older. There are few women in management, leadership, and decision-making roles in the workplace[104].

In the 2050 vision under the Wealth creation strategic focus area states further that opportunities must be created for citizens to start-up businesses and to expand existing businesses. This can be

[102] Tebutt Research – SME Baseline Survey for the Small-Medium Enterprise Access to Finance Project Pg. 11

[103] PNG Vision 2050 Pg. 30

[104] PNG Vision 2050 Pg. 35

possible through tax relief, technical and financial support, the establishment of an entrepreneurial incubator scheme and other incentives[105].

With the large number of women representation in population up to 50%, there is potential for women in Papua New Guinea to engage in micro macro small to medium enterprise and pursue alternative income either than full time employment as a source of wealth to support their families, communities and contribute to the economy.

In terms of social and economic development and the new introduction and existence of ICT and Telecommunications, more women are now engaging in business and entrepreneurship like never before with the opportunity to provide alternate income apart from full time employment to sustain themselves, their families and livelihoods[106], With this trend, we see the uptake of readily available easy to use ICT platforms to engage in commerce and trade such as social media such as Facebook, Twitter, Instagram and others and to engage with consumers on products and services. As ICT becomes available to the general population through smart phone and mobile, more and more women are looking toward ICT to help them develop and enrich their businesses in order to grow their customer base and revenue and their entrepreneurial training, learning and experience. ICT also gives women a more connected network unlike never before through easy reach of phones, voice calls, chat systems like WhatsApp, websites, SMS services, Email services and the Internet to reach their clientele more quickly than before.

However, PNG still has a lot to do in addressing policies to support growth of local start-up, innovation and scale-up businesses especially by women. Several initiatives have been developed and introduced into PNG such as the StretPasin Business Incubation Program[107] by National Development bank (NDB), The WeCreate Challenge by Australia and United States governments, The Kumul Game Changers[108] program by Kumul Foundation, The PNG ICT Cluster initiative by European Union for ICT entrepreneurs with Australian Business Volunteers (ABV) Your Enterprise Scheme (YES) program[109], Banking institutional setups such as the PNG Women in Business Micro bank[110], Banking packages for Women businesses within NDB and Women's Business Centres such as the newly opened Women's Business Resource Centre in Port Moresby and other ongoing initiatives.

[105] PNG Vision 2050 Pg. 37

[106] http://png.embassy.gov.au/pmsb/531.html

[107] https://www.thenational.com.pg/success-through-stret-pasin/

[108] http://www.kumulgamechangers.com/about/

[109] http://www.abv.org.au/png-small-businesses-graduate-from-the-your-enterprise-scheme/

[110] http://pngwib.com/womens-micro-bank/

There is still a lot more work to do into developing the right ecosystem to support businesses and businesses run by women and to promote the Digital pathways that can help women trade easily and reach markets. This are some of the current development dialogue brought to the table to address many of these ongoing challenges faced by the population and our women both in rural and urban settings.

14. Economy Report of Peru[111]

14.1 Current Status of the ICT Sector of Peru

Economy Presentation

The Republic of Peru covers 1,285,216 Km² of western South America and is the world's 19th biggest economy. With 31,488,628 inhabitants, the 51 percentage of these are men and the 49 percentage are women. Its population density has been estimated at 24,5 people per Km². (National Institute of Statistics and Informatics, 2016).

There are three natural regions: Coast, with the 55,9 percentage of inhabitants; the highlands, with the 29,6 percent, and the Amazon jungle with the 14,5 percentage of Peruvian population. However, the Amazon jungle is the largest by area (775,353,84 Km²), followed by the Highlands (353,988,94 Km²) and finally the Coast (150,872,82 Km²).

In respect of the economy in Peru, a report issued by the World Bank – WB (2017) remarks that, over the last decade, it has been one of the fastest growing economies in Latin America, with an average grow rate of 5.9 percentage within a framework of low inflation (average 2,9 percentage), due to the presence of a favourable external environment, careful macroeconomic policies and structural reforms in different areas.

However, investment in Peru has been suffering a negative effect since 2014 according to Alejandro Werner, Director of the IMF's Western Hemisphere Department - 2017 (International Monetary Fund). He declares that Peru must increase public investment, joining it with the plan of economic stimulus - to be launched by the regime of the President Pedro Pablo Kuczynski – and the funds for the economy's reconstruction, because of the damages caused by the phenomenon El Niño Costero.

Werner says: "It is important that economic growing must go hand in hand with public policies which are aimed to reduce important gaps in infrastructure, improve the access to clean water and sanitation. Promote financial inclusion, improve the coverage of public health and continue to strengthen the educative system". (*El Comercio Newspaper*, May 26, 2017) This way, he is in favor of the new institutional framework for investment, the reduction of administrative procedures and the new tax regime for small and medium-sized enterprises (SMEs). He noted that the compliance of the new regulations will require enhancing tax base, improving competitively, and facilitating labor regulations and associate labor costs with productivity.

[111] This report was written by Maria del Carmen Ferrua Allen, Professor, Universidad Femenina Del Sagrado Corazón (UNIFÉ), Peru.

Economy Information on ICT/Smart Technology

In Peru, the Ministry of Transport and Communications (MTC) is responsible for developing transport systems and local communications and telecommunications infrastructure. It has an important labour on socioeconomic development since it allows state, regional and international integration, trade facilitation, poverty reduction and citizen's wellbeing.

Through the Telecommunications Investment Fund (FITEL by its acronym in Spanish), the MTC is in charge of providing access to a group of essential telecommunications services, which provides voice and data transmission across Peru in order to achieve the connectivity of this economy, being integrated through quality telecommunication services and coordinating its sustainability, especially in rural areas and social interest locations.

In May 2017, Deputy Prime President (former Minister of Transport and Communications) Martín Vizcarra announced the creation of a Vice-Ministry of Information and Communication Technology (MTICT)

According to former minister Martin Vizcarra, the spreading of digital topics and the lack of Authority in Terms of Society of Information across Peru observed in many government reports, demand a setting up of an institutionalism on ICT, which could provide PBI with $1150 USD millions. (*La República Newspaper*, October 8, 2017)

Currently, both the Vice-Ministry of Communications – in charge of the Optical Fiber Backbone Network deployment which will increase the connectivity across Peru as well as private investment on Telecommunications – and the ICT industry in Peru have direct impact on PBI's growing. According to the study "Information and Communication Technologies for Development (ICT4D), undertaken by the WB, an increase of 10,0 percentage in the number of broadband connections means an increase of 1,3 percentage in an economy's economic growth. (FITEL, April 11, 2017)

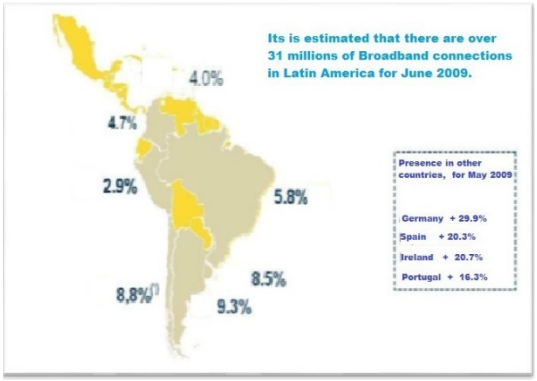
National Optical Fiber Backbone Network - RDNFO (Meaning Red Dorsal Nacional De Fibra Optica in Spanish)

One of the strategic targets of the Ministry of Transports and Communications is Digital Inclusion, through which citizens from underprivileged sectors will be able to access tele-medicine, online education, online training and online security services, among others; this will allow improving their quality of life significantly, by offering better development opportunities.

The key motivation to develop the National Optical Fiber Backbone Network (RDNFO, by its Spanish initials) was the demand for broadband services in the interior of the economy, mainly in Peru's highland and jungle areas.

In May 2011, Manuel Cipriano, General Director of Authorizations in Telecommunications for MTC-PERU remarked, in his article "Peru's ICT context" (*"El Panorama de las TIC en el Peru"*), that the density of broadband in Peru was 2,9 percentage.

Figure 18. Peru ICT



Source: CISCO Broadband Barometer, June 2009. In "Broadband: Modern and powerful Economic Development Tool". rge Cuba-MTC (Cipriano, 2011, pp. 8-9)

Internet access in houses with a computer was 19,2 percentage, in houses with Internet connections was 9,7 percentage; meanwhile, according to one member of each family involved in the survey, this access was 43,2 percentage via public internet cabins. (Cipriano, 2011, p.10).

In 2011, optical fiber networks were located mainly along the coast, with some branches in part of the highlands (Junín, Puno, Ancash and Cajamarca), which basically reached the regional capitals. On the other hand, access to (privately owned) optical fiber transport was a barrier to the development of the member economy's telecommunications and, above all, to widespread use of broadband services. (Valle Chicama, 2016)

In this context, Law N° 29904 was enacted, Act for Broadband Promotion and National Optical Fiber Backbone Network Construction, in 2012, which declares the Backbone Network's construction as of public concern and economy's interest. (Valle Chicama, 2016)

The National Optical Fiber Backbone Network will have an optical fiber extension of 13,500 km and will interconnect 180 province capitals; the service to be provided in the concession is a Bearer Service. (Valle Chicama, 2016)

The project awarded by PROINVERSION (Agency for the Promotion of Private Investment) to the Mexican consortium TV Azteca – Tendai then known as Azteca Comunicaciones Peru S.A.C. has a 20-year network funding, amounting to US$333 million. The concession contract was signed on June 17, 2014, from which every deadline stipulated in the Schedule; remarked below, start with a period of two years to present the Backbone Network. The RDNFO will have international connections with Bolivia, Brazil, Chile and Ecuador. (Valle Chicama, 2016)

The network deployment efforts started on December 18, 2014 and it is expected to be finished in June 2016. The rate intended for the Bearer Service is US$27 per megabit per second, value added tax included. (Valle Chicama, 2016)

By April 2017, Javier Morales Fhon, a consultant on projects associated with public policies as well as telecommunications regulatory consultancy and ICT's, among other issues, conducting an evaluation of RDNFO, he affirms Azteca has met the deadline programmed for the network's delivery. Projects to expand the backbone network to districts of each province were tendered as such network was being built. In this way, FITEL (Telecommunications Investment Fund) designed a number of regional projects for transport and access, to complement the RDNFO with more than 30 000 kilometers of additional optic fiber.

Regional networks would be implemented by other operators offering services to final users. According to Morales, these 21 regional projects were programmed for 2015 – 2017, with a total investment of more than 1 800 million of dollars. By this time, eight (08) projects have been tendered, one (01) to Telefonica, four (04) to Gilat Peru and three (03) to Andean Telecommunications Networks; the remaining ones, five (05) were in promotion stage, four (04) were viable and the others (04) were in evaluation. Moreover, once the RDNFO started operating, it has allowed the reduction of wholesale rates. (Morales, March 10, 2017)

However, after a year of activities by the RDNFO, all telecommunications operators in Peru (such as Movistar, Claro, Entel and Bitel, among others) have serious concerns about the amount they have to pay in order to receive data through the Backbone: US$ 23 per ´megabyte´, a comprehensive price five years ago when this infrastructure was designed, but now it is not attractive at all, noted Carlos Huaman Tomecich, CEO DN Consultores. According to him, the ´megabyte´price in the market is currently between US$10 00 dollars and it is estimated by volume (if the operator has more customers, it has a reduction for each ´megabyte´). This amount is flexible, as in the case of the RDNFO. In that sense, concession companies of the eight (08) regional networks delivered by the Peruvian State had delayed its start of operations (until June 2017) pending improving this and other noticed problems to achieve the implementation. (Hurtado de Mendoza, 2017)

After completion of these projects, more than 30 000 kilometres of optic fibber will be deployed so that it will allow to connect 1 529 district's capitals through a high – speed, capacity and reliability telecommunications network, benefiting around 6 thousand of localities; 3,8 million of Peruvians and more than 11 thousand of public entities (among education institutions, health centres and polices stations). These projects are considered as one of the economy development pillars in the next years, regarding competitiveness as well as economic and social inclusion. In addition, they will allow the expansion and development of the State's services as well as promoting and motivating the use – advantage of the ICT's.

ICT's Impact on the Development of Peru

In 2015, a study published by Apoyo Consultoria (a leading consultancy firm in business consulting) made an evaluation about the impact of many technological and social - political trends on the economic and social development of Peru. It was founded that RDNFO project of MTC had connected 6.1 million of Peruvians; the number of Peruvian people using smartphones reached the 17,2 percentage with an aim of 58,7 percentage for 2020. Similarly, it planned that 5 million of Peruvian would be using technologies of electronic money, fomented by the Banks Association in Peru (ASBANC in its Spanish acronym), an organization representing the private financial institutions in Peru.

The study also showed that only 10,0 percentage for the public spending on cloud computing represents an increase of the 0,75 percentage in the economy's GNP, which impacts considerably on the economy's development.

Finally, Apoyo Consultoria suggested the need to implement a number of future actions, grouped in three pillars: promoting the institutionalism in the ICT's use within the Peruvian State, through important institutions which have a direct political support; defining and increasing the relevant public policies, such as the broadband, cloud computing, use of ICT's in MYPES policies as well as giving priority to the confidence citizen and the company in technology through policies and actions of training and protection regarding cyber security. (Torres, 2015)

On June 2015, a Peruvian delegation headed by Bernardo Muñoz – Commercial Counsellor of the Peruvian Embassy in Spain, attended as a guest economy the fifth edition of the Business and Networking Forum for the Market of the Information Technologies and Spanish – Language Communication, Business TIC 2015.

Figure 19. El Eco Nomista

elEconomista
América.com | Perú

In such event, Mr. Muñoz noted that Peru has an ICT sector which has increased at an annual rate of 8,5 percentage, since 2010, launched by the GNP increase closed to 6,0 percentage in 2002 – 2013 period, according to the information given by the Peruvian Government and the Chamber of Commerce in Lima.

In the Forum, Peru was presented as a relevant export economy of technological services, such as call centres and the business process outsourcing for the software, video games, animation and architecture 3D development, among others. Similarly, it was said that Peruvian ICT SME's were investing close to 240 million of euros per year in infrastructure developments as well as the electronic trade had achieved a 250,0 percentage of development concerning to 2014. However, it was concluded that "a significant foreign capital is still needed for the investment in I+D+I (Research + Development + Innovation)", because when compared Peru to the rest of the Pacific Alliance partners (Mexico, Chile and Colombia) some deficiencies were observed, such as the networks implementation, the cloud use or the sales online. Therefore, a gap between supply and demand of professionals specialized in ICT's networks was close to 37,0 percentage of the Peruvian Market.

In order to solve these deficiencies, the Peruvian Government has set up the Peruvian Digital Agenda since more than a decade. It is the "Plan for the Development of the Information Society in Peru", which was developed under the Multi - Sectoral Commission for the Development of the Information Society (CODESI, in its Spanish acronym) meaning a joint effort of permanent consensus between the Government, the Private and Academic sector as well as the civil society. According to Bernardo Muñoz, this will allow the sustained – structured development of the Information Society in the economy. (El Economista.America.com|Peru, June 12, 2015)

The Infiltration of the ICT's in Households

On June 2017, the National Statistics Institute and Information (INEI, in its Spanish acronym) presented the Technical Report N° 2 corresponding to the "Statistics of the Information and

Communication Technologies" in Peru according to the results obtained from the quarterly National Household Survey (ENAHO, in its Spanish acronym).

Evolution of the Access to the ICT's in Households

Table 16. Peru: Households According to the Ownership of ICT Condition
Trimester: January – February – March 2016 And 2017

(Percentage)

Ownership of ICT Condition	Jan-Feb-Mar 2016 P/	Jan-Feb-Mar 2017 P/	Percentage points change
At least one ICT	91,7	93,0	1,3 *
None	8,3	7,0	-1,3 *

* There is an important difference, with a level of 90 % confidence.
** The difference is highly significant, with a 95% confidence level.
*** The difference is very highly significant, with a confidence level of 99%.
P/ Preliminary.

In the first trimester of 2016, it was founded that 92 interviewed households out of 100 had at least one ICT's. The following year, in the same quarter, this number had increased, in 93 households an information and communication technology, was present.

Households Access to Land Line and Mobile Telephony

At the economy's level, in the first quarter of 2017, 29,9 percentage of households has access to fixed telephony versus 31,6 percentage of 2016, being Lima Metropolitana which reports 53,4 percentage of the cases related to 57,5 percentage of 2016, followed by 28,2 percentage in 2017 versus 29,6 percentage in 2016 according to the rest of the urban population respectively. As well as 0,9 percentage in 2017, in comparison with 1,3 percentage in 2016 for the rural area. Apparently, this reduction takes account the major access to the mobile telephony.

At economy's level, an increase of 1,5 percentage related to households which have a member using a phone is observed. In this way, it appreciates the major increase is on the rural area with 3,7 percentage by being from 76,8 percentage in 2016 to 80,5 percentage in 2017. In the urban area, 1,5 percentage was increased, by being from 92,3 percentage in 2016 versus 93,8 percentage in 2017. However, Lima Metropolitana decreased in 0,8 percentage (from 93,5 percentage to 92,7 percentage).

Table 17. Peru: Households with Land Line Telephony According to the Residence Area
Trimester: January-February-March 2016 and 2017

(Percentage)

Residence Area	Jan-Feb-Mar 2016 P/	Ene-Feb-Mar 2017 P/	Percentage Points Change
Total	31,6	29,9	-1,7
Lima Metropolitana	57,5	53,4	-4,1
Urban Area 1/	29,6	28,2	-1,4
Rural Area	1,3	0,9	-0,4

1/ Lima Metropolitana is not included.
P/ Preliminary.

Table 18. Peru: Households with Mobile Telephony According to the Residence Area
Trimester: January-February-March 2016 and 2017

(Percentage)

Residence Area	Jan-Feb-Mar 2016 P/	Jan-Feb-Mar 2017 P/	Percentage Points Change	
Total	89,0	90,5	1,5	***
Lima Metropolitana	93,5	92,7	-0,8	
Urban Area 1/	92,3	93,8	1,5	***
Rural Area	76,8	80,5	3,7	***

* There is a significant difference, with a confidence level of 90%.
** The difference is highly significant, with a 95% confidence level.
*** The difference is very highly significant, with a confidence level of 99%.
1 / It includes without level and initial education.
P / Preliminary.

Household Access to a Computer, Internet and Cable TV

Within the first trimester, only 38 had at least one computer in 100 households; and 94,0 percentage of whom declared that it is for the household, academic, professional or study activities' exclusive use; and 5,7 percentage for the household and work's use and only 0,3 percentage use it exclusively at work.

Table 19. Peru: Households with at Least One Computer, According to the Use
Trimester: January-February-March 2016 and 2017

(Percentage)

Computer Use	Jan-Feb-Mar 2016 P/	Jan-Feb-Mar 2017 P/	Percentage Point Change
Total	100,0	100,0	
For the Household's Exclusive se	92,8	94,0	1,2
To Use Exclusively at Work	0,7	0,3	-0,4
To Use at Work and at Home	6,6	5,7	-0,9

P/ Preliminary.

Table 20. Peru: Households with Access to a Computer and Internet, According to the Area of Residence
Trimester: January-February-March 2016 Y 2017

(Percentage)

Area of residence	Jan-Feb-Mar 2016 P/		Jan-Feb-Mar 2017 P/		Absolute Change (Percentage points)	
	Computer	Internet	Computer	Internet	Computer	Internet
Total	37,7	31,7	38,4	33,1	0,7	1,4 ***
Lima Metropolitana	57,2	54,9	56,1	53,0	1,1	1,9 ***
Urban area 1/	43,6	31,7	44,4	35,1	0,8	3,4 ***
Rural area	5,6	1,0	6,5	1,7	0,9	0,7

* There is a significant difference, at the 90 percent confidence level.
** There is a highly significant difference, at the 95 percent confidence level.
*** There is a huge difference, at the 99 percent confidence level.
1/ Excluding Metropolitan Lima.
P/ Preliminary.

According to the area of residence, a 56,1 percentage of households living in Lima Metropolitana, within the first trimester of 2017, had at least a computer, followed by the urban area with 44,4 percentage and rural households with 6,5 percentage.

Regarding the Internet service, a 53,0 percentage of households living in Lima Metropolitana had access to this service; 35,1 percentage in the urban area and only a 1,7 percentage of households living in the rural area had access to internet services, within the 2017 trimester.

Population with Internet Access

Table 21. Peru: A Population Aged 6 and Over Which Use Internet, According to the Residence Area
Trimester: January-February-March 2016 and 2017

(Percentage of the total population aged 6 and over from each residence area)

Residence area	Jan-Feb-Mar 2016 P/	Jan-Feb-Mar 2017 P/	Percentage Point Change
Total	46,0	51,7	5,7 ***
Metropolitan Lima	66,1	71,7	5,6 ***
Urban area 1/	50,3	56,6	6,3 ***
Rural area	11,1	13,9	2,8

* There is a significant difference, at the 90 percent confidence level.
** There is a highly significant difference, at the 95 percent confidence level.
*** There is a huge difference, at the 99 percent confidence level.
1/ Excluding Metropolitan Lima.
P/ Preliminary.

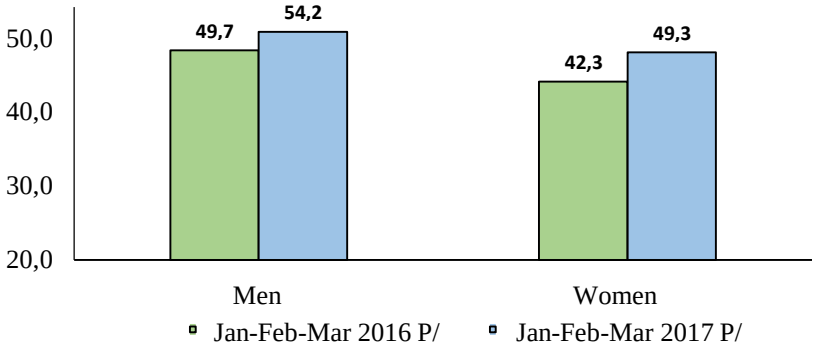
Within the 2017 first trimester, a 51,7percentage of Peruvian population aged 6 and over used

Internet, with an increase of 5,7percentage compared to a similar trimester of 2016, which reached a 46,0percentage of such population.

According to the residence area, the greatest increase was noticed in the urban area which had an increase of 6,3percentage, increasing from 50,3percentage in 2016 to 56,6percentage in 2017, followed by Lima Metropolitana with an increase of 5,6percentage, due to having increased from 66,1percentage in 2016 from 71,7percentage of the population aged 6 and over which used Internet in 2017. The increase in the rural area was 2,8percentage.

Male people aged 6 and over are the most frequent users of Internet in the view of 54,2percentage of the interviewed men versus 49,3percentage of women who used this service, in 2017. So, there is a gender gap of 4.9 percentage for men.

Table 22. Peru: Population Aged 6 and over Who Use Internet, According to Gender
Trimester: January-February-March 2016 Y 2017



P/ Preliminary.

Table 23. Peru: Population Aged 6 and Above, According to Sex, Age Groups, and Type of Activity Carried Out on the Internet
Trimester: January-February-March 2017 P/

(Percentage of total internet users)

Activities	Total	Sex		Group ages	
		Male	Female	6 - 24 years	25 years or more
To communicate (e-mail, chat, etc.).	88.8	88.5	89,0	84,5	2,4
To obtain information	84.5	83,9	85,2	80,0	3,4
Entertainment activities (videogames, movies, music, etc)	81.9	83,4	80,1	87,1	77,3

P/ Preliminary.

The 88.8 percentage of the population used the internet to communicate, using e-mail and chat, 84.5 percentage did it to obtain information, and 81.9 percentage searched for entertainment activities such as video games, films, and music.

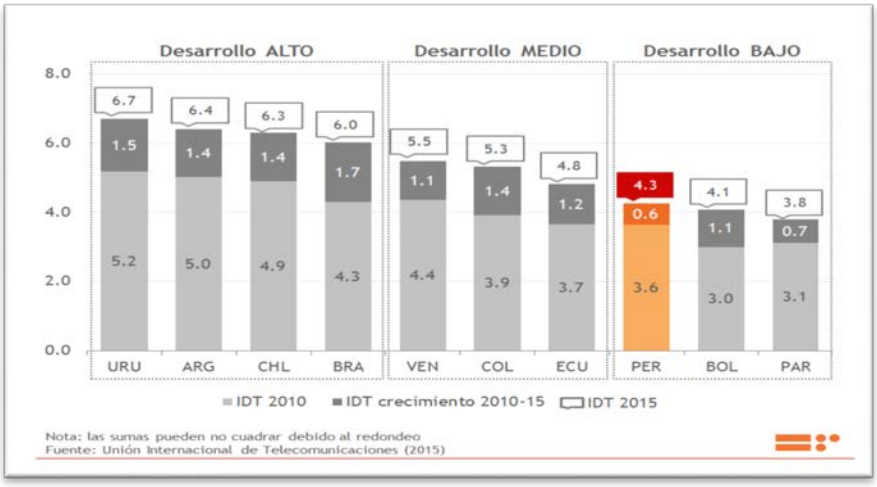
ICT's Current State in Peru

The International Telecommunication Union (ITU), which is the specialized institution of the United Nations (UN) in ICT, created last decade the ICT Development Index to monitor the its global markets evolution. The IDT considers three dimensions: access to services, use of services, and skills of users, which is useful for analysing the evolution of ICT in each economy and between them.

The index has a scale from 0 to 10, and in 2015 Republic of Korea (8.93), Denmark (8.88), and Island (8.86) were the economies with more development in ICT and with high-income economies in the world, while the last positions (out of 167 economies) corresponded to ten (10) African countries with a score between 1.17 and 1.82.

In South America, Uruguay is by far the leader country in ICT development in the sub region (6.70), followed by Argentina (6.40), Chile (6.31), and Brazil (6.03), while at a second development level is Venezuela (5.48), Colombia (5.32), and Equator (4.81). Below these economies, at a low development level, were two Andean economies, such as Peru and Bolivia, being Paraguay the last (3.79). (DN Consultores Strategies Telecom, 2016)

Figure 20. The Revision of the ICT Development Index



Source: Prepared by DN Consultores

The revision of the ICT Development Index components shows that the low position of Peru is mainly explained by the low rate of a fixed internet connection acquisition (situation aggravated by the low rate of ownership of a desktop at home) and mobile internet, concluding that Peru is the economy in South America with fewer internet users, along with Bolivia.

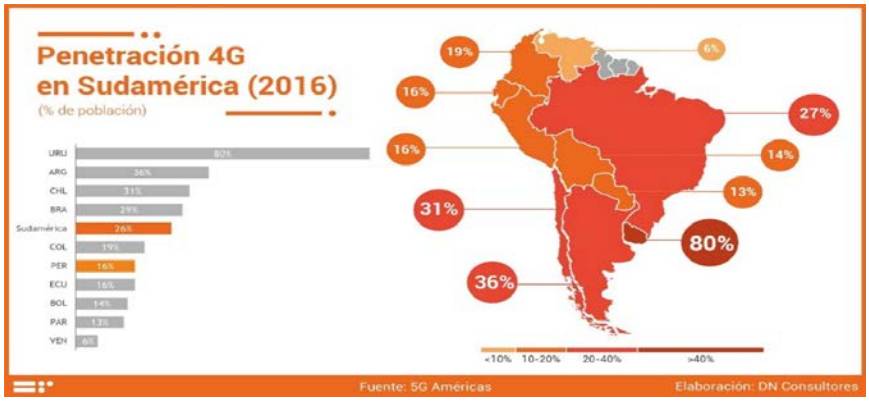
The review of the RTD components shows that Peru's low position is mainly explained by the low rate of fixed internet acquisition (situation aggravated by the low rate of PC ownership in the home) and mobile internet, all of which can be summarized in that Peru is the economy in South America with less internet users, along with Bolivia.

In the analysis provided in October 2016 by DN Consultores, it is pointed out that market figures suggest that the income-effect is not enough to explain what happens in Peru, because according to figures from the World Bank, Peru is currently located in the fifth position in South America in terms of GDP per capita adjusted by purchasing power parity (PPP). By contrast, it is affected by the price-effect, since several studies show that the prices of fixed and mobile broadband in Peru are among the highest in South America.

Besides, it indicates that above the income-effect or the price-effect, there is what economists call "customs and practices," which refers to the fact that Peruvians do not use the internet among the habits incorporated into their daily life, for a number of reasons that DN Consultores does not get to develop.

However, they consider that to get out of this ICT low development is important that Peru make the decision to create a digital governing body in charge of promoting the massive use of the internet for daily life. This would complement the great effort developed by the Ministry of Transport and Communications in the National Dorsal Fibber Optic Network – (RDNFO) and Regional Networks, being the next step the promotion of digital services that can strengthen economic sustainability of the Network and the widespread growth of a popular digital citizenship.

Figure 21. The 2016 ICT Development Index

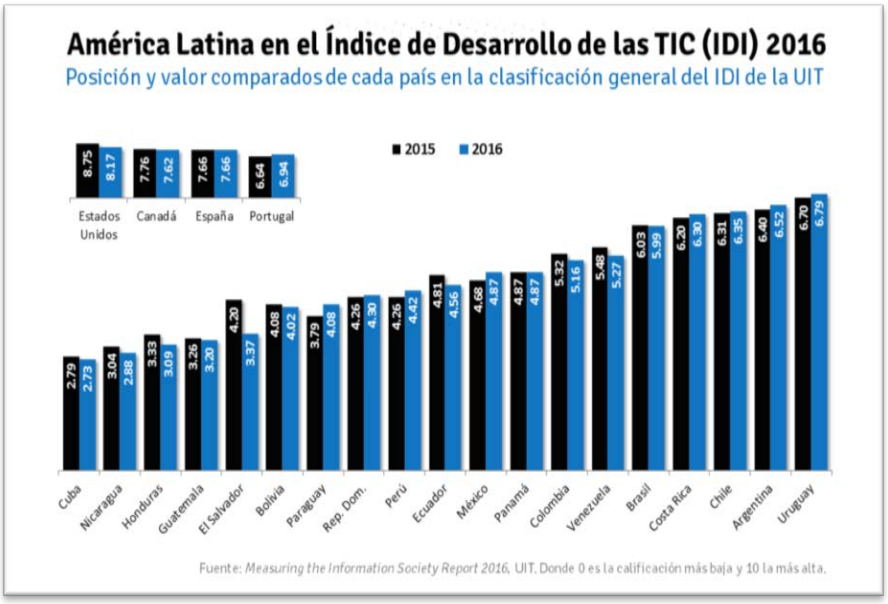


Source: DN CONSULTORES Telecom Strategies (May 20, 2017). 4G penetration in South America (2016) Recovered from http://www.dnconsultores.com/graficos/penetracion-4g-sudamerica-2016/

The 2016 ICT Development Index, presented in 2017, shows the new position reached by the 175 economies that were evaluated by the ITU, among them, Peru, which in 2015 dropped a position in the world ranking, by placing 101st place of the ITU economies. The results reflected that Peru is still behind in subscriptions to fixed telephones and homes with internet and broadband. At the level of South America, Peru was in the eighth position, surpassing only Paraguay and Bolivia. (Gestion Newspaper, January 26, 2017)

Cesar Peñaranda, Executive Director of the Institute of Economy and Business Development of the Chamber of Commerce of Lima (CCL) said that the index highlighted internet access and broadband in the Lima Metropolitan area, but the digital divide is too broad. Therefore, he said that the Peruvian government should stimulate a demand with policies of diffusion and training in rural areas and accelerate the process of learning and use of ICT in MYPES. (Gestion Newspaper, January 26, 2017)

Figure 22. Latin America in the ICT Development Index (IDI) 2016 Comparison of Position and Value of Each Economy in the General Classification of IDI by UIT (Taxation Unit)



Source: Instacharts M (s.f.). Latin America in the ICT Development Index (IDI) 2016. Compared position and value of each economy in the general classification of the ITU IDI. Recovered from: http://mediatelecom.com.mx/media/pdf/Instachart-america-latina-idi-2016.png

On July 6, 2016, the World Economic Forum (WEF) published the 2016 Global Information Technology Report, which mentioned that Finland, Switzerland, Sweden, Israel, Singapore, the Netherlands, and the United States of America are leading the world when it comes to generating economic impact of investments in Information and Communication of Technologies (ICT). These economies are known for adopting ICTs early and demonstrating that ICTs, together with a

favorable environment characterized by sound regulation, quality infrastructure and delivery skills, among other factors can provide broad benefits.

The 2016 report, "Innovar en la economía digital," (Innovate in the digital economy) measures 139 economies in the world, revealing that economies are increasing their ability to innovate in all areas, although few have had significant successes with economic or social impact.

In the case of Peru, it reports that it continues to occupy 90th place as it has the previous year, highlighting it as a positive aspect of its good coverage of the mobile network (1), while the economy with the greatest progress in the sub region was Brazil, which increased twelve positions, reaching 72nd place.

The report also points out that Peruvian development is limited due to the low quality of its educational system (129th place) and its poor quality of math and science education (136th place) making it difficult to prepare the economy to make good use of information technologies, as well as a lack of effectiveness in its legislative bodies (138th place) that delay the regulatory environment for ICT. (Baller Silja, Dutta Soumitra y Lanvin Bruno *Eds.*, s. f.).

Richard Samans, Head of the Centre for Global Agenda and member of the Board of the World Economic Forum in Geneva, said that the digital economy is an essential part of the Fourth Industrial Revolution, innovation needs to be fostered, as a key to prosperity in the world and the emerging Fourth Industrial Revolution, the governments of the Latin American region will need to strengthen efforts to improve their regulatory and innovation environments. (Industrial Development Centre. National Society of Industries, 2016)

Indeed, Peru is behind in terms of technology because it is one of the economies with the lowest rates of innovation, as commented by Edwin Maravi Perez, Director of Java. He said that companies invest in the Peruvian market, but not in innovation; for Peru to boost technologically, it must break the cycle of being an economy only producer, and show that it can create and innovate; in addition, it requires a digital literacy to work, to invest in systems specialists, not only in engineers but also in computer science experts who can contribute to medicine or any area of human knowledge. (Gestion Newspaper, September 29, 2016)

To clarify the state of the situation, the National Council of Science, Technology and Technological Innovation (CONCYTEC) as an organization to oversee the development of science, technology and technological innovation (CTI) in Peru, requested that the INEI to draw up and execute the I National Census of Research and Development in Research Centres in 2016,

in order to in order to obtain a reliable database that allows a better analysis of research and development (R & D) in Peru. The results of this census were presented in 2017.

Among the main conclusions were the following:

- In 2015, the R&D expenditure of the Research Centres surveyed was 518 Soles (US $163 million) which represented 0.08 percentage of the GDP. This result shows that Peru remains stagnant and lagging the regions peers and advanced economies. In fact, R&D spending as a percentage of GDP of the Pacific Alliance, excluding Peru, stood at 0.38 and the Organization for Economic Cooperation and Development (OECD) at 2.38.
- It was found that universities are the ones that have spent the most in R&D. In the year 2015, university spending accounted for 46.8 percentage of total expenditure (private non-profit universities: 28.0 percentage, public universities: 15.7 percentage and private for-profit universities: 3.1 percentage). It should be noted that R&D spending by private non-profit universities accounted for about 60.0% of university expenditure and about 30,0 percentage of total expenditure.
- According to the area of knowledge, in 2015 R&D Activities were mainly extended to Natural Sciences: 32.0 percentage and Engineering and Technology: 23.0 percentage, in both cases according to total R&D expenditure. Approximately 80.0 percentage of R&D spending was funded by the economy's funds (around 60,0 percentage with own resources and 20,0 percentage with resources from third economies.) For its part, the remaining 20.0 percentage was financed by international sources, mainly from foreign donations and competitive funds.
- In the same year, 31.8 percentage of the researchers had a doctorate degree (1,069 researchers with doctorates) a number that was lower than other economies in the region. For example, Chile and Uruguay this percentage was 39.2 percentage and 64.2 percentage respectively. While in the OECD it reached 42.8 percentage. In addition, only 27.0 percentage of the researchers were working in Engineering and Technology, this figure was lower than other economies in the region. Thus, in Chile it was 35.1 percentage and in OECD members it was 46.0 percentage.
- The main obstacle faced by the research centres was the lack of financial resources (58.6 percentage) followed by a lack of knowledge of funds that finance R&D (29.5 percentage) and lack of coordination within the institution or with other institutions (28.4 percentage)

Finally, CONCYTEC today has available information on Science, Technology and Technological Innovation (STI) for Peru that can be classified into three categories:

- *Science and Technology*, which in turn is divided into three informative components: Research and Development (R&D) covered by the Census in mention; training of human resources for Science and Technology, information obtained by the National University Census 2010, and Scientific and Technological Services.
- *Innovation*, according to models from international experience, it is classified in sectors as manufacturing, services, farming, among others; Peru currently has data from the National Survey of Innovation in The Manufacturing Industry, executed in the term 2012 - 2014.
- *Other aspects*, as perceptions surveys of Science and Technology, gender and other gaps, and studies carried out by private entities and multilateral organisms. (CONCYTEC, 2017).

In December 2012, the Ministry of Economy and Finance (MEF), through the General Management of Investment Policies, released the document "Public Investment Policy in Science, Technology and Innovation. Priorities, 2013 - 2020" with the aim of improving the performance of the economy's STI (Science, Technology and Technical Innovation), system, in terms of major efficiency in the generation, transfer and adoption of knowledge that could allow an increase of the economy's productivity and competitiveness in the medium and long term.

Pursuant to Act N° 28303, the Act of Science, Technology and Technological Innovation, Peru formulates for the first time a "National Strategic Plan for Science, Technology and Innovation for Competitiveness and Human Development. STI "2006 - 2021", which was published in April 2006. Such plan recognizes the STI as a public necessity and an economy's interest; it is oriented towards the priorities of the economic and social development, and the attention to the demands of the Government's actors involved, the academic and research institutions and productive sectors. In addition, it prioritizes strategic areas of knowledge in which Peru can achieve leadership based on its comparative advantages: biotechnology, genomics, materials sciences, environmental sciences, information and communication technologies and clean technologies. It places the strengthening of human capacities at the highest level of importance, and the indispensable material support in infrastructure, information and equipment of investigation in STI priority areas. (CONCYTEC, s.f.)

On the other hand, CONCYTEC and the agencies of the National System of Science and Technology (SINACYT) promote the interaction of the private, public and academic sectors to help prepare the central, regional and special programs that are required to stimulate science and technology in Peru, in accordance to the long-term plans and policies of the Peruvian Government.

14.2 Current Status of Women Entrepreneurs of Peru

History

In the 90s, when Peru endured a hyperinflation and lived in chaos because of terrorism, people from its different provinces moved to the capital in pursuit of safety and opportunities to improve their social and economic situation, but things didn't happen like that, so Peruvian creativity begun to make a living.

Bronny Loayza Alvarado, Manager of Peru Global Projects - an independent brand providing services of new business development and consultancy on business management, states that the term "entrepreneurship" appeared in Peru motivated by poverty and the lack of job opportunities in this decade. According to Loayza, "entrepreneurship out of necessity" is just the implementation of a business idea in haste, without knowing if there is or not a market potential to generate incomes. That way, that necessity led many people to look for their own job and create their own business; but most of them were involved in the trade and service industries.

Likewise, he noted that these entrepreneurs weren't supported by the Government, which led them to create Industrial and Business Clusters in areas of Lima Metropolitana, such as Villa El Salvador, Los Olivos and the commercial emporium of Gamarra, places in which today's successful entrepreneurs, who are good examples for other entrepreneurs, were born.

Similarly, Patricia Jimenez, former Director of Business development LATAM - Opinno for Latin America, remarked that not all businesses imply a high first investment, due to many enterprises started with little capital and became in successful businesses. In her opinion, good ideas, effort and dedication define entrepreneurship's success.

Jimenez also remarked that there are many profiles of social entrepreneurs who try to give a solution for the greatest problems of Peruvian society, interacting in fields related with Education, Transport, Hygiene and Health.

Over the years and developments in legislation, there has been an improvement in the environment for the rising of new entrepreneurs in Peru who, currently, have established big companies with an economy's and international recognition and prestige. (*Gestion,* August 30, 2015)

Female Labor Force in Peru

In May 2016, the National Institute of Statistics and Informatics (INEI by its acronyms in Spanish) reported that the Peruvian female population was 15,716,000 people, representing a 50.0 percentage of the total population, a 74.8 percentage of which were in a legal age (11,752,000

people). From this population, 7,209,000 women belonged to the economically active population (EAP) of Peru that is from every 100 people, aged 14 or over belonging to the EAP, 44 were women.

According to the results obtained from the "INEI's National Household Survey", the percentage of employed women increased by 23.2 percentage in the last ten years; by 2016, there were 6,947,000 employed women. The greater incorporation of women into economic activity followed the decrease of fertility rates and access to education, which allowed a major time available to access to a paid activity.

Therefore, INEI reported that women's insertion in small enterprises defined their participation in the labor market; this way, a 69.2 percentage of them worked in an enterprise with a range of 1-5 employees, a 5.5 percentage in enterprises with 6 to 10 employees, a 6.4 percentage in enterprises with 11 to 50 employees and only an 18.9 percentage in enterprises with 51 employees and over.

According to the economic activity branches in which women interact, it was noted that a 40.5 percentage of these women worked in services, a 25.6 percentage in trade activities, a 22.3 percentage in agriculture, an 8.6 percentage in manufacturing and a 1.9 percentage in transport and communications. (INEI, 2016)

Women Entrepreneurship in Peru

The Ministry of Women and Vulnerable Population (MIMP) has as one of its strategic institutional aims the enhancement of women and vulnerable populations' physical, politic and economic autonomy over their lives and promote the insertion of women into the labor market, perhaps through agreements with public and private entities and, also the promotion of entrepreneurship's ideas.

Regarding this last, the former MIMP's head, Marcela Huaita, in an interview performed by Gestion newspaper in May 2015, recognized that many women started a business because of "their needs", they are household heads with children whom they need to feed; so, this is not a result of their opportunities, as in businesses started by men, this is a result of their needs.

She also remarked that the "good" coming onto the market and the "service" performed by enterprising women do not have a market research, making a 26.0 percentage of those businesses doomed to failure. Another factor she remarked was their lack of training, making that such businesses have a high failure rate later. For that reason, the MIMP was committed to take measures in order to enhance the women's economic business skills which allow them to generate incomes and prevent their children from working in the streets.

The ex- minister emphasized that women entrepreneurship faces various challenges. The first one is to improve the conditions in which these initiatives rise. Then, face situations of violence which they are victims and provide that entrepreneur with the appropriate health care because, the more time for her recovery, the less profits into the business and possibilities to subsist, making the women entrepreneurship's failure and mortality rate really high.

Finally, she noted that the three specific aims to achieve are: improve enterprising women's self-esteem, increase their knowledge on business plans and generate skills on a particular product. (Gestion, May 11, 2015)

In November 2010, Claudia Piras, a specialist in the fields of gender, labor marked and business development in Latin America of the Inter-American Development Bank - IDB and co-author of the book "Women Entrepreneurs: Barriers and Opportunities and Barriers in the Formal Private Sector in Latin America and the Caribbean", confirmed what the former minister Huaita said: Peruvian women have a higher entrepreneurship rate than men, in contrast to most of the economies of this region. Peruvian women have a greater presence as entrepreneur in SME's (small and medium-sized enterprises) than men.

Among the findings of the study, it was noted that in almost all the economies of the region, businesses owned by women are smaller in terms of sales, dimension and value of the assets due to the lower levels on women education in terms of "business management and financial literacy". Similarly, due to their obligations in caring for their children and household, these entrepreneurs were looking for opportunities in their businesses, which meant a "cost in the number of hours dedicated to business activity". (Pymex, November 22, 2010)

Several years later, in March 2017, Peru was considered one of the leading economies with women in the world, according to the first index of MasterCard's Women Entrepreneurs. The International Markets President of MasterCard, Ann Cairns, pointed out that economies in Latin American region at the top of the list are: Costa Rica, Peru, Colombia and Chile followed by Brazil, Uruguay, Argentina, Ecuador and Mexico.

The report presented by MasterCard confirmed that women's entrepreneurship is due to the "need and determination". But some significant conditions of support are required, such as opportunities of professional development, access to financial services and facility to start business in order to insurance its business property as it occurs in developed markets of New Zealand, Canada, the United States of America among others, where the existing conditions endorse the business

property for women, with significant communities of small and medium - sized businesses as well as a high quality governance and facilities to start business.

In addition, it was indicated that there are some of the best enterprising women in Peru, but the entrepreneurship in the future is limited by the fear of business failure, restrictive governmental policies, lack of financial support, education and the suitable business training. In this way, the report points out that enterprising women tend to become successful in social surroundings where the female gender bias is lower in terms of opportunities to access to financial services, education where market factors for SME's are favorable.

For this reason, the Report recommended that public and private sector work together for dealing with cultural and organizational issues in order to empower the leading women since, to the extent that more spaces are opened where they can strengthen their relations with peers, women will be in a better position to recognize their full potential as well as accelerating a more inclusive growth. (RPP News, March 7, 2017)

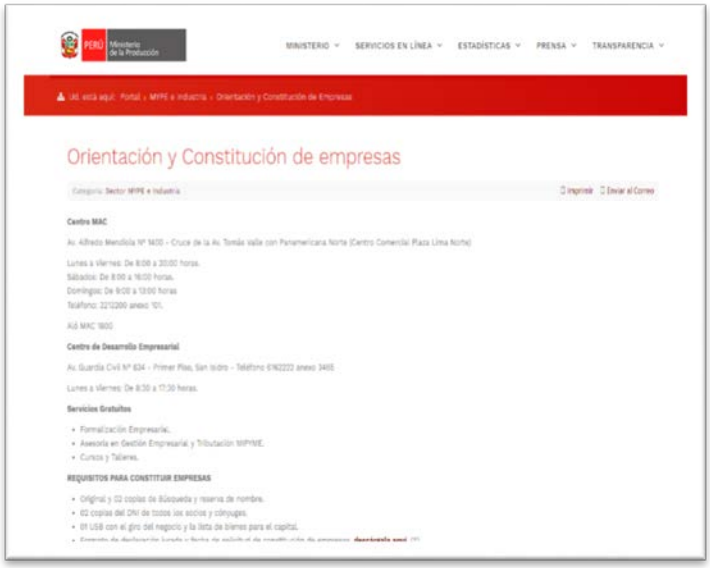
In the context of the International Women's Day, on March 8, 2017, then the Ministry of Production minister (PRODUCE, in its Spanish acronym), Bruno Giuffra, claimed that the number of enterprising women in Peru would reach a 1.2 million for this year. This, because of the administrative simplification applied and the digitalization strategies introduced in his sector.

> *"These actions promote the emergence and formalization of businesses. Only this year, more than 26 000 micro and small companies headed by enterprising women would be created"*, he said. (Ministry of Production, s.f.).

The former head of Production explained that there is a great heterogeneity regarding the geographic distribution of the number of enterprising women. A 19.0 percentage of them is in Lima (217 553), 10.0 percentage in Puno, 7.0 percentage in Cusco and La Libertad respectively, and 6,0percentage in Piura where important cases of women entrepreneurship are also observed.

Likewise, he indicated that the average age of women entrepreneurs is 45, being lower in two years to the men entrepreneurs' average (aged 47). At a sectoral level, the activities with greater presence of women entrepreneurs are trade (41.6 percentage), services (26.2 percentage), agriculture and livestock (25.3 percentage) and manufacturing (6.7 percentage). (*La Republica*, March 8 2017)

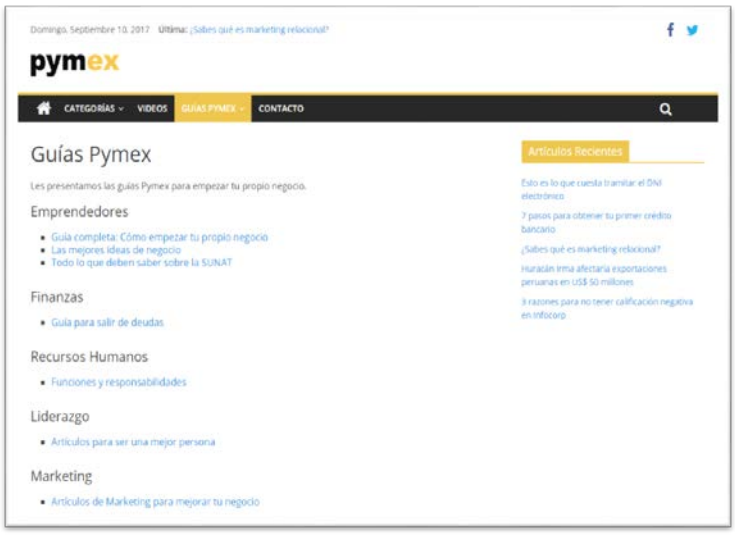
Figure 23. MSE Sector and Industry



Source: Ministry of Production (s.f.). Companies Orientation and Constitution. Category: MSE Sector and Industry. Recovered from: http://www.produce.gob.pe/index.php/mype-industria/orientacion-y-constitucion-de-empresas

Similarly, in March 2017, two months later, PYMEX, a portal oriented to enterprising entrepreneurs and exporters providing useful information and training on finance, leadership and technology issues to be applicable to business, reported on the situation of Peruvian women entrepreneurs, through its "Pymex Guide".

Figure 24. Pymex



Source: PYMEX. Business Portal, Business Ideas, Success Stories (September 10 2017). "Pymex Guide". Recovered from: https://pymex.pe/guias-para-empezar-tu-propio-negocio

This guide presented the results of the "Boletin de Demografia Empresarial" (Bulletin of Business Demography) – INEI (National Institute of Statistics and Informatics) which allows to know the creation and disappearance of companies at quarterly, on the basis of the information obtained from the Central Companies and Establishments Directory which has the National Register of Taxpayers from the National Customs and Tax Administration Superintendent (SUNAT, in its Spanish acronym), that registers functioning companies as well as those which were written off.

Figure 25. Independent Entrepreneurs

According to INEI data, by the 4th quarter of 2016, 42,104 businesses managed by natural persons were established, of which 23,468 (55.7 percentage were managed by women and 18,636 (44.3 percentage) by men, showing a greater insertion of women as formal independent entrepreneurs within the business community, with more opportunities than men to succeed in their businesses. In this sense, INEI found that the behavior of businesses that entered and left the business market, revealed a greater participation of women.

Regarding the businesses created by natural persons closed or written off within a similar period, 12,705 were managed by men, representing a 55.3 percentage of the total and 10,266 (44.7 percentage) by women. More women than men started a business as natural person within the service sector. It is remarkable that a 63.9 percentage of new business units (10,532) were managed by women versus a 36.1 percentage (5,943) of businesses managed by men within the retail trade.

Similarly, a greater participation of women in new businesses, in accommodation activities and food service (3,537 units) was reported, representing a 63.7 percentage of businesses created by natural persons versus the 5,552 units in total recorded within the trimester under development. According to type of business, beauty salons were included, of which 8 from every 10 salons opened by natural persons were registered by women.

Within the developed period 2016, INEI reported that, in all of the economy's departments, except from Loreto, the percentage of women entrepreneurs was higher than men's, that is, it overreached the 50,0 percentage, among which outstands Tumbes (64.3 percentage), Tacna and Ica (63.0

percentage for each one), Moquegua (61.3 percentage), Madre de Dios (61.0 percentage) and Cusco (60.7 percentage). (*Pymex*, May 10, 2017)

The following year, the Bulletin "Business Demography in Peru" corresponding to the second quarter of 2017 recorded 43,735 operating businesses created as natural person, of which 22,759 were managed by women representing a 52,0 percentage of the total, which means and states again that there is a greater participation of women in the management of businesses. While the number of businesses managed by men amounts to 20,976 (48.0 percentage).

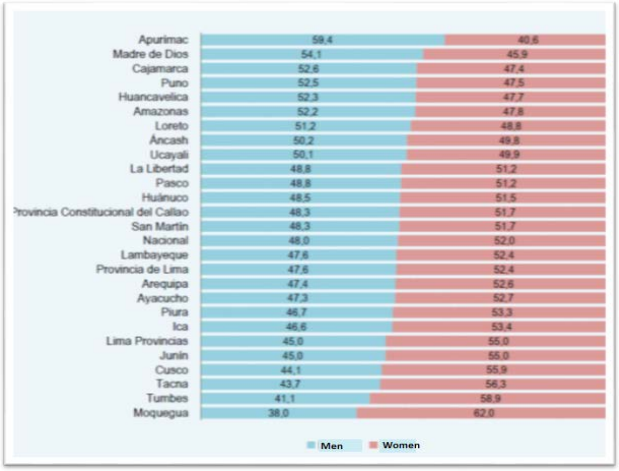
Making a gender and region-based analysis of the businesses created as natural person, it was noted that women had participation greater than 50.0 percentage in almost all of the economy's regions, except from Amazonas, Ancash, Apurímac, Cajamarca, Huancavelica, Loreto, Madre de Dios, Puno and Ucayali. Women's greater participation was recorded in regions such as Moquegua (62.0 percentage), Tumbes (58.9 percentage), Tacna (56.3 percentage), Cusco (55.9 percentage), Junín and Lima Provinces (55.0 percentage for each one) among the most representative.

According to the economic activity performed by businesses created as a natural person, INEI reported that 5,690 businesses performed activities of food and beverage service, of which a 64.3 percentage were managed by women and a 35.7 percentage by men. Businesses managed by women, too, such as retail (61.8 percentage) and wholesale trade (55.4 percentage), were found among the most important.

On the other hand, men had a greater participation in the management of businesses dedicated to construction (85.5 percentage), mining and quarrying (79.3 percentage), transport and storage (76.5 percentage), sale and repair of vehicles (68.2 percentage) and agriculture, livestock, forestry and fishing (67.1 percentage) within the trimester under development.

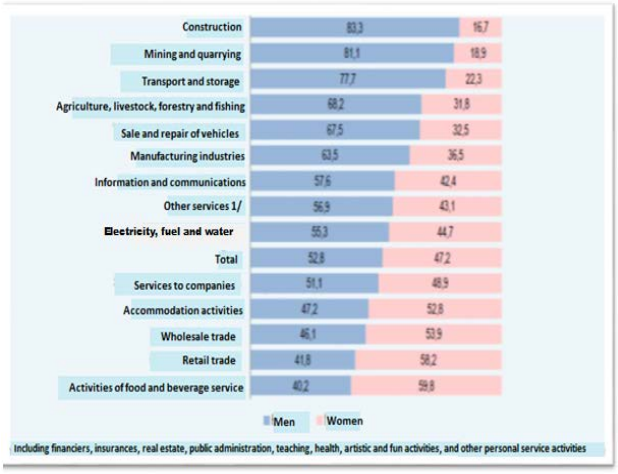
In the second quarter of 2017, Peru had 21,997 businesses written off, registered as natural persons, 11,604 (52.8 percentage) were managed by men and 10,393 (47.2 percentage) by women.

Figure 26. Operating Natural Persons by the Managers Gender, According to the Region, Second Trimester 2017



Source: Instituto Nacional de Estadística e Informática - Directorio Central de Empresas y Establecimientos

Figure 27. Operating Natural Persons by the Manager's Gender, According to the Economic Activity Second Trimester 2017



Source: Statistics and Informatics National Institute - Central Directory Companies and Establishments

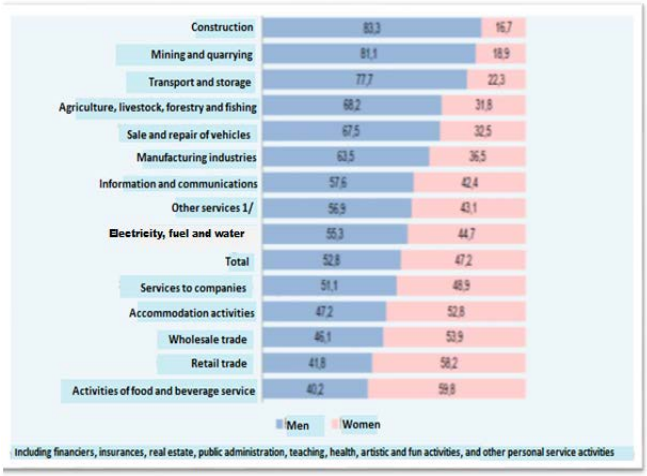
Regions where women had more participation in the management of retired companies as a natural person were Tacna (58.3 percentage), Moquegua (57.9 percentage), Cusco (56.6 percentage), Pasco (55.1 percentage), Lambayeque (52.9 percentage), Piura (52.6 percentage) and Tumbes (51.9 percentage). Meanwhile, there were different regions where men had more participation in the management of retired companies and they were Amazonas (58.3 percentage), the Constitutional Province of Callao (58.0 percentage), Madre de Dios (57.3 percentage) and San Martín (56.6 percentage) and others.

According to the activity carried out by the retired companies constituted as natural persons, where women had greater participation, one thousand 505 companies were engaged in food and beverage

service activities: 59.8 percentage were of women and 40.2 percentage were of men. Retail trade activities followed (58.2 percentage) wholesale trade (53.9 percentage) and accommodation activities (52.8 percentage)

On the other hand, the activities in which the man had a greater participation in the management of retired companies registered as natural persons were: construction (83.3 percentage) mining and quarrying (81.1 percentage) transport and storage (77.7 percentage) and agriculture, livestock, forestry and fisheries (68.2 percentage).

Figure 28. Natural Person Written off by the Manager's Gender, According to the Economy Activity



Source: Statistics and Informatics National Institute, 2017, p.40)

Terms used by the INEI:

- Natural person: Is a human person, of visible existence, endowed with all the rights and obligations that the legislation needs.
- Company startups: Includes companies that are created or reactivated; likewise, those who start to carry out economic activities.
- Discontinuation: Includes companies that cease to operate due to permanent closure or termination of their activities, temporary suspension, death in the case of natural persons, and merger by division in the case of legal entities.

To this day, September 2017, the consultant Themma specialized in entrepreneurship, through Francisco Marcelo, its founder and General Manager announced the results of a public survey on entrepreneurship in Peru, with the objective to review the Panorama of the sector and to know the perceptions of the different actors of the local entrepreneurial ecosystem. Among its main results is that:

- 54.2 percentage have confidence in their product and/or services; have motivations that allow them to focus their work to achieve success, even though, there exists many aspects to improve the entrepreneurship.
- 26.4 percentage undertake because they want to be their own boss, although, it is known that the entrepreneur has to be accountable for more people.
- 9.7 percentage trust in the profitability of their idea, however Marcelo indicates that it is not possible to be undertaken unless a route of income generation is defined.
- 8.3 percentage were aware that the "union means strength" by what it undertakes with strategic allies and/or clients established at the beginning of the entrepreneurship.

The survey made by Themma also found that 29.2 percentage of respondents sought commercial strategies, 25.0 percentage used innovation as a tactic to remain in the market, 22.2 percentage sought to specialize in their sector to know their own market, 12.5 percentage required external support and 11.1 percentage sought other channels of communication, such as investment for dissemination in social networks and the media.

Finally, 54.2 percentage of the entrepreneurs surveyed aimed to increase their client base and hoped to boost their business strategy, 11.1 percentage wanted to expand their knowledge by participating in events and 22.2 percentage planned to increase turnover with their current customers.

What is certain is that, the entrepreneurship needs the success, resilience, conviction and the development of the entrepreneur's abilities as a guide in this way, according to Francisco Marcelo. (*Gestion*, September 6, 2017)

How Is the Peruvian Woman Characterized as an Entrepreneur?

Respond to this question Claudio Leno, Director of the NGO Embark Woman Peru and former director of WEConnect in Peru, an international organization that unites Peruvian women with international corporations such as Pfizer, Coca Cola or Microsoft. She states that, among the main characteristics of women's leadership style, women tend to hire more women, they are more responsible for the payment of loans that they acquire because they have to build a credit history; in her research, she found that 60.0 percentage of loans to microenterprises in Peru are delivered to woman and that is a consequence of the fact that they have shown that they are good payers. In addition, she said that women entrepreneurs are more flexible and considerate about their workers permits because they believe in the capacity of responsibility of their collaborators in terms of the

objectives that must be met. (Cadenillas, 2015)

Also, she pointed out that Peruvian women are not afraid of starting a business; they are so entrepreneurial, despite many of them not having access to education, resources and credits, unlike other entrepreneurs in different parts of the world. The 70.0 percentage of Peruvian women want to have their own business, because they consider that to make a business is a challenge, but is not impossible, there is a need to balance the personal life with work life, and she said Leno. (Cadenillas, 2015)

The ACP Group, a non-profit civil corporation that seeks to achieve a social impact in Peru through investments in companies or self-sustaining programs, to support micro-entrepreneurs and young people with limited resources, has presented some reflections on the qualities of the enterprising women in Peru.

The company indicates that, according to the IDB (Inter-American Development Bank), a large part of micro-enterprises in Peru are led by women, many of whom have to support their families and, thanks to a business idea, have succeeded in running a business that today allows them to support their home. Among the characteristics that every enterprising woman has, the following ones stand out:

- Entrepreneurial spirit
  Women have seen entrepreneurship as their economic independence and the way towards their personal and family development. They do not ask anything from anybody and - even if they have everything against them– they continue by themselves.
- Fighter
  Due to an identified idea or opportunity in the market, women have assumed the challenge of being their own source of income to provide for their families.
- Positive
  Enterprising women are specialists in "always seeing the glass half full", which means that despite "very good" or "bad" situations they are always ready to find the bright side of the situation.
- Leader
  Enterprising women are leaders and at the same time workers. Enterprising women know how to manage their houses and also their business. They know how to guide their children and their workers, as well as their community and other women like them.
- Persevering
  They are aware that they may not get good results when setting up a business; but they

> know they need to keep going until they achieve their goal. Entrepreneurial women do not give up and see failure as an opportunity for learning. (Peru21, March 4, 2016)

The leadership, effort, dedication, perseverance and responsibility shown by Peruvian enterprising women to manage their businesses and promote their growth are recognized by public and private organizations as well as by society in general. The aim is their inclusion in the development of the economy and therefore it also aimed to provide them with tools and competences, so they will be able to manage their businesses successfully, assume leadership and achieve management responsibilities within organizations.

Thus, the Network of Women Entrepreneurs of Peru (REDMEP), established in Peru and the United States of America, works to strengthen and empower businesswoman and entrepreneurs across the economy and in those States of North American territory where Peruvian women live.

The REDMEP brings together "Entrepreneurial Women", "SME Women", "Successful Enterprising Women" and "Professional Women" who fulfill their own and diverse roles, but are integrated with the same purpose, to achieve growth and personal and professional development, gain access to constant training, have equal opportunities for the support of their businesses, goals that will guarantee an economic growth, environmental care and social welfare. (RedMep, s.f.)

Last year, 2016, Dalila Rosario Gamarra, legal representative of REDMEP, in agreement with Alfonso Velasquez, president of Sierra Exportadora, implementing public agency that aims to promote and develop the exportable quality supply in order to introduce the Peruvian Sierra to the domestic public and international markets through the promotion of local enterprises and innovation of productive processes, signed an agreement for inter institutional cooperation framework to take forward the "National Enterprising Woman Award" and other activities and services that contribute to emphasize the relevance and importance of the role of enterprising women in society.

In the first edition of the 2016 prize, a total of 91 women entrepreneurs from the small business, whose income did not exceed the 1,700 ITU Tax Units (sales per S/ 6.7 million soles per year) and of the microenterprise whose non-income exceeded 150 ITU (sales per S/ 592,500 soles per year), from 19 regions of the economy.

The regions with the largest number of participants were Lima (18), Cusco (10), Amazonas, Cajamarca and Arequipa (7 each one), Apurímac (6) and La Libertad, Huancavelica and Huánuco (5 each one). Other regions that participated were Ancash, Junín, Puno, Tacna, Ayacucho, Callao, Moquegua, Lambayeque, Piura and San Martín. The candidates came from the sub-sectors agroindustry, handicrafts, trade, gastronomy, jewelry, clothing and textiles, and tourism, among others.

The indicators that were evaluated were: innovation, sales, and business contribution to the promotion of gender equality and number of working position created for women. The results were awarded to the entrepreneur Adriana Valcarcel Manga, from the Cusco region, owner of "Cusco Mara", in the Micro Enterprise category, dedicated to the research, production and marketing of products made from kiwicha, quinoa, cañihua, corn and beans, in different presentations.

Likewise, in the Small Business category, Maria Guzman Mariño, from Arequipa, won for her outstanding management and contribution to the tourism sector through her company "Santa Catalina Tours", founded in 1986; she is one of the pioneers in promoting the Colca route and opening new tourist destinations in the south of Peru. (*Gestion*, March 29, 2016)

The 2017 edition of the "National Enterprising Woman Award" will evaluate the start-up of the company that is directly managed by the entrepreneur, it is agro industrial, textile, livestock, tourism, handicrafts or others, as well as the results and contribution of the business to the promotion of equal opportunities, and the number of working positions created especially for women.

This year award 2017 also includes four honor mentions: online business, career record, family and youth entrepreneurship; the award ceremony will be held in October.

In the Micro Enterprise and Small Business categories, as well as in the honorable mentions, prizes will be given, such as international and domestic internships, so the winners of the contest can exchange experiences that enrich their business development. Internships will be granted by the Trade and Investment Unit IDB / ConnectAmericas.

Likewise, they will receive scholarships granted by the ESAN University and the Pontifical Catholic University of Peru (PUCP) to gain access to courses in business management with the goal of strengthen their performance in their area of work. (*Gestion*, March 10, 2017)

15. Economy Report of the Philippines[112]

15.1 Current Status of the ICT Sector of the Philippines

By technical definition, Information and Communications Technology (ICT) refers to all technology designed for the purpose of creating, manipulating, storing, managing, sending, and receiving any type of information. This includes media utilized through the internet and on technology hardware such as computers, tablets, mobile phones, and as well as older technologies such as radio, television, and the telephone[113]. ICT also includes software like social media services, mobile apps and tools. In the socio-economic development sphere, ICT is powerful tool that, when correctly utilized, can address social inequities and help poor economies achieve its development goals. In fact, the promotion and the utilization of ICT is among the key strategies agreed upon by the members of the United Nations (UN) to effectively deliver on the Sustainable Development Goals (SDG) by 2030[114].

In the current ICT landscape in the Philippines, there is a striking digital divide between the educated middle class in the cities and the rural-based populations. While people in the city have easier access to internet, mobile phones, computers and other forms or medium for ICT, there is still a very low computer and internet proliferation and usage in the rural countryside[115]. Contributing to this digital divide are the (1) lower levels of education in the rural areas that makes ICT intimidating to use; (2) the unavailability of ICT infrastructures or services that makes it inaccessible for these individuals; and (3) affordability of ICT tools and services, such as laptops, mobile phones and internet.

Infrastructure is among the key driver to accessing ICT, in the Philippines, there are only two major private corporations which provide mobile and internet services across the economy - PLDT-Smart Telecommunications with 54% market share, and Globe Telecoms with 29% market share, smaller mobile, cable TV and internet providers are also beginning to penetrate households in smaller market shares. This duopoly in mobile and internet services have efficiently kept prices all-time high, recently, the Philippines has been rated to be one of the slowest internet service in the Asia Pacific region.

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[112] This report was written by Joy Munsayac-Cacal, Researcher | Project Management Consultant, Coca-Cola Philippines, the Philippines.

[113] UN-APCICT. (2016). Module C1: Women's Empowerment, SDGs and ICT. Korea: UN-APCICT/ESCAP

[114] Sustainable Development Goals as defined in Transforming Our World - the 2030 Agenda for Sustainable Development

[115] (2003, May 28). Gender and ICT in the Philippines: A Proposed Policy Framework. Philippines Legislators' Committee on Population and Development Foundation, Inc. & WomensHub: the Philippines.

Despite being one of the slowest, prices of internet services in the Philippines is among the most expensive. Rate per Mbps is on the average of Php848.65 (US$18), which is over three times the average global price of Php243.07 (US$5.21) per Mbps. PLDT Smart and Globe offers 100 Mbps fiber optic internet services in high end locations in Metro Manila with a monthly rate of about Php20,000 (about US$400)[116].

According to the Foundation for Media Alternatives, only 43% of Filipinos have Internet access. Internet shops where you can rent computer and internet time are also available in the economy, but many youth are utilizing these facilities mainly for games and entertainment. It is common that many young Filipinos are avid online gamers, but do not know the basics of ICT applications for educational and productive utilization.

While ICT software, hardware and gadgets are easily available for sale from the numerous malls and shops across the member economy, only individuals earning wages or have at least a regular source of income are able to acquire such tools, which they mainly use to communicate or socialize online with other individuals, like family and friends. According to newsbytes.ph, 40 million Filipinos are active mobile social media users, favoring Android operated gadgets, 81%, over iOS, 19%. This is mainly because Android based gadgets are more adaptable and costs cheaper compared to iOS. Based on age demography, 88% of mobile internet users are under the age 34. With ages 15-24 dominating by 53%; 25-35 years old by 35%; 35 to 44 years old by 9%; and 45 years and older by 3%.It is also noteworthy that 94% of these active mobile internet users have Facebook account, with Facebook messenger as the most popular communication app, followed by Viber and Skype[117].

Figure 29. Asia Pacific Economies Internet Speed

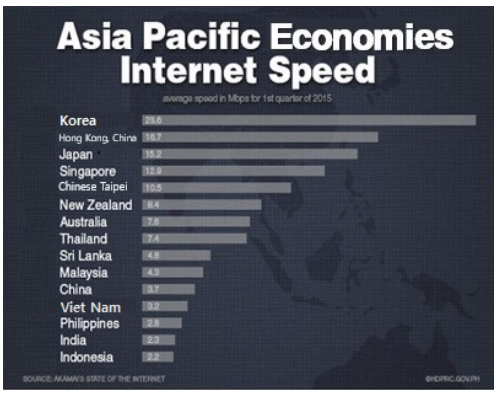


Image source Philstar Website: http://beta.philstar.com/opinion/2015/08/23/1491398/uy65lI2jA8sREwpd.99

[116] Why is our internet so slow?, Lila Ramos Shahani, August 2015, http://beta.philstar.com/opinion/2015/08/23/1491398/why-our-internet-so-slow#uy65lI2jA8sREwpd.99

[117] Profile of Smartphone Users in the Philippines, September 10, 2016 http://newsbytes.ph/2016/09/10/inforgraphic-profile-of-smarkphone-users-in-the-philippines,

There is also an observed gender disparity when it comes to access to ICT for productive use. Traditional Filipino families, especially in the rural areas, remain very patriarchal. It is regarded that ICT, and other Science, Technology, Engineering, and Math (STEM) fields in general, as a form of productive endeavor is a more appropriate field for male members of the family[118]. As a result, ICT is likely to become more accessible through education to Filipino males. This gender digital divide is deeply rooted from the historical economic, socio-cultural, and political inequities between Filipino men and women. Filipino male population dominates the IT field in the economy, gender stereotyping and discrimination in education and the workplace end up making the knowledge needed to better utilize ICT more accessible and seemingly more appropriate to men only. These circumstances makes ICT promotion among Filipino women a gender gap equalizing tool, as stipulated in SDG #5 on achieving gender equality and empowering all women and girls.

The succession in the Philippine Government leaderships acknowledge the importance of ICT in state building. In the year 2016, the ICT government arm has been fully empowered to become an independent executive department, this is coming from being a long time sub-office of the Department of Transportation and Communications (DOTC) and the Department of Science and Technology (DOST). The Department of Information and Communications Technology (DICT) came into being by virtue of Republic Act 10944 otherwise known as the "Department of Information and Communications Technology Act of 2015," which was signed into law on 23 May 2016 by former President Benigno S. Aquino. Transitioning to a fully operational department, the DICT is mandated to serve as the primary policy, planning, coordinating, implementing, and administrative entity of the Executive Branch of the government that will plan, develop, and promote the economy's ICT development agenda. It envisions that the Philippines will become "*an innovative, safe and happy economy that thrives through and is enabled by Information and Communications Technology,*" with the firm commitment to (1) provide every Filipino access to vital ICT "infostructure" and services; (2) ensure sustainable growth of Philippine ICT-enabled industries resulting to creation of more jobs; (3) establish a One Digitized Government, One Nation facility; (4) Support the administration in fully achieving its goals; and (5) be the enabler, innovator, achiever, and leader in pushing the economy's development and transition towards a world-class digital economy. The current government leadership is also supportive to the set mandates of the DICT and provided budget to facilitate the accomplishment of its set of commitments[119].

Likewise, the DICT, the Philippine Commission on Women (PCW), and the United Nations Asian and Pacific Training Centre for Information and Communication Technology for Development

[118] (2003, May 28). Gender and ICT in the Philippines: A Proposed Policy Framework. Philippines Legislators' Committee on Population and Development Foundation, Inc. & WomensHub: the Philippines.

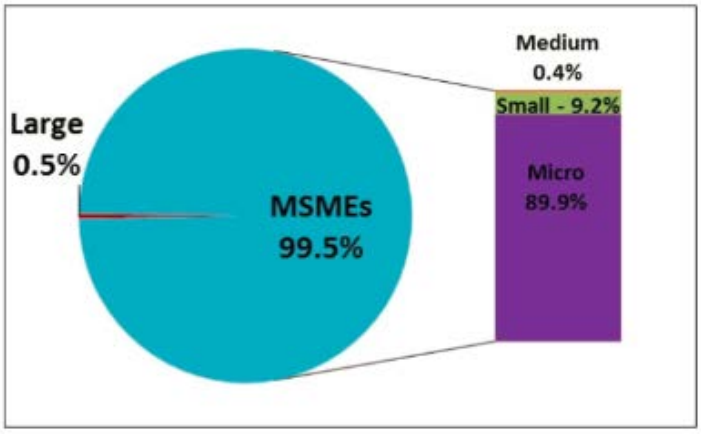
[119] Department of Information and Communications Technology (DICT) official website: www.dict.gov.ph

(APCICT), together with the Department of Trade and Industry (DTI) and the ASEAN Women Entrepreneurs Network (AWEN) forged partnership for the Women ICT Frontier Initiative (WIFI) ASEAN Sub-Regional Launch. This partnership program aims to promote ICT capacity development to help empower women entrepreneurs in Asia and the Pacific. The program aims to promote ICT as business development tool to support women-owned businesses, while also influencing Philippine legislative and executive government leaders to foster an enabling environment for an ICT-empowered women entrepreneurship[120].

15.2 Current Status of Women Entrepreneurs of the Philippines

In the 2015 recorded data of the Philippine Statistics Authority (PSA), there are about 900,914 enterprises established in the member economy, where about 896,839 or 99.5% are categorized as micro, small and medium enterprises (MSMEs) and the remaining 0.5% or 4,075 are classified as large enterprises. Of the MSMEs, 89.9% are categorized as micro enterprises, 9.2% are small enterprises and about 0.4% are considered medium enterprises. Majority of women entrepreneurs are concentrated in the MSME category.

Figure 30. Distribution of Businesses by Enterprise Size



Source: Department of Trade and Industry website: http://www.dti.gov.ph/businesses/msmes/msme-resources/msme-statistics

Based on business assets valuation and number of employees, MSMEs are classified according to these values in Table 25 below.

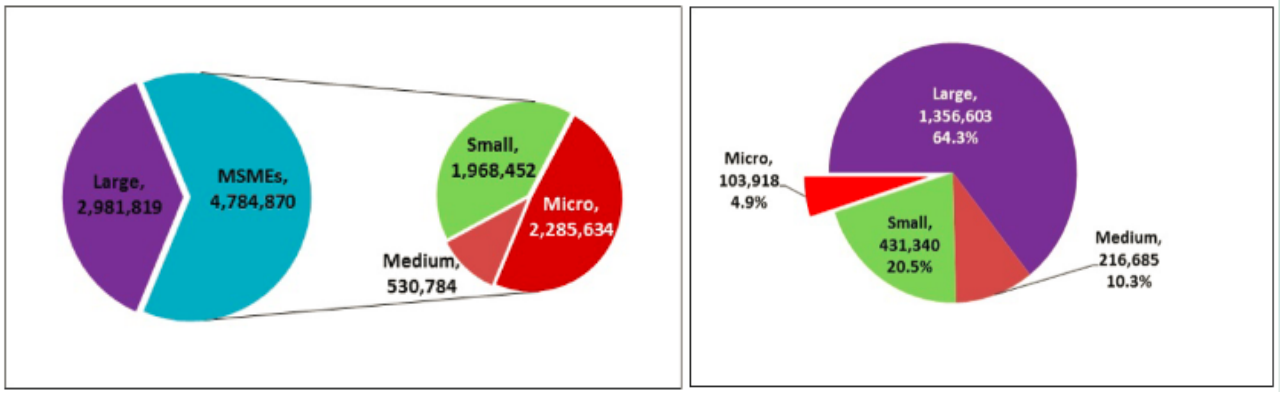
[120] Philippine Commission on Women. (2017, August 28). Women ICT Frontier Initiative (WIFI) Program for ASEAN launched in PH-hosted 2017 Women's Business Confab. Retrieved from http://www.pcw.gov.ph/article/women-ict-frontier-initiative-wifi-program-asean-launched-ph-hosted-2017-women%E2%80%99s-business-confab

Table 24. SME Classification[121]

Enterprise	Category	
	By Asset Size	**By Number of Employees**
Micro	Up to Php 3,000,000	0 – 9 employees
Small	Php3,000,0001 – Php 15,000,000	10 – 99 employees
Medium	Php15,000,001 – Php 100,000,000	100 – 199 employees

While enterprises brings financial benefits to its owners and operators, these businesses also create economic value to a great number of Filipinos as their employees. Figure 32 below illustrates the number of employment created from the enterprises operating in the Philippines.

Figure 31. Distribution of Enterprises by Total Employment and Value Added



Source: Department of Trade and Industry website: http://www.dti.gov.ph/businesses/msmes/msme-resources/msme-statistics

MSMEs employ about two-thirds of the total employees working in enterprises, while large businesses employ more than one third. However, when it comes to value added, large enterprises bring in 64.3%, while MSMEs contribute a total of 35.7%. It is also estimated that 60% of all exporters in the economy are attributed to the MSME category, this is about 25% of the economy's total export revenue.

Regional distribution shows concentration of enterprises in cities and industrial zones, particularly the National Capital Region (Metro Manila), CALABARZON, and Central Luzon. Figure 33 below accounts for all the regions in the Philippines and the categories of enterprises operating in each area.

[121] Senate of the Philippines, The MSME Sector at a Glance, SEPO, March 2012

Figure 32. Distribution of MSMEs by Region

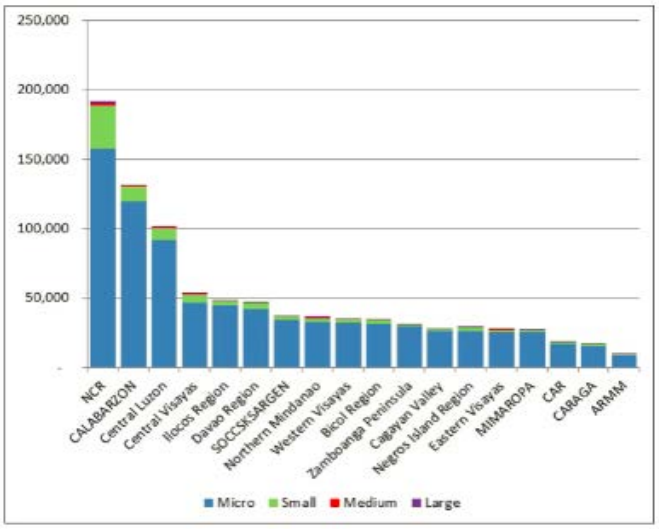
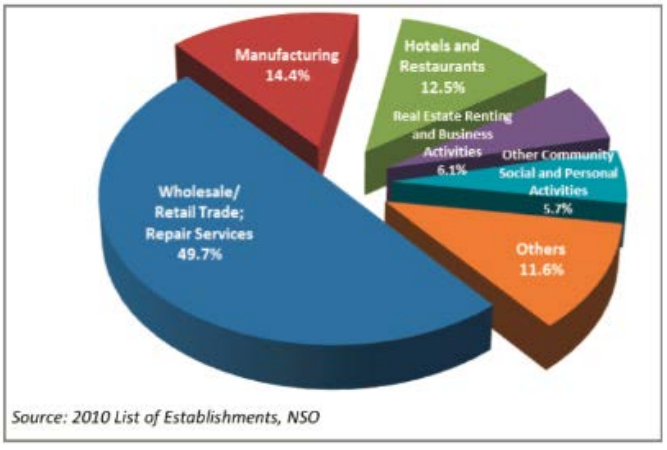


Image Source: Department of Trade and Industry website: http://www.dti.gov.ph/businesses/msmes/msme-resources/msme-statistics

In terms of type of MSME industries, nearly half of the MSMEs are engaged in wholesale/retail trade and repair services. Particular to retail trade, the Sari-Sari Store Training and Access to Resources (STAR) Program, a leading women economic empowerment program implemented by Coca-Cola Philippines and the Technical Education and Skills Development Authority (TESDA) for women micro-entrepreneurs, revealed that 89% of micro-retail businesses are owned and operated by women[122]. Figure 34 below illustrates the industry distribution of MSMEs in the Philippines.

Figure 33. Percentage Distribution of MSMEs



Source: Senate of the Philippines website: www.senate.gov.ph, based on 2010 data of National Statistics Office (now PSA)

[122] Sari-Sari Store Training and Access to Resources (STAR) Program, TESDA and Coca-Cola Philippines, 2011

Based on a recent global study on entrepreneurship, results show that women comprise the majority of the upcoming entrepreneurs in the developing economies[123]. Congruently in the Philippines, women are more likely to instigate and engage in the early stages or start-up of enterprise operationalization than Filipino men[124]. Filipino men counterparts often get highly involve or even take over the enterprise when it is already growing, owing to the care work double burden of Filipino women alongside managing a growing business.

According to the Policy Notes published by the Philippine Institute for Development Studies, a critical issue among women entrepreneurs in developing countries is the sustainability and scaling up of business, after it has been started. Statistics show that about 40% to 50% of start-up businesses close down and this happens mostly or more often to women owned businesses due to some gender-based identifiable factors, such as, (1) lack of access to financing; (2) insufficient profitability or rechanneling of profits to household needs; and (3) lack of time due to family responsibilities[125].

Several government laws have been passed to support and protect the plight of MSMEs, with clear provision to cater women and youth entrepreneurs in order to help them achieve business sustainability and growth. According to a published statement of DTI Undersecretary Nora K. Terrado, "the Go Negosyo Act, or Republic Act 10644 otherwise known as Go Into Business Act, promotes job creation and inclusive growth through the development of micro small and medium enterprises (MSMEs) and has a section that specifically provides for support to women and youth."

The DTI, as the main government arm for trade and industry, took upon itself to lead the translations of these laws to implementable programs through partnerships with the private sector and civil society organizations. The recently launched WIFI for the ASEAN encourages Filipino women entrepreneurs to look into the potential of ICT-based enterprises. As per World Bank definition, ICT-based enterprises are categorized into the following, (1) enterprises involving the production and selling of hardware, software, and telecommunication products; (2) ICT-based enterprises that use ICTs to provide services such as data entry, business services, software applications and e-learning; and (3) ICT related support services such as computer training and consulting[126].

Other Philippine laws supporting women in the MSME sector include Republic Act 9501 or the Magna Carta for MSMEs of 2008, a comprehensive law outlining a package of support for

[123] Kelley, D. et al. (2015) Special Report: Women's Entrepreneurship. Global Entrepreneurship Monitor.

[124] World Bank. Female Entrepreneurship: Program Guidelines and Case Studies.

[125] Philippine Institute for Development Studies, Policy Notes, ISSN 1656-5266, No. 2015-03, February 2015

[126] Philippine Commission on Women. (2017, August 28). Women ICT Frontier Initiative (WIFI) Program for ASEAN launched in PH…

MSMEs, and Republic Act 7882 of 1995, an act providing assistance to women engaged in micro and cottage business enterprise, that mandates government financial institutions to allocate 5% of their funds for loans to women MSMEs[127]. Another landmark law for micro-enterprises is Republic Act 9178, otherwise known as the Barangay Micro Business Enterprises Act of 2002, particularly targeting micro category businesses or start-ups to benefit entrepreneurs by automatic tax exemption, reprieve from coverage of the Minimum Wage Law, priority credit window, and technology transfer on production, management and marketing assistance programs from government or its partner institutions[128].

[127] Recognizing the vital role of women in the PH growth: DTI remains supportive of women's empowerment, April 2 via www.investphilippines.gov.ph

[128] How to Register as a Barangay Micro Business Enterprise (BMBE) in the Philippines, Victorino Abrugar, April 2013

16. Economy Report of Russia[129]

16.1 Current Status of the ICT Sector of Russia

Modern communication technology LTE allows to have access to the modern services more than 70% of Russian citizens[130]. According to the plans this figure will be increased to 97% to 2024.

The fast spread of the modern communication services in Russia is remarkable both from the accessibility as well as from the low price level perspective. According to the investigation of the World Economic Forum, Russia takes the 2nd place in the rating of economies with the cheapest mobile Internet and Communication. Russia also takes the 10th place in terms of price on wide band services access.

Figure 34. Russia in the World Rating

According to Indicator of Readiness to digital society, Russia also demonstrates the positive dynamics. For the period from Y2012 to Y2016 it went up on 15 places and now Russia is the 41st in the rating.[131] It built 35 Kkm of fiber-optical lines.

[129] This report was written by Irina Saltikova, Technical Director of ANO APE, Ericsson Training Center, and Veronika Peshkova, General Director, IExpert, Russia.

[130] Ministry of Communication and Informatics of the Russian Federation- http://minsvyaz.ru/ru/events/36827

[131] Iinvestigation of the World Economic Forum

Figure 35. Digital Services Penetration

The volume of Russian Internet-users in Y2017 increased on 2.7 million people (3.1%) to 87.7 million people[132]. At the same time the part of mobile devices is higher than the stationary one (PSTN devices). The volume of mobile and digital economy amounts to 4.35 trillion RUB in Y2017 which is 5.06 % of GDP. 1/10 part of mobile economy is formed by SMEs. E-commerce increased on 21%[133]. Digital content production (video, music, games and e-books) increased on 12%, and digital economy infrastructure including software increased on 32%.

Russian market of media on-line services increased on 22% where 70% is the part of online cinemas. For this moment the number of legal online cinema's users in Russia is 39.6 million. For last 4 years it increased on 82.9%. In Y2013 it was 21.7 million people.

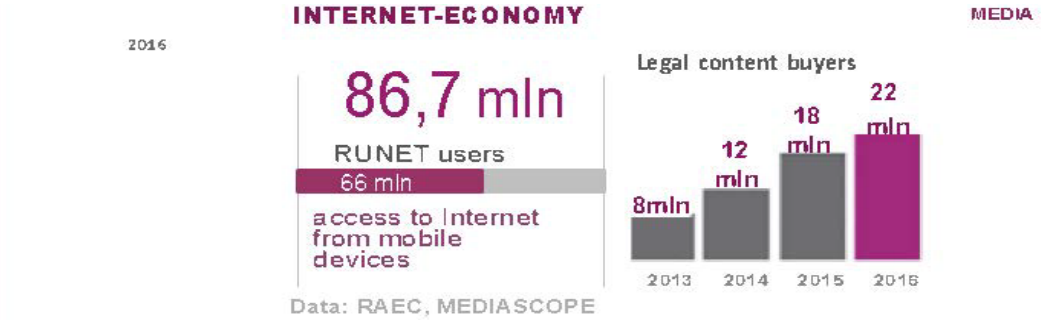
The number of legal content buyers in the Internet increased to 25 million people (on 13%). Currently 2.3 million people are employed by Internet economy sector in Russia. Unfortunately, there is no growth in the number of working places in the sector during recent years. However, the labour productivity in the sector increased on 15.2% from 1.58 trillion RUB to 1.82 trillion RUB in Y2017. Thus, Internet dependent sectors increased their share in GDP from 19% to 24% during the recent years.

The number of mobile Internet users has also witness an increase. The last year growth is 9% and currently 66 million people use mobile internet on a regular basis. That represents 75% of the total number of Internet users in Russia. The number of smartphone users increased on 15% and achieved the level of 46% of Internet users. The mobile traffic increased on 90%. The cost of mobile traffic in Russia is 10 times cheaper than one in the USA, 3 times cheaper than in Germany, and twice as cheap as in South Africa.

[132] Report of Ministry of Communication and Informatics of the Russian Federation "Final results of Y2017 in the field of media and Internet"

[133] Report of Ministry of Communication and Informatics of the Russian Federation "Final results of Y2017 in the field of media and Internet", GENDER DIVERSITY 2017, HAYS Recruiting experts worldwide, March 2017

Figure 36. Internet-Economy



The perspectives of digital technology development and mobile services penetration of all economic spheres forced the demand for additional training to adopt people to new conditions. For Y2017, an index of digital literacy in Russia grew up on 5,7% to 59,9% of the population.

16.2 Current Status of Women Entrepreneurs of Russia

The sector of Small and Medium Enterprises in Russia represents 21 per cent of GDP. The Russian Small Business Index (RSBI), which gauges the activity of SME based on quarterly survey of 2000 Russian enterprises, rose to 44.9 percentage points in Q3 2016, its highest level since the end of 2014, indicating improved business' environment.

However, the index declined in Q4 2016 as more respondents expressed pessimism over the current situation, describing it as stagnation. Aggressive growth strategies or boost in investments disappeared from the SME' agenda and declining turnovers in retail and squeezed profit margins slow down investment activity. These figures indicate SME' adaptation to new economic conditions by achieving cost efficiency and profitability without making bold moves. Frugality principles and organic growth have become a priority for many companies and, as a result, 75% of SMEs do not set out the requirement of additional funding. Dismayed by low confidence about the economic environment or revenue growth prospects, businesses try to operate without debt financing attraction. 59% of SMEs believe that the business environment has not changed. 80% of companies do not plan to scale investments either up or down[134].

Based on RSBI survey results, women feel more constrained. Only in Q3 2016 female respondents expressed more optimism than men about access to funding and the overall economic environment.

According to the survey, 38% of women entrepreneurs are primarily oriented toward frugal and cost-efficient models, while 35% of men entrepreneurs are focused on ensuring the stability of

[134] Ministry of Economic Development of the Russian Federation Report,2017

their business. For women entrepreneurs cost efficiency above all means the transformation of the product or service mix, rather than lower spending on materials or components, let alone job cuts. The RSBI survey suggests that 92% of women entrepreneurs have never received funding from state-owned supporting infrastructure, while one-third of all companies are unaware of state SME' support mechanisms available. In practice only 7% of women entrepreneurs have received subsidies and grants under start up support programs in the last 5 years. The lack of access to finance is identified by women as one of the key obstacles for opening new businesses. As a result, most women used owned, family-owned or friends-owned funding to start their businesses[135].

The share of women entrepreneurs participating in bidding for state and municipal procurements contracts is also marginal; even the special legal quote, that at least 10 per cent of state procurements and 18 per cent of state-owned corporation procurements are to me made from SMEs (including sub-contracting) does not help to over-come the problem.

Women in Russia are successful not only addressing local challenges and running microenterprises but also in climbing the ladder in big corporations, be it in heavy industry in the ICT sector. In the modern world, there are increasingly more female professionals in accountancy and finance, who increased gender diversity in boards of major Russian companies. Almost half of Russia's major companies (44%) have women on the both boards of directors and management boards. Combined statistics, including RTS50 companies, indicate that women hold top management positions in 88% of major fast-growth companies in Russia.

In Hays' gender diversity survey held in Russia among 1,614 respondents, 32% of female respondents were business unit leaders, 30% were manager sand only 4% either had their own business or served as CEO. There are certain barriers that impede the advancement of women in Russia. Stereotypes and informal arrangements are the top reason that women are not leading in sufficient numbers, cited by 59% of respondents. 57% believe that women are forced to interrupt their carriers, while 52% point to challenges in striking a balance between work and family.

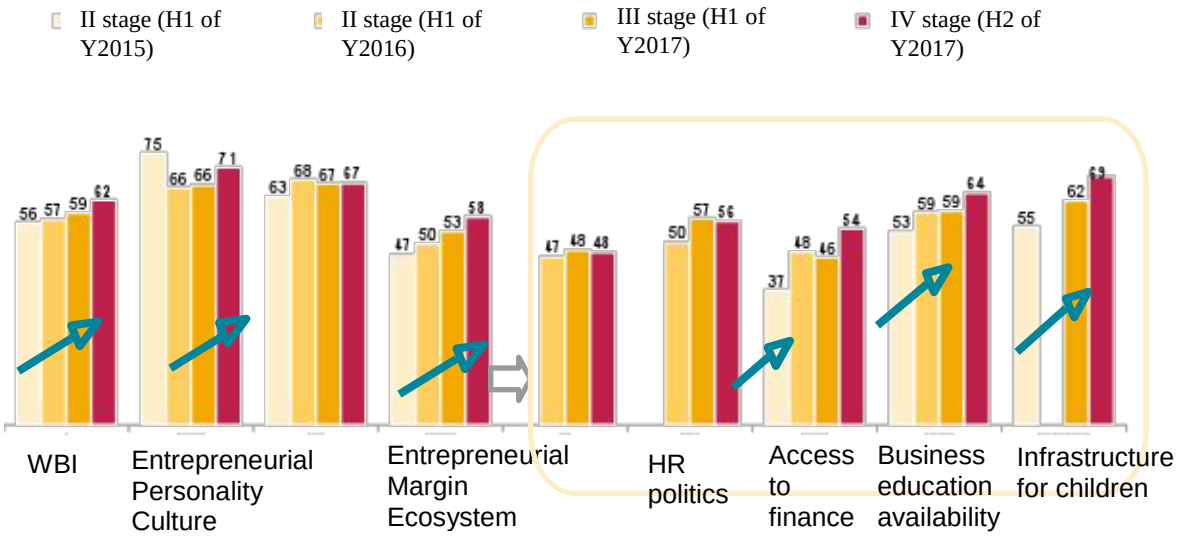
Women executives in Russia normally hold a university degree, but this does not necessarily mean that they have adequate knowledge and skills in finance and business management. The findings of the RSBI survey provide evidence: 58% or female respondents have not studied additional degree in management. 69% of women entrepreneurs holding a business degree say that it is helpful in both finding a solution to business problems and running day-to-day operations. Lack of time is the main barrier to receiving special training. Tuition fees are too high for them as well.

[135] GENDER DIVERSITY 2017, HAYS Recruiting experts worldwide, March 2017

This can be attributed to the fact that women typically run microenterprises, which requires little investment and presupposes a strong focus on cost efficiency.

The Russian Federation Women Entrepreneurship Development Committee (OPORA RUSSIA) together with NAFI evaluated Women Business Index (WBI) from Y2015. The aim of this investigation is to look after dynamics of entrepreneurial activity of women to make legal and economical initiative to support the trend of women entrepreneurship development. WBI is the accumulated relative indicator that characterizes women activity in business from the 3 positions: entrepreneurial culture (the society's attitude towards women-entrepreneurs); entrepreneurial ecosystem (estimation of business conditions, infrastructure, finance and business education availability etc.), and personality (estimation of women professional skills and life quality).

Figure 37. Private Index "Entrepreneurial Ecosystem"



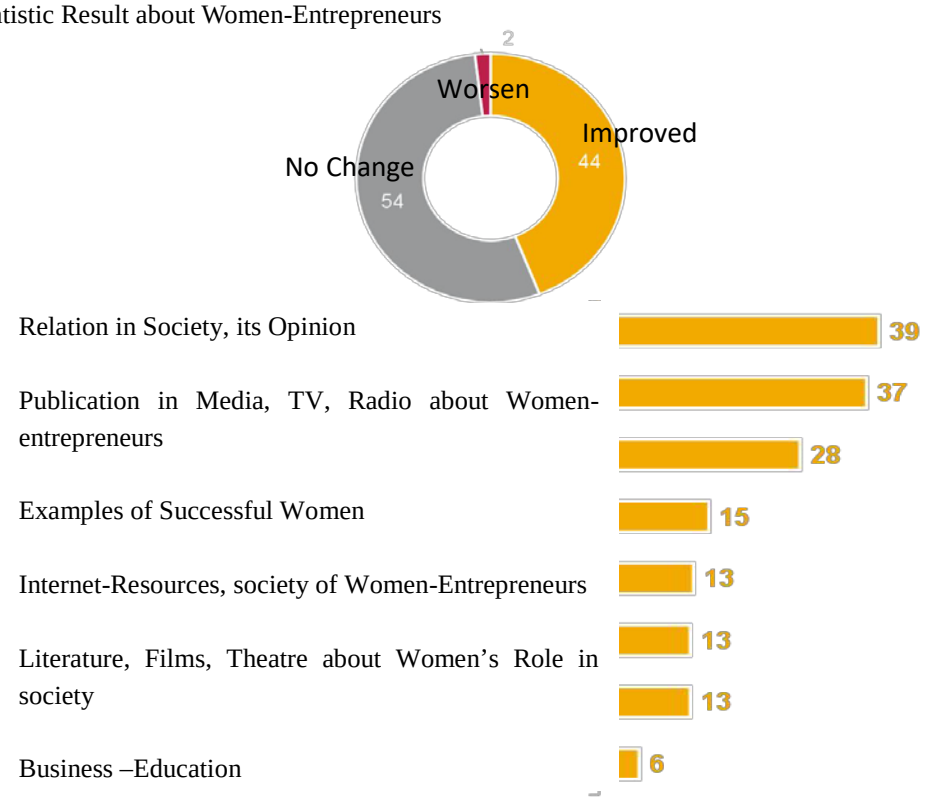
The target group for the investigation:

- Not less than 1,000 women 18-55 years old, living in Russian cities with population of 500,000+ people.
- Not less than 1,000 women, heads/owners of SMEs. Max blunder is not more than 4.9%

From Y2015 WBI has grown up on 6 points (from 56 to 62). The basis of this growth is increase of private index "Entrepreneurial ecosystem" from 47 to 58 ps. The main improvements are related to advantages in access to finance (from 37 to 54 ps.) and business education (from 53 to 64 ps.) as well as infrastructure for children (from 55 to 69 ps).

- Another reason for WBI growth is improvement of business doing culture – private index has increased from 66 to 71 ps[136].

Figure 38. Statistic Result about Women-Entrepreneurs



Women rarer pointed at negative reaction of their relatives to the decision of starting business (12% at the 3-d stage and 8% -at the 4-th one). Moreover, women-entrepreneurs underlined positive changes in attitude towards business-women. Publications in media, spreading women success stories, active public politics in the field of women's entrepreneurship, activities of women's business societies and presentations of officials supporting this topic, contributed to the WBI growth.

Changes in relation to women-entrepreneurs are noted by about half of respondents (44%). The most part characterized them as positive ones. The major changes are related to the shifts in public opinion and stereotypes (39% of respondents noting the positive dynamics of the changes) and media publications (37 %).

[136] GENDER DIVERSITY 2017, HAYS Recruiting experts worldwide, March 2017, , Analitical Report on 4 stage of Women Business Index (WBI), NAFI, 2017

17. Economy Report of Singapore[137]

17.1 Current Status of the ICT Sector of Singapore

Being an urbanised economy with an area of 719.2 sq km and 5.61 million total population (as at June 2016), Singapore has continued its efforts in integrating ICT for sustainable urbanisation and to build an inclusive Society for continued growth.

Infocomm Industry in Singapore

Based on the Annual Survey on Infocomm Industry for 2015 by Infocomm Development Authority of Singapore (copyright © 2016 IDA), Singapore's infocomm industry revenue grew by CAGR 18.0% p.a. from 2010 to 2015 to reach S$189.6 billion in 2015, an increase from S$167.1 billion in 2014 (Chart 1), largely due to re-exports of mobile and smart phones, telecommunication equipment and storage devices.

Table 25. Chart1: Infocomm Industry Revenue by Year

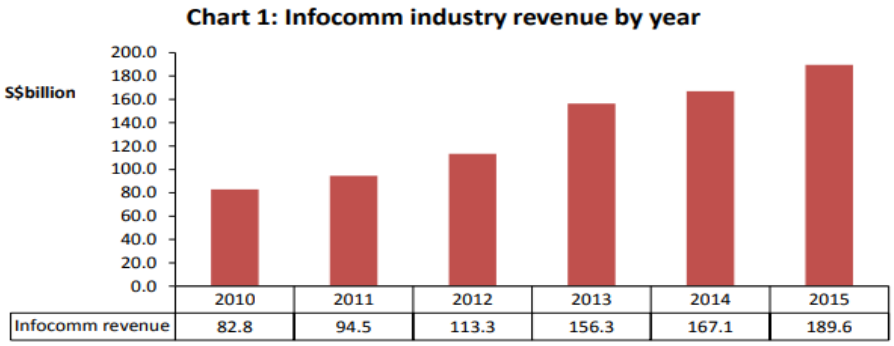


Table 1: Proportion of domestic and export revenue by year

	2010	2011	2012	2013	2014	2015
Domestic revenue	43.7%	37.9%	31.3%	31.0%	30.3%	28.2%
Re-export revenue	40.9%	49.7%	55.3%	59.4%	60.7%	63.4%
Processed exports revenue	15.5%	12.4%	13.4%	9.5%	8.9%	8.5%

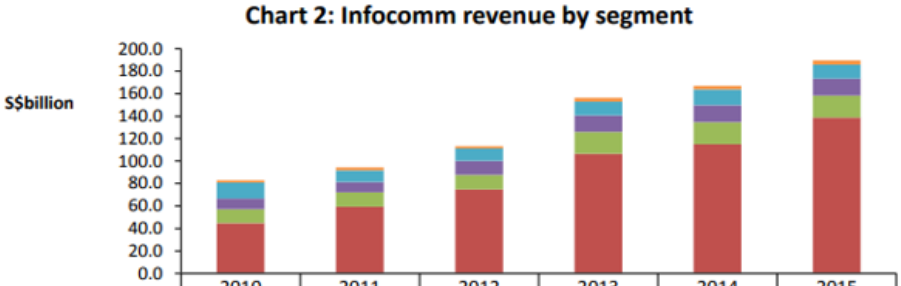
*Figures may not add up to 100% due to rounding.

Hardware segment continues to be largest contributor to infocomm industry revenue. The hardware segment grew from S$115.0 billion in 2014 to S$138.6 billion in 2015 (Chart 2). The

[137] This report was written by Irene Boey, Consulting Director, Integral Solutions (Asia) Pte Ltd, Singapore.

hardware segment was the largest contributor, with a share of 73.1%, followed by the software segment with a share of 10.4% (Table 2).

Table 26. Chart 2: Infocomm Revenue by Segment



	2010	2011	2012	2013	2014	2015
Total revenue	82.8	94.5	113.3	156.3	167.1	189.6
Content services	2.0	2.8	2.1	3.4	3.3	3.7
Telecom services	14.0	10.2	10.8	12.3	13.9	12.4
IT services	9.6	9.4	12.5	14.6	15.1	15.1
Software	12.2	12.6	12.9	19.4	19.7	19.7
Hardware	45.0	59.5	74.9	106.6	115.0	138.6

Table 2: Proportion of infocomm revenue by segment

2015	Hardware	Software	IT services	Telecom services	Content services	Total infocomm
Share of infocomm revenue	73.1%	10.4%	8.0%	6.5%	2.0%	100.0%

Total export revenue grew from S$46.6 billion in 2010 to S$136.2 billion in 2015 (Chart 3), with exports responsible for 71.8% of revenue in 2015 (Table 3).

Table 27. Chart 3: Infocomm Revenue by Market

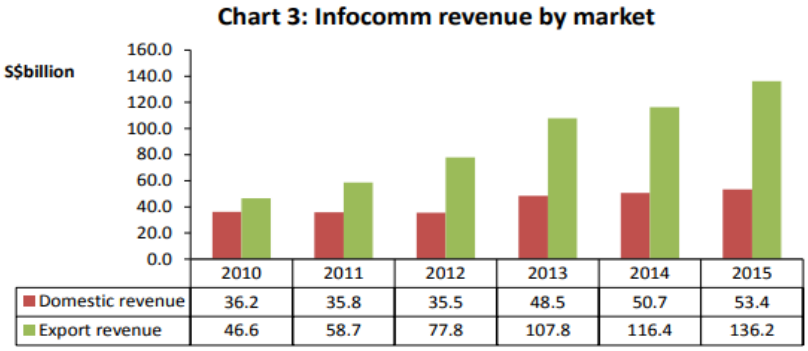


Table 3: Proportion of infocomm revenue by market

	2010	2011	2012	2013	2014	2015
Share of domestic revenue	43.7%	37.9%	31.3%	31.0%	30.3%	28.2%
Share of export revenue	56.3%	62.1%	68.7%	69.0%	69.7%	71.8%
Total Infocomm revenue	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Re-exports formed 88.2% of export revenue in 2015, while the remaining 11.8% were from processed exports (Table 4).

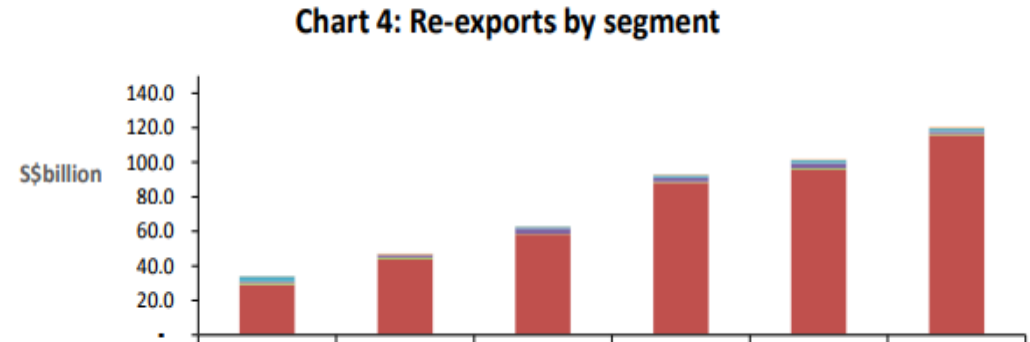
Table 28. Table 4: Proportion of Export Revenue by Type

Table 4: Proportion of export revenue by type

	2010	2011	2012	2013	2014	2015
Share of processed exports	27.4%	19.9%	19.6%	13.8%	12.8%	11.8%
Share of re-exports	72.6%	80.1%	80.4%	86.2%	87.2%	88.2%
Total exports	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Hardware segment contributed the bulk of re-exports while software segment contributed more than half of processed exports. Re-exports grew from S$33.9 billion in 2010 to S$120.1 billion in 2015 (Chart 4), mainly driven by the hardware segment which accounted for 96.3% of re-exports.

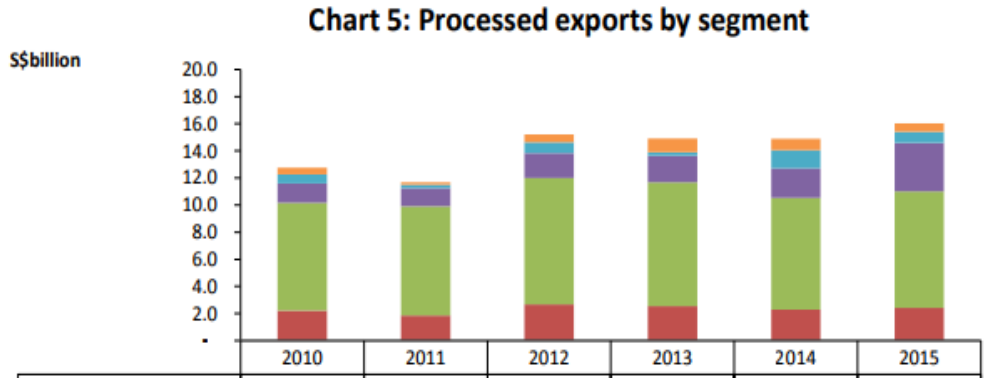
Table 29. Chart 4: Re-Exports by Segment



	2010	2011	2012	2013	2014	2015
Total Re-Exports	33.9	47.0	62.6	92.9	101.5	120.1
Content services	0.0	0.4	0.0	0.5	0.4	0.5
Telecom services	2.8	0.3	0.8	1.2	1.6	1.7
IT services	0.7	1.3	3.1	2.4	3.0	1.3
Software	1.3	1.3	0.3	0.6	0.9	0.9
Hardware	29.1	43.7	58.3	88.2	95.7	115.7

While processed exports rose from S$12.8 billion in 2010 to S$16.0 billion in 2015 (Chart 5) due to the software segment which contributed 53.6% of processed exports.

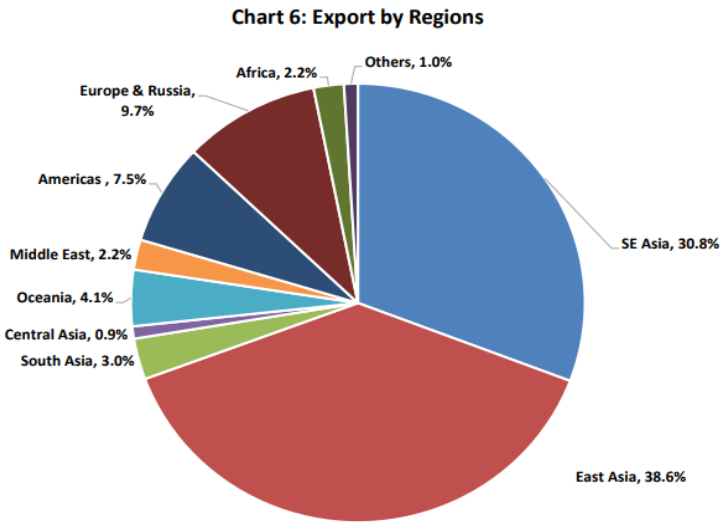
Table 30. Chart 5: Processed Exports by Segment



	2010	2011	2012	2013	2014	2015
Total Processed Exports	12.8	11.7	15.2	14.9	14.9	16.0
Content services	0.5	0.2	0.6	1.0	0.8	0.6
Telecom services	0.7	0.3	0.8	0.3	1.3	0.8
IT services	1.4	1.3	1.8	2.0	2.2	3.6
Software	7.9	8.1	9.3	9.1	8.2	8.6
Hardware	2.2	1.9	2.7	2.6	2.3	2.4

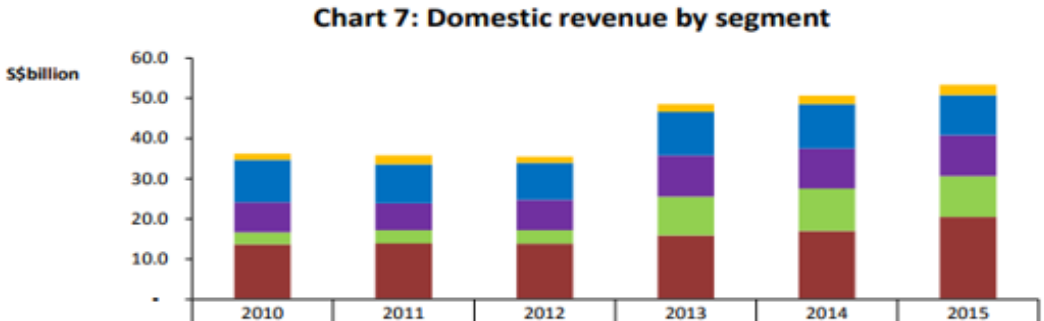
East Asia was the top region for exports East Asia, which includes China, Japan and Republic of Korea, was the top export destination region for 2015, accounting for 38.6% of exports (Chart 6).

Table 31. Chart 6: Exports by Regions



Hardware also drove the growth in domestic revenue Domestic revenue was S$53.4 billion in 2015, an increase from S$36.2 billion in 2010 (Chart 7). The hardware segment was the largest contributor of domestic revenue with a share of 38.3% (Table 5).

Table 32. Chart 7: Domestic Revenue by Segment



	2010	2011	2012	2013	2014	2015
Domestic revenue	36.2	35.8	35.5	48.5	50.7	53.4
Content services	1.5	2.2	1.5	1.9	2.1	2.6
Telecom services	10.6	9.7	9.2	10.8	11.0	9.9
IT services	7.5	6.7	7.5	10.2	10.0	10.2
Software	3.0	3.3	3.3	9.7	10.5	10.2
Hardware	13.7	13.9	13.9	15.9	17.0	20.5

Table 5: Proportion of domestic revenue by segment

2015	Hardware	Software	IT services	Telecom services	Content services	Total domestic revenue
Share of domestic revenue	38.3%	19.0%	19.1%	18.6%	4.9%	100.0%

The Institute of Policy Studies reported on July 2017 that the transformation of Singapore into a Smart Economy highlights the fact that it has a hyper-connected society that is heavily plugged into a digital world. With the current emphasis on increasing automation, Artificial Intelligence (AI) and big data for companies to transform their business models, the government has focused on the following growth strategies:

- Investing in frontier capabilities such as through the launch of the Singapore Data Science Consortium, and AI.SG, a new economy's programme to boost Singapore's AI capabilities.
- Support promising enterprises Singapore based companies through various programmes and initiatives such as SMEs Go Digital. This is to raise SMEs' overall level of digital readiness to help them at various stages of their digital transformation journey. The SMEs Go Digital initiative has close to 50 pre-approved digital tech solutions that SMEs could tap on to innovate.
- Develop a pipeline of frontier tech talent such as through the IMDA's TechSkills Accelerator that will equip the workforce with tech skills for the digital economy.

17.2 Current Status of Women Entrepreneurs of Singapore

There are approximately 200,000 SMEs in Singapore with sales revenue of S$100 million and below. Like other businesses, the smaller businesses face challenges such as difficulty in hiring as well as high overheads from rental and utilities expenses. They also often do not have the time and know-how to upgrade their productivity or capabilities as they would be focused on managing their day-to-day operations.

In terms of enabling small and medium enterprises (SMEs), Enterprise Singapore is the agency championing enterprises development in Singapore. It is also responsible for trade promotion and the building of trust in Singapore products and services. As the enterprise development agency, Enterprise Singapore helps local enterprises build capabilities and capture new opportunities across sectors and markets, in order to be globally competitive.

One of the many areas of assistance introduced to build a conducive business environment in Singapore, was the setting up of SME Centres, as one-stop centres where SMEs can receive free business advice and guidance to various sources of help made available for businesses. Since then, the SME Centres collectively assisted over 20,000 SMEs every year through one-on-one advisory sessions, capability workshops and outreach events. Majority of the SMEs assisted were micro and small enterprises (i.e. less than S$1 million in annual revenue, and between S$1 million and S$10 million in annual revenue respectively). In view of changes in technology and market conditions, SMEs will need to develop strong capabilities in order to adapt, stay resilient and achieve sustainable growth. The SME Centres will continue to enhance their services to help SMEs prepare for the future.

Additionally, the government has initiated enterprise and innovation programmes to promote entrepreneurial spirit among the youth across different age groups in secondary and post-secondary institutions. It is noted that Singapore’s policies and programmes for entrepreneurship and enterprise development are gender-neutral.

18. Economy Report of Chinese Taipei [138]

18.1 Current Status of the ICT Sector of Chinese Taipei

The development of Information and Communication Technology (ICT) is extensively and profoundly affecting every single facet of the society. At the micro level, ICT has affected people's daily life and modes of interaction. At the macro level, ICT has greatly changed many economic, industrial and social institutions. As a result, promotion of digital construction is a vital task assumed by governments in the world.

Since 1990, the focus of Chinese Taipei's industrial development has gradually shifted towards ICT industry. The government announced policy incentives and allocated government funds to establish "Board of Science and Technology" and "National Information and Communications Initiative Committee" as the designated agencies together with other initiatives to promote ICT policy. "E-Taiwan Project" launched in 2002, "M-Taiwan Project" launched in 2005, and the following "I-Taiwan" all established a solid basis of Chinese Taipei's ICT infrastructure. In 2008, Chinese Taipei was ranked in Top 10 by the World Economic Forum in terms of IT readiness and industrial competitiveness.

According to the case study suggested by "The Global Information Technology Report 2005-2006," Chinese Taipei achieved another economic miracle from 1990 to 2000. Due to large-scale investment in ICT industry 20 years ago, the per capita GDP in Chinese Taipei grew from US$8,000 to US$14,000. Moreover, measures such as bountiful human capital and the establishment of specialized research think tanks, etc. were the key factors building Chinese Taipei into a tech island. Since 2010, Chinese Taipei has been well-established as a major procurement center for global ICT companies and buyers, ranking top 3 in market share for major ICT products worldwide.

Environment and Readiness

In terms of ICT infrastructure, Chinese Taipei ranked 19th worldwide and 9th in the APEC region according to 2016 Networked Readiness Index (NRI). NRI is measured based on different pillars of Environment, Readiness, Usage and Impact. Chinese Taipei ranked 2nd in Readiness and 1st worldwide in terms of mobile network coverage and accessibility. However, Chinese Taipei still needs to strengthen its environmental pillar, ranking 40th according to Political and Regular

[138] This report was written by Lee Li-Hsuan, Researcher, Foundation for Women's Rights Promotion and Development (FWRPD), Chinese Taipei.

Environment Indicator. As for enterprises, Chinese Taipei ranked 25th and 31st worldwide in terms of "ICT usage for B2B transactions" and "B2C internet usage," indicating that there is still room for improvement for ICT usage ratio among enterprises. Furthermore, another study report shows that the digitalization of small and medium-sized enterprises in Chinese Taipei had been drastically risen from 2001 to 2006. And with a higher level of digitalization in e-commerce of business, the productivity is enhanced.

Usage and Gender

In terms of ICT utilization rate, according to 2016 Digital Opportunity Survey Report disclosed by National Development Council, percentage of individuals above 12 years of age that have gone online has risen from 62.7% in 2005 to 79.7% in 2016, and the number of internet users is 16.77 million. In particular, mobile internet has become the mainstream.

In terms of gender differences, 80.3% of men go online, compared with 79.2% of women who go online, making online access rate between men and women to be on par with each other. Moreover, the survey indicates that women are more dependent on the internet, and a higher ratio of women accessing the internet through mobile phones or tablets is disclosed as well. In terms of internet browsing, women spend more time on lifestyle, arts and culture or social media websites, while men tend to engage in gaming and various online discussion forums.

However, in terms of employees in ICT industry, the number of women employees in ICT lags far behind men. In the ICT field, about 70% of the employees are male. The extremely low women participation ratio in ICT industry is a warning sign for future development. It is because ICT industry is currently undergoing the transition of R&D and branding. The male-dominant ICT industry may not fully meet the needs of women users; as a result, it cannot effectively make profits for this potential market. On the other hand, women's remoteness from ICT industry may also cause harm by losing an opportunity to participate in future economic development.

18.2 Current Status of Women Entrepreneurs of Chinese Taipei

Data of Women-owned Businesses

In Chinese Taipei, women-owned businesses make up 36% of the total number. In 2016, there were 516 thousand women-owned businesses, marking an increase of 16.5% over the past 10 years. To be more specific, women-owned businesses in Chinese Taipei are mainly categorized as SMEs (99.2%). However, general survival rates of SMEs are lower than total, in which, generally speaking, the survival rate of service industry is lower than the one of manufacturing. The survival rate of accommodation and food industry is below 60%. However, professional, scientific, and technical services industry has 90% survival rate.

In terms of industries, women-owned businesses has a concentration in the service industry (85.14%), and the sales target is mainly domestic. Over the past 5 years, the domestic sales revenue of women-owned businesses has been increased every year. In 2016, the total domestic sales of women-owned businesses reached NT$4.76 trillion, effectively becoming one of the supporting factors of Chinese Taipei's economic development. However, women-owned businesses tend to be lower in export ratios; therefore, its participation in international trade can be further increased in the future.

In terms of management efficiency, if one calculates the added-value rate based on corporate investment and value creation, women-owned businesses have an added-value rate of 42.34% while those owned by men have a rate of 35.42%. Moreover, women-owned businesses have a profit rate of 8.65%, higher by 2.57% than their male counterparts. Based on these corporate management performance figures, women-owned businesses tend to perform better than men-owned businesses. Another statistic also supports that women-owned businesses have better performance than men's. Statistics indicate that although the numbers of employees and gross production of women-owned businesses are subordinate to men's, the added-value rate of women-owned enterprise is 42.34% compared to 35.42% of men-owned enterprise.

In terms of background, female business owners are slightly younger than their male counterparts; and the age group of 50-54 years old is of the highest ratio (21.48%). Women business owners under 40 years old make up 18.95% of total, while male counterparts make up 16.14%. In terms of educational level, due to educational environment in the past, ratio of women business owners with the educational level of vocational school ranks first, followed by the educational level of university. However, if one looks at the women's age for initial business venture along with their educational background, there is a trend of women starting their businesses at a younger age and of higher educational background.

In general, women-owned businesses in Chinese Taipei are mainly categorized as SMEs, and the majority of them are concentrated in service industry. Meanwhile, women-owned businesses are smaller in scale and tend to have shorter life span but better performance compared to businesses run by men.

Entrepreneurship and Start-Up Activities

In terms of initial business environment and actions, MasterCard Index of Women Entrepreneurs 2017 shows that, females in Chinese Taipei are advantageous in knowledge assets and financial access, as well as in participation in workforce and in entrepreneurial conditions; however, women from Chinese Taipei are lack of self-belief/entrepreneurial drive to start their own business. The report examines Women's Advancement Outcomes, Knowledge Assets and Financial Access, and

Supporting Entrepreneurial Conditions among 54 economies. And the top 3 markets with the strongest supporting conditions and opportunities for women to thrive as entrepreneurs are New Zealand, Canada, and the United States. Chinese Taipei is ranked as #27 and performs well in Knowledge Assets & Financial Access and in Supporting Entrepreneurial Conditions. Half of women have tendency to start their own business; the report further suggests that with good supporting entrepreneurial conditions, Chinese Taipei should encourage more women to turn their entrepreneurial inclination into actions with the help provided by society, enterprises, and the government.

Global Entrepreneurship Monitor (GEM) also reveals that, according to GEM 2016/17 Global Report and Human Resource Surveys, people from Chinese Taipei hold a positive attitude towards entrepreneurship. 70% of people from Chinese Taipei desire to start their own business, but they are not fully ready in terms of ability and resolve. In terms of the comprehensiveness of entrepreneurial resources and not easily giving up due to external influences, less than 50% of the respondents revealed that they are equipped with these entrepreneurial requirements.

As for female Early-stage Entrepreneurial Activity, there is an indication of high level of willingness but relatively lower ratio in taking concrete actions. Even if she has certain level of educational background, there is still an absence of capacity to acknowledge one's own ability. There is a fear of entrepreneurial failure and difficulty in identifying entrepreneurial opportunities among women. Moreover, just like the obstacles that other entrepreneurs face, Chinese Taipei women entrepreneurs still see financial loans as a major obstacle; they also believe that even when they have an achieved success in their business, they will face ensuing challenges establishing networks and developing further business opportunities.

In Chinese Taipei, there are few entrepreneurial programs that mainly cater to women. The Ministry of Labor's Phoenix Micro-entrepreneurship provides entrepreneurial consulting, management training, mentor counseling and support as well as loans, etc. Loans are for women between ages 20 and 65 or seniors between ages 45 and 65, with no collateral required. The government provides 95% of the credit guarantee and a special loan interest rate for loans (up to NT$1 million). The Ministry of Economic Affairs has a Women's Entrepreneurship Flying Geese Program that has 12 years of entrepreneurial service experience. Not only does it provide an integrated service for women at different entrepreneurial stages, but it also establishes networking and support groups when the entrepreneurship takes off, providing business development and elite capacity building, etc.

In general, people from Chinese Taipei have a strong willingness towards entrepreneurship; moreover, there is substantial coverage in terms of support system for women entrepreneurship,

including consulting services, training programs and role model creation. However, the policies tend to provide entrepreneurial assistance on a project basis, lacking comprehensive regulatory plan. As a result, it is difficult to utilize a single coordinating agency to conduct reasonable resource allocation and platform connection. Moreover, since Chinese Taipei's entrepreneurship model has entered the innovation-driven stage, even though women-owned businesses are still focusing on whole-sale and retail, the government's entrepreneurship policy has transformed college campuses into one of the entrepreneurship incubation sites. There is a trend of younger entrepreneurs and a shift towards digitization. Women's entrepreneurship action has gradually emerged with trends as knowledge economy and innovation technology; and e-commerce has gradually become one of the main ways for women entrepreneurship.

19. Economy Report of Thailand[139]

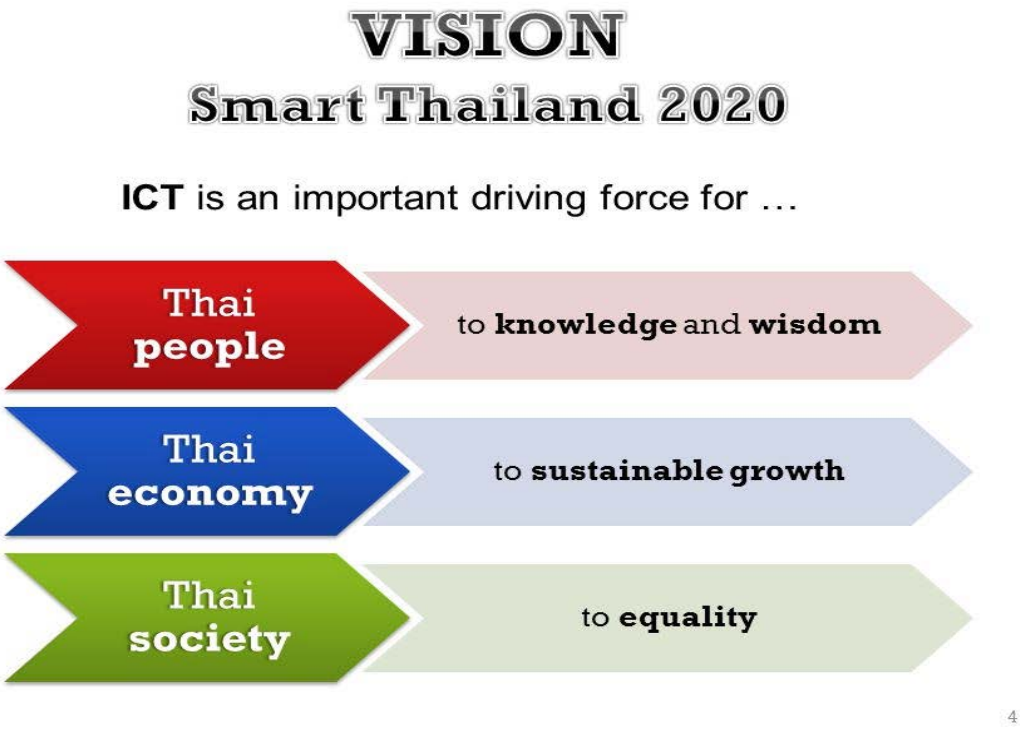
19.1 Current Status of the ICT Sector of Thailand

This background information has divided into 2 topics as follow.

ICT/Smart Technology in Thailand

The Information and Communication Technology (ICT): "Thailand 4.0" -- A sustainable, Value-based economy building...

Figure 39. Thailand 4.0



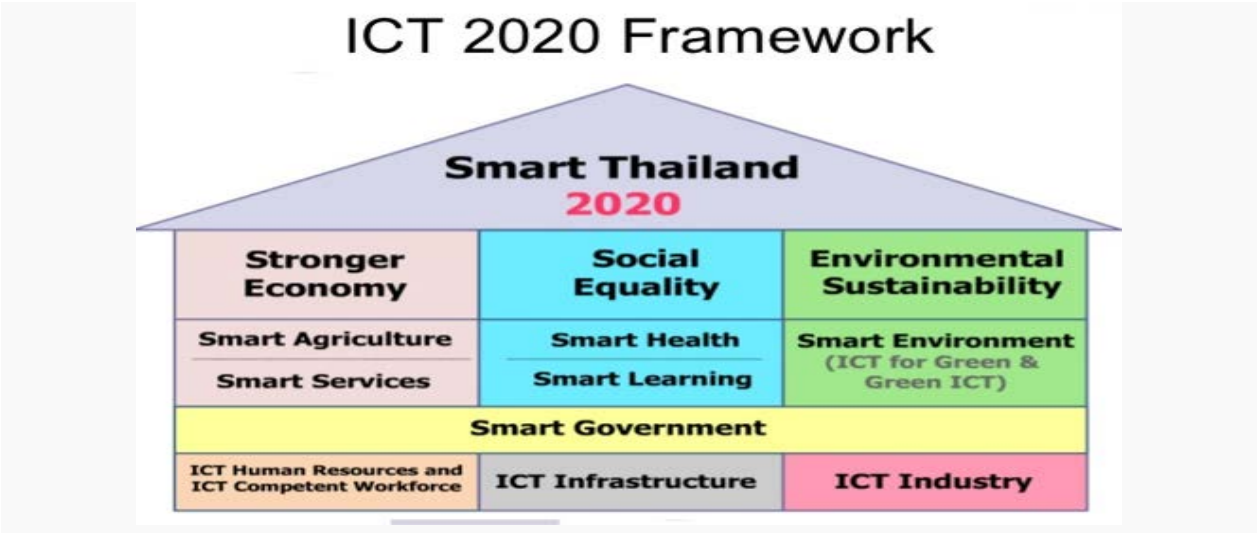
Source: https://www.it24hrs.com/2017/thailand-4-0/

Smart Thailand is part of the economy's ICT framework called 'ICT2020': a development blueprint for the member economy that will lead and guide all parts of the economy, especially the government sector, to move forward with ICT development. ICT infrastructure, after all, is a key

[139] This report was written by Kamolrat Intaratat, Director, The Research Center of Communication and Development Knowledge Management (CCDKM), Sukhothai Thammathirat Open University, Thailand.

to success. For Thailand to step out of the middle-income trap, it must engage all sectors in pursuing Thailand 4.0.

Figure 40. ICT 2020 Framework



Source: https://www.it24hrs.com/2017/thailand-4-0/

"ICT Pushes Drive towards Thailand 4.0"

Smart Thailand comprises two main parts – readiness of ICT infrastructure under the 'Smart Network' project; and readiness of government services under 'Smart Government' with its objective of the Smart Thailand concept is to raise the economy's competitiveness ranking in the world, empower local stakeholders such as education and business sectors to be ready for competing with other regional economies especially under the ASEAN Community (AC) since 2015, and to reduce the cost of using ICT for Thai people and help them use ICT to improve their quality of life. Because currently, Thailand has been "working hard for just a little gain". It thus needs a new approach so as to "work a little but make big gains" or "work smarter than before".

- Instead of producing "simple commodities", Thailand should create "innovations". Thai economy must transform itself from being industry-driven to the innovation-driven or technology-driven as follow;
- Agricultural sector needs to move away from a conventional mode to the modern style. Smart Farming should spread over Thailand. Leveraging technologies, farmers can become entrepreneurs and get richer.
- Small and medium enterprises (SMEs) must transform themselves into Smart Enterprises or Startups with high potential.

- Service sector must change. Instead of sticking to services with rather low value, it must shift towards the high-value services.
- Labor skills and knowledge must be high. It is time to make little-skilled workers a thing of the past.

Figure 41. Thailand 4.0

Source: https://www.it24hrs.com/2017/thailand-4-0/

Thailand 4.0 Pursues… Security, Prosperity and Sustainability…

> "ICT infrastructure is a fundamental key to all success. For Thailand to step out of the middle-income trap, ICT must engage all sectors in pursuing Thailand 4.0".

Thailand 4.0 is the vision to transform Thai economy into an innovation-driven one. This model will prove successful only with its main strategy: public – private partnerships. The private sector including banks, educational institutes, research organizations, SMEs, startups and people must all jump into the same bandwagon and head towards the same direction. To drive these efforts, it is necessary that the economy has quality communications and telecom infrastructure too. Internet penetration rate must be highest possible to ensure the smooth connectivity and integration of all sectors[140].

19.2 Current Status of Women Entrepreneurs of Thailand

This overview findings are from 1) the relevant contents studies from policy to other studies, and 2) from the 10 women entrepreneur leaders from five regions of Thailand (North, Northeast, Central, South, and East). The simple e-questionnaire together with the phone interview was used.

[140] http://www.nationmultimedia.com/technology/SMART-THAILAND-PROJECT-ON-TRACK

For the case study in-depth study, the Line VDO call was also used. Some of its findings are integrated as follow.

The General Positive Policy Contexts

Digital Economy is one among the main mission of the member economy. The establishment of digital parks for SMEs is intended to finally drive local companies to enter into Industry 4.0, or the fourth industrial revolution, in order to digitize the manufacturing sector. Especially in Thailand today, the entrepreneurship activities among men and women are almost equal. There are many businesses which are run by women, and the rate of entrepreneurship among females is higher than males. The total entrepreneur activity rates of women and men are 21% and 17% respectively[141].

Entrepreneurialism is recognized as being an important contributory factor in the development of Thailand as well as in ASEAN. Thai women now outnumber men as business owners" and are at the forefront of owning businesses. There were approximately 2,500,000 small and medium enterprises (SMEs), which compose 99 % of all enterprises in Thailand and nearly half of the figure were women. Interestingly, women entrepreneurs in Thailand, particularly in the Start Ups and SMEs. Numbers have increased in all parts of the economy besides from Bangkok. Currently found female population around 47% of the economy's workforce, which makes up the highest percentage of working women in the region of the Asia-Pacific. However, these women are still confronted with many challenges such as hiring discrimination, gender inequality in relation to wages, etc. Some of the general challenges are shown as below in table 33.

Table 33. General Challenges of Thai Women Entrepreneurs

Gender and Division of Labour	Mean ($\overline{X}$)	SD
The primary role of a woman is to be a mother and housewife	3.41	1.17
Culturally, women are expected to take care of household duties and child care	3.50	1.13
Men are the primary income earners for the family	3.15	1.22
Women should depend on men and husbands to make a decision	2.56	1.10
Women should follow men's footsteps whether right or wrong	2.00	1.04
House work is for women only	2.10	1.06
Overall	2.78	

Source: https://en.wikipedia.org/wiki/Women_in_Thailand

The overview of the Thai women entrepreneurs demographic.

Found Some High Light Findings as Follow

[141] http://www.entrepreneur.com/article/227163

The general characteristics of Thai women entrepreneurs found most of the women opened their business below the age of 30 (60.0%), with 27.5% doing so between 30-35 and the remaining 12.5% from 35-40. Anyhow from the contextual analysis found that their ages will keep decreasing due to the start up business style.

Type of business found most of the businesses were small-scale in nature, with 86.3% having from 1-9 employees, 10.0% from 10-49 employees and the remaining 3.8% with 50 or more employees. Most of their businesses was mostly involved in services (87.5%). 23.8% of businesses were involved with clothing and accessories, 6.3% in hotels and services, 33.8% in restaurants and food and the remaining 36.3% in other areas. Most of the women were part-time managers of their businesses: 11.3% worked less than 6 hours a week, 42.5% from 7-10 hours and 46.3% more than this amount. Most of them started the business themselves (70.0%); while 15.0% inherited it from their family, 11.3% had bought it and 3.7% other situations.

The overview attitude of the Thai women entrepreneurs toward ICT relevant to entrepreneurship.

Found a Very Significant Findings as Follow

They are mostly admit that ICT must be used to help their business especially about their marketing outlet, their PR, and others.

They feel more possible to create or to build up their own family business and let their kids to help or even any youth nearby. (Reema Thakur, John Walsh, 2013, CCDKM with USO ICT Community Center, 2015).

20. Economy Report of the United States [142]

20.1 Current Status of the ICT Sector of the United States

Research Objective & Design

The overall purpose of this research study is to help inform women entrepreneurs from Asia-Pacific Economic Cooperation (APEC) Economies of current entrepreneurial trends pertaining to the 4th Industrial Revolution. This research study will focus specifically on case studies involving American female entrepreneurs and ICT startups based in the United States of America (USA). In line with the case study criteria, the women interviewed in this section have been recognized for running successful ICT related startups/businesses for at least 5 years.

In terms of background for the 'Research Design', a female CEO/entrepreneur was initially identified by using the website for Built In Colorado (Built In Colorado, 2018), which is a community organization that connects startup companies throughout the Denver metro area in Colorado (in the USA). In May 2016, the Built In Colorado website released a list of 25 women who had founded a startup company, which can be referenced on their website (Ryan, 2016).

We reached out to several women who were on this list and were able to successfully schedule an interview with two successful business women and entrepreneurs. The first is Krista Morgan, the co-founder/CEO of P2Binvestor. We were also able to schedule an interview with Virginia Santy, co-founder of Women in Kind, a co-working space in Denver, Colorado.

Entrepreneurs from Colorado were exclusively selected, as we, the researchers, were currently located in the state and wanted to conduct the interviews in person. Furthermore, as previous research has demonstrated, Colorado is currently considered to be a burgeoning market for both ICT-related startups and entrepreneurship and recently ranked within the top 5 states for highest levels of startup activity (Morelix *et al.*, 2016).

Before presenting the case study details and findings, an overview of general economy information, ICT/smart technologies, and the current state of women entrepreneurs in the United States (US) will be introduced below.

[142] This report was written by Stephen Ham, Researcher & Editor, and Teri Ham, Researcher, the United States.

Economy Information

The below figure provides some general economy statistics and information on the US (CIA, 2018).

Figure 42. The United States Information

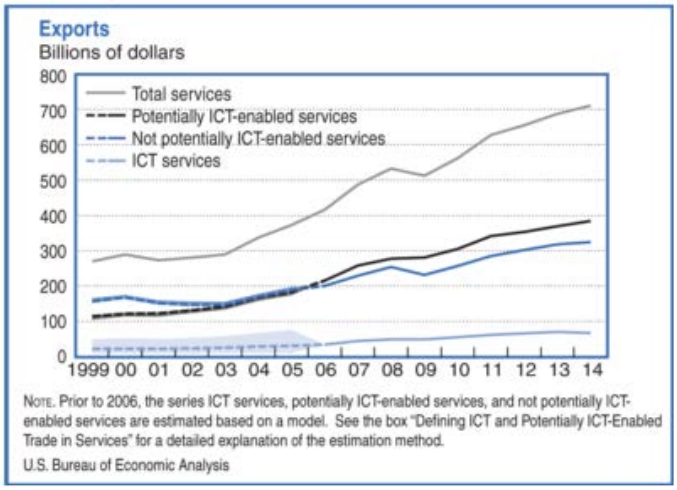
THE UNITED STATES

- Area of land: 9,147,593 sq km
- 2017 Population: 326,625,791 people
- 2016 Gross Domestic Product (GDP): $18.62 trillion
- 2016 GDP per Capita: $57,600; an Increase of $400 from 2015
- 2016 GDP Growth Rate: 1.5%
- GDP Composition: Agriculture: 0.9%, Industry: 18.9%, Services: 80.2%
- Industries: Highly Diversified, World Leading, High-Technology Innovator, Second-Largest Industrial Output in the World; Petroleum, Steel, Motor Vehicles, Aerospace, Telecommunications, Chemicals, Electronics, Food Processing, Consumer Goods, Lumber, Mining
- 2016 Export and Import Value: $1.456 trillion / $2.208 million
- 2016 Labor Force: 159.2 million
- 2016 Unemployment Rate: 4.9%

Economic Background of ICT in the United States

In a report released by the US Bureau of Economic Analysis in November 2017 (US Department of Commerce, BEA, 2017), it was shown that the information industry in the US accounted for $924.7 billion (out of a total $16716.2 billion) of the economy's GDP in 2016, or approximately 18% of the economy's GDP. Although this figure is actually lower than the approximate 20.26% that the information industry's GDP previously accounted for 8 years before in 2008, it's still a growth of $192.7 billion from $732 billion in 2008, made all the more impressive by the fact that most of this growth largely occurred over the latter four years (2012-2016). To provide further context on this growth, the US Bureau of Economic Analysis released a report showing that the export of trade in ICT and potentially ICT-related services in the United States more than tripled over the 15 years from 1999 to 2014, from approximately $100 billion in 1999 to nearly $400 billion in 2014 (Grimm, Borga and Koncz-Bruner, 1998), as shown in the figure below.

Figure 43. Trade In ICT & Potential ICT-Related Services (1999-2014)



Source: Adapted from (Grimm, Borga and Koncz-Bruner, 1998)

This high growth in the information industry in the United States has created a high-potential environment for entrepreneurs and in fact, the USITC estimated in 2011 that the digital economy was responsible for the creation of up to 2.4 million jobs and an increase in average wages by 4.5 to 5.0 percent (Giulia McHenry, 2016).

Startups in the United States

Today's climate of startups in both the US and around the world, particularly those in the ICT sector, can be traced back to a specific timeframe, 1980 to 2009, in which several major tech companies were formed and laid the groundwork that is in place today. This section will briefly cover this history which these major tech companies played a factor in shaping, as well as the geographical locations of these startups around the US.

Up until the 1980s, large existing firms and establishments were the predominant form of employment in the US. In this context, firms refer to business entities that maintain economic activity under a common operation, while an establishment refers to a single physical location. For example, if a firm is a large state chain of stores, an establishment is a single individual store (Haltiwanger, 2012). It was not until during the 1980s that startups began to play a significant factor in job creation, as they rapidly increased in number and size throughout the 1980s and 1990s in particular. By 2009, startups were contributing just 3.1% towards the US employment rate, while larger firms and establishments were contributing 13.5% (Haltiwanger, 2012).

Most of the startups during this timeframe (1980-2009) were quite small in size in terms of number of employees (Haltiwanger, 2012). Data shows that 38% of startups employed fewer than 10 employees, and 70% of startups were found to employ fewer than 50 employees. To put these

figures into additional context, startups contributed 3.5% towards the economy's job creation in the 1980s, 3.0% in the 1990s, and 2.6% in the 2000s, reaching a relative low at the end of the 2000s that can be attributed to the 2008 "Great Recession" (Haltiwanger, 2012).

It was shortly after this "Great Recession" when a new wave of ICT-related startups were rapidly increasing in prominence, notably Facebook (founded 2004), Twitter (founded 2006), Groupon (founded 2008), Skype (founded 2003), Zynga (founded 2007), Foursquare (founded 2009), and LinkedIn (founded 2002) (Andreessen, 2011). Over 2 billion people were using the broadband Internet at the time, and the rise of software programming tools and Internet-based services effectively lowered costs for startups and made it easier than ever to launch globally as well, removing the need to invest in infrastructure and employee training (Andreessen, 2011).

However, in a more recent report released in 2016, it was found that business creation from startups had increased by 0.38 over the previous year, reaching the peak from before the 2008 "Great Recession" (Morelix *et al.*, 2016). In the same report it was found that the top five states with the highest startup activity were (ordered by population): Texas, Florida, California, New York, and Colorado. It was also found that 30 states in total had more new business activity than in 2015, and in the larger-populated states of California and Texas, it was found that the "Rate of New Entrepreneurs" (defined as: "when someone first starts working on a business as his or her main job") went as high as 390 new entrepreneurs for every 100,000 adults. In order, the statistics reported for this rate were as follows (ranked by decreasing population and not the rate): 0.39% for Texas, 0.36% for Florida, 0.39% for California, 0.35% for New York, and 0.33% for Colorado. To provide additional background on these statistics, it is important to note that the sparsely-populated Iowa was in last place with 0.18%, while Montana (also sparsely-populated) actually had the highest rate at 0.50%. Hence, total state population is not necessarily linked to the Rate of New Entrepreneurs (and thus number of startups), but rather, other factors like *urban* population may be a more influential factor when it comes to entrepreneurial generation.

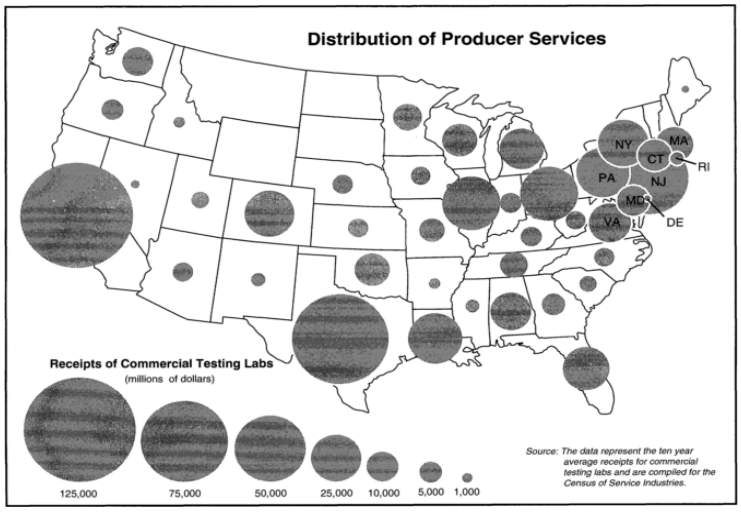
ICT Infrastructure in the United States

In 2017, the United States' ranking on the ITU's ICT Development Index was 16 (International Telecommunication Union, 2017), and 5 on the World Economic Forum's Networked Readiness Index in 2016 (World Economic Forum, 2016). This indicates that the US is among the most developed in terms of ICT infrastructure, which can once again be traced back to the 1980s and 1990s, when software and related technology companies were the main contributors towards growing the industry.

This industry growth was achieved at a rate of 38 percent per year over the 30-year period from 1970 to 2000, finally leveling off in the mid-1990s (Debroy and Morris, 2004). It was during this

timeframe in which some well-known American companies were founded that contributed heavily towards ICT infrastructure during the 1980s and 1990s, such as Apple in 1977, Microsoft in 1975, Oracle in 1977, Dell Inc. and Cisco in 1984, Amazon in 1994, and Google in 1998 (Mitchell, 2011). In a 1994 report on where this growth was occurring geographically within the United States, it was found that California was responsible for most of the innovations in electronics-related sectors, including computers, communication equipment, and electronic equipment, and thus was also responsible for the infrastructure for these sectors, primarily in Silicon Valley. However, other states notable for a high amount of business-service providers also included Massachusetts, New York, New Jersey, Pennsylvania, and Texas, as shown in the figure below (Feldman and Florida, 1994).

Figure 44. Distribution of Business-Service Providers



Source: Adapted from (Feldman and Florida, 1994)

It was not until 1989, however, when ICT infrastructure in the US was significantly advanced by Tim Berners-Lee's invention of the World Wide Web, and then again in 1993 when the first Web browser, Mosaic, was released (Greenstein, 2004). For the first time this allowed anyone with a computer to access the Internet and caused a demand for standardized mass market applications such as e-mail, instant messaging, and browsing and in turn opened the market to new entrepreneurs. As the commercialization of the Internet increased during the early 1990s, Internet service providers (ISPs) began appearing in order to provide Internet access for both mass-market users and businesses (Greenstein, 2004). By the late 1990s, the ICT infrastructure within the US was being provided by a network of local, regional, and economy's ISPs and other firms that had sprouted up to build the Internet "backbone." Some of these companies included AT&T, Cable and Wireless, Global Crossing, GTE, Level 3 Communications, Qwest Communications, Sprint, Williams, and WorldCom (Greenstein, 2004).

20.2 Current Status of Women Entrepreneurs of the United States

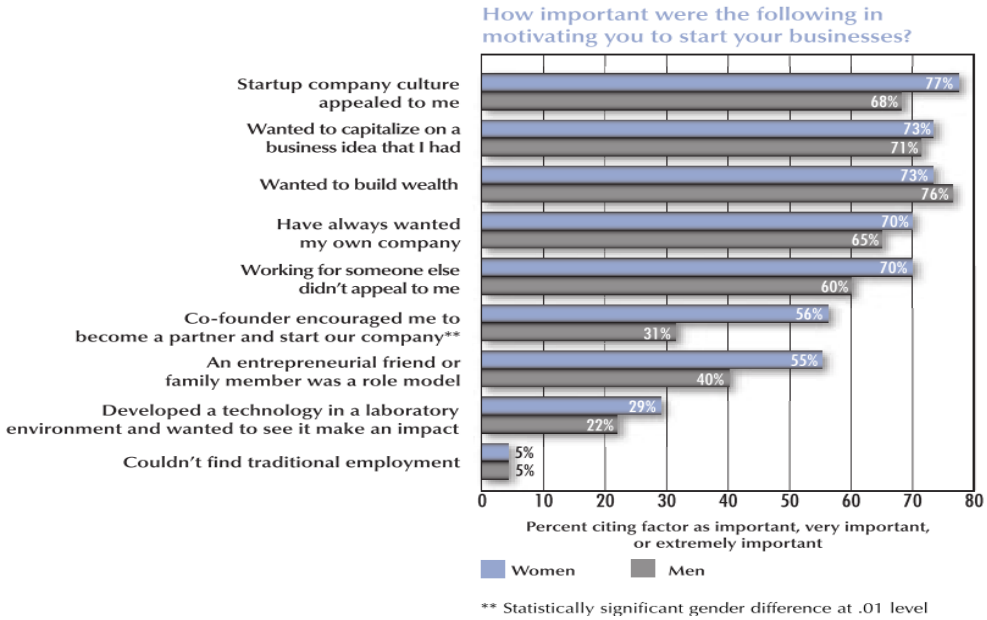
Characteristics of Women Entrepreneurs

In the post-2008 US economy, entrepreneurs are regarded as one of the most important contributors to new wealth and new jobs (Cohoon, Wadhwa and Mitchell, 2010). Entrepreneurs are also inventors of new products and services, and revolutionize society and the economy. However, despite their prominence in the US, not much has historically been known about their motivations, or where they come from, or their reasons for success, and even less has been known about female entrepreneurs in particular (Cohoon, Wadhwa and Mitchell, 2010).

Although the statistics around women entrepreneurs in the US are on the sparse side, it is estimated that in 1976, approximately 700 thousand women-owned businesses in the US generated $41.5 million dollars in revenue that year (Brush et al., 2003). Additionally, it was discovered that there were 1.5 million women entrepreneurs in the US in 1972, 2.1 million by 1979, 3.5 million by 1984, and 9.1 million by 1999, employing a total of 27.5 million workers and generating revenues of nearly $3.6 trillion. By 2003, women were recognized as a major force in the US economy (Mitchell, 2011). By 2014, it was found that women-owned businesses had increased to about one-third of all businesses in the United States (Robb, Coleman and Stangler, 2014).

In terms of characteristics, successful female entrepreneurs have been found to be similar to male entrepreneurs in terms of: (1) level of education, (2) level of early interest in starting a business, and (3) desire to build wealth or capitalize on a business idea (Cohoon, Wadhwa and Mitchell, 2010). The main differences between the genders includes women being more averse to being entrepreneurs without prior business experience, rating their “human capital” (professional and business networks) more highly than men, and being more challenged to protect their intellectual capital. In contrast, men tend to focus on fiscal insecurities and lack of available mentors. Some of the data available is shown in the below figure.

Figure 45. Gender Differences in Motivation to Start a Business



Source: Adapted from (Cohoon, Wadhwa and Mitchell, 2010)

In a 2014 survey of female entrepreneurs throughout the economy, it was found that they were very well-educated, with more than 56% having graduate degrees and approximately 40% having bachelor degrees (Robb, Coleman and Stangler, 2014). Business was the most popular field of study at 27%, while Computer Science, Engineering, and IT came in at 18%. In terms of age it was found that nearly 20% of the female entrepreneurs were under 25 when they started their first company, ~25% were between the ages of 25 and 29, ~33% were in their 30s, and the remaining ~21% were aged 40 or older. The distribution of this data is shown below (Robb, Coleman and Stangler, 2014).

Figure 46. Distribution of Founder Characteristics

Distribution of Firms by Founder Characteristics

Education Level		Age When You Founded Your First Company	
Associate Degree or Less	5.23	<20	4.64
Bachelorís Degree	38.95	20-24	15.11
Master's Degree	47.68	25-29	25.29
Doctoral Degree	8.14	30-39	33.42
		40-49	16.85
In What Field was Your Highest Degree?		50+	4.64
Business	27.46		
Liberal Arts	19.94	Source: Survey of founding CEOs, Presidents, CTOs, or lead	
Computer Science/IT/Engineering	18.21	technologists of tech startups founded between 2002 and 2012	
Social Sciences	9.83		
Design	4.91		
Natural Sciences	4.62		
Law	3.47		
Education	2.89		
Behavioral Sciences	2.6		
Other	2.31		
Medicine	1.73		
Mathematics	0.87		

Source: Adapted from (Robb, Coleman and Stangler, 2014)

In the same survey, it was found that these female entrepreneurs had varying factors contributing to their success in starting and building companies. Eleven of these factors are tabulated in the figure below, showing that the highest factor contributing to success was prior industry experience.

Figure 47. Success Factors

Drivers of Success

	Your university education	Your prior industry work experience	Lessons learned from previous successes	Lessons learned from previous failures	Company's management team	Availability of financial capital	Advice/ assistance provided by company investors	Location	Professional business networks
Extremely important	20.7%	45.7%	37.4%	44.1%	30.1%	21.2%	8.7%	12.8%	39.9%
Very important	21.1%	23.3%	29.1%	25.7%	24.1%	20.5%	13.2%	18.8%	24.3%
Important	26.3%	19.2%	21.7%	17.5%	19.6%	22.4%	19.9%	23.3%	18.5%
Slightly important	16.1%	5.4%	5.8%	5.7%	6.6%	14.1%	15.8%	15.7%	6.7%
Not at all important	14.1%	4.2%	1.6%	1.6%	6.0%	9.3%	12.9%	19.5%	6.7%
N/A	1.6%	2.2%	4.5%	5.4%	13.6%	12.5%	29.6%	9.9%	3.8%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
Total citing Important, Very Important, or Extremely Important	68.1%	**88.2%**	**88.2%**	**87.3%**	73.7%	64.1%	41.8%	55.0%	**82.7%**

Note: Survey question was: How important were the following in the success of your most recent startup?

Source: Survey of founding CEOs, Presidents, CTOs, or lead technologists of tech startups founded between 2002 and 2012

Source: Adapted from (Robb, Coleman and Stangler, 2014)

These success factors will be further explored in section 2.3 below, as this point may be of particular interest to policymakers.

<u>Women Entrepreneurs and ICT</u>

This section will explore the topic of ICT-related entrepreneurial activity for women in the US and the current statistics available, along with the challenges that they face.

In terms of baseline statistics, below are some key and applicable global rankings for women and entrepreneurship include:

- GEDI Ranking for United States in 2018: 1 (GEI: 83.6)
- GEDI FEI Ranking for United States in 2015: 1 (score: 82.9)
- GEM Ranking for United States of *Total Early-state Entrepreneurial Activity* (TEA) in 2017 (defined as "Percentage of 18-64 Population who are either a Nascent Entrepreneur or Owner-Manager of a New Business"): 13.64
- GEM Ranking for United States of *Female/Male TEA* in 2017 (defined as "Percentage of Female 18-64 Population who are either a Nascent Entrepreneur or Owner-Manager of a New Business, divided by the Equivalent Percentage for their Male Counterparts"): 0.64

Despite the increasing number of women entrepreneurs in the United States, comparatively very few have founded or co-founded companies in the ICT sector. Some of the few examples in this

sector include Sandra Lerner (co-founder of Cisco in 1984), Meg Whitman (CEO of eBay in 1998), and Caterina Fake (co-founder of Flickr) (Mitchell, 2011). For the most part, the computing and technology field has remained dominated by men in both corporations and academia, with women earning about 17% of the degrees in computer science and 12% in electrical engineering. In recent years, this has caused greater recognition and awareness that more women should be going into STEM (Science, Technology, Engineering, and Math) fields, in order to encourage more high-growth startups. However, as a result of more women pursuing higher education, the following consequence has occurred: "*Women have risen to the top in technology-oriented corporate and university hierarchies, much more than in entrepreneurship*" (Mitchell, 2011, p. 10).

One of the logical conclusions of increasing numbers of women in corporate or academic environments is that the knowledge or experience of "what it takes" to launch tech startups is different from the knowledge or experience to advance in corporations or academic environments (Mitchell, 2011). Additionally, women in academic science tend to have fewer contacts in private industry than men, which is vital for aspiring entrepreneurs in getting advice and partners with the know-how to help build a company. On this point, it was found in 2011 that 6.5 percent of such women were part of science advisory boards of high-tech companies, compared to more than 93 percent for men (Mitchell, 2011), putting women at a severe disadvantage. It was further found in 2014 that there were three main challenges for women-owned tech startups, specifically: (1) the time and effort involved in starting a business, (2) lack of financial capital, and (3) lack of available mentors or advisors (Robb, Coleman and Stangler, 2014). Thus, the survey recommended greater access to mentors as an important strategy, as well as greater access to outside funding, as studies have indicated that women entrepreneurs tend to raise less capital to finance their firms compared to men (Robb, Coleman and Stangler, 2014).

These findings, as well as those from the previous sections, will be used to set the context for the case studies, and will be additionally leveraged in the forthcoming sections on success factors and obstacles.

21. Economy Report of Viet Nam[143]

21.1 Current Status of the ICT Sector of Viet Nam

Economic Background of ICT in Viet Nam

ICT industry in Viet Nam began to develop in the 1990s; it focused on 3 main fields including hardware, software and digital content. While the hardware sector has begun to slow down, software and especially digital content have grown at a phenomenal rate.

ICT industry has been becoming a rapid growth rate and sustainable economic sector with high revenue, great export value and considerable contribution to Viet Nam's GDP. Total number of businesses operating in the sector was approximately 24,500 (as of 2016); total revenue of ICT industry in 2016 was roughly USD 66.7 billion (or 11.5% increase compared to the year 2015); of which, revenue from hardware was USD 58.9 billion, software revenue was more than USD 3 billion, and the rest came from digital content and ICT services. In 2016, ICT export quota reached more than USD 60 billion for the whole economy[144].

In 2016, the ICT industry kept a steady growth when the economy of Viet Nam showed signals of recovery. Coupled with Viet Nam's upward economic trend, the Vietnamese government and businesses are strategizing to upgrade the economy's information technology (IT) infrastructure. The strategy is aimed to increase total revenue of the IT sector as a percentage of Viet Nam's GDP. In April 2015, the Prime Minister issued Resolution #26/NQ-CP, instructing all Ministries and local governments to promote the application and development of IT to serve the purpose of successfully developing economy sustainably and integrating internationally. In addition, as Viet Nam has become a member of ASEAN's Economic Community as well as Asia Pacific Economic Cooperation (APEC), the enterprises are expected to increase spending to upgrade their IT infrastructure. The goal of the upgrades is to improve operational efficiency and expand business.

The Ranking of Viet Nam's ICT Industry Got Improvements According to International Evaluation

According to the ranking of the evaluation report on Measuring of Information Society by the International Telecommunication Union (ITU), the ICT Development Index (IDI) of Viet Nam in

[143] This report was written by Nguyen Thi Bich Thuy, Director, Research Center for Female Labour and Gender, Institute of Labour Science and Social Affairs, Ministry of Labour, Invalids and Social Affairs, Viet Nam.

[144] Ministry of Information and Communication of Viet Nam

2017 was 4.43, ranked 108th among 176 economies in 2017; and ranked 17th among 34 economies in Asia - Pacific. The IDI access sub-index was 4.75; the IDI use sub-index was 3.65 and IDI skill sub-index was 5.31.

According to the ranking in the Global IT Report by the World Economic Forum(WEF), the Networked Readiness Index (NRI) of Viet Nam in 2016 reached the 79th among 139 economies, an increase of 6 grades compared to 2015.In this evaluation, the sub-index on access to ICT services of Viet Nam was ranked 3rd among 139 economies. The broadband internet price in Viet Nam was the lowest in the world and ranked the 1st among 139 economies.

ICT Infrastructure Continued Being Invested in and Upgraded to Satisfy Robust Growth of the Economy

Per the EIU, spending on IT will rise to $5.1 billion in 2017, an increase of 9.8 percent y-o-y. In 2016, spending on IT hardware continues to dominate the biggest share (86 percent) of the total spending, with software and services representing 6 percent and 8.3 percent of the market. Key players in the hardware market include suppliers from Chinese Taipei, China, the U.S., and Japan. Major players in the software market include suppliers from the U.S., Germany, China, Russia, and Viet Nam.

Telecommunications

Total telecom service revenue in 2017 is expected to reach $6.9 billion. Mobile data services own the major share (36.8 percent) of the sector[145].

In 2016, there were 74 businesses providing fixed public telecommunication network and 5 businesses offering public land mobile network. Viettel, Mobifone, and VNPT-Vinaphone continue to dominate Viet Nam telecom market with over 90 percent shares. Viettel is the largest player currently and estimated to be at the same position through 2020. As of October 2016, the four operators had gained 4G licenses were Viettel, VNPT-Vinaphone, Mobiphone, and Gtel. In 2017, with strong investment, 4G services are estimated to rollout and expand rapidly[146].

Mobile Phone Networks

At present, there are six mobile operators in Viet Nam; VNPT-Vinaphone, Mobiphone, Viettel, Vietnammobile, Gtel, SPT. Per Viet Nam's Ministry of Information and Communications, in 2016 there were 128 million subscribers of mobile phones, of which 63 million were Viettel users, 34.6 million on Mobiphone, 20.5 million used VNPT-Vinaphone, 5.9 million on Gtel, and 3.6 million

[145] Ministry of Information and Communications of Viet Nam, "Viet Nam Information and Communication Technology 2017"

[146] lbid

are subscribers to SPT and Vietnammobile. In 2016, the mobile cellular subscriptions per 100 inhabitants were 128.04[147].

Fixed Phone Networks

In fixed phone networks, the five operators (VNPT, Viettel, FPT Telecom, SPT, and VTC) provide services to over 7.3 million fixed phone subscribers in Viet Nam. In 2016, the fixed telephone subscriptions per 100 inhabitants were 5.94[148].

Internet

As of January 2017, number of fixed broadband internet subscribers is 9.3 million, while the number of mobile broadband internet users via 3G network is nearly 44 million. Per Business Monitor International, the internet market in Viet Nam is forecasted to grow at a rapid annual pace of 9 percent for the next few years due to the strong growth of applications, e-commerce, and internet TV.

In 2016, percentage of individuals using the internet was 46.50%; the fixed (wired) broadband subscriptions per 100 inhabitants were 9.91; and the active mobile broadband subscriptions per 100 inhabitants were 46.63[149].

Viet Nam is continuing to be the leader in ASEAN region in the number of economy domain name registrations. Total number of domain names ".vn" in the system is currently 386,751[150].

Leading Sub-Sectors

From 2010 to 2015, urbanization in Viet Nam increased 3.4 percent per year, and currently one in three Vietnamese people live in urban areas. The United Nations projects that half of the Vietnamese will live in cities by the year 2040, placing an increasing burden on municipalities. Vietnamese governments at both the central and city levels have institutionalized their strong support of smart city development in Viet Nam to help improve services to the growing urban areas while reducing or maintaining costs.

The growing Internet and mobile phone penetration is helping to drive smart city development and e-government solutions. Significant financing support provided by international donors, such as the World Bank, is behind this growth area. As the Vietnamese government continues to encourage

[147] lbid

[148] lbid

[149] lbid

[150] lbid

and facilitate public-private partnerships in urban infrastructure projects, more funding will likely become available for the development of smart cities in the larger cities in Viet Nam.

Mobile Phones

Coupled with growing e-commerce and over-the-top applications, the rising income of the tech-savvy population in Viet Nam is expected to drive the market for mobile phones at an estimated 12-13 percent from 2015 to 2018. The major suppliers of mobile phones in Viet Nam include Apple, Samsung, Microsoft, Asus, Sony, HTC and Oppo.

Cyber Security Equipment and Software

After Viet Nam Airlines' computer system was hacked and the personal information of some 400,000 of its customers was published online in July 2016, and the international ransom ware attack in May 2017, the Vietnamese government and its enterprises have increasingly paid attention to cyber security.

ICT Skills

In 2016, total workers in ICT industry were 780,926; of which, more than 568,000 persons (or 72.6%) worked in hardware and electronic fields, the rest 27.4% participated in software, digital content and IT services. The number of IT workers in centralized IT zones was 36,000, or 80% increase compared to 2015[151].

As for ICT human resources training, by the end of 2016, Viet Nam have 250 universities and colleges which offered training courses on telecommunications and IT majors with the total enrollment quota exceeding 68,883 students. Viet Nam also have 164 vocational colleges and vocational secondary schools which offered training courses on telecommunications and IT majors with the total enrollment quota exceeding 18,331 students[152].

21.2 Current Status of Women Entrepreneurs of Viet Nam

Characteristics of Women-owned Small Businesses in Viet Nam

Small and medium enterprises (SMEs) are vital to Viet Nam's economic growth, accounting for more than 98% of all business, 40% of GDP, and 50% of total employment[153]. The number of

[151] lbid

[152] lbid

[153] Swiss Program for Research on Global Issues for Development, Employment and Quality of Employment in Viet Nam: The Roles of Small Firms, Formalization and Education, R4D Working Paper 2015/8

SMEs grew by around 100,000 in 2016154, encouraged in part by increased government efforts to facilitate new business.

Women own 95,906 firms, representing over 21% of the total number of formal or registered enterprises in Viet Nam[155]. The majority of women-owned firms (57.40% or 55,049) are microenterprises, with revenues of less than USD 100,000 per annum; 41.71% or 44,003 are SMEs(annual revenues between USD 100,000 and USD15 million35); and 0.89% or 854 are large enterprises, with annual revenues over USD 15 million. By comparison, men own a slightly higher percentage of micro businesses and a lower percentage of small enterprises than women (see Figure 50)[156]. This data is based on Viet Nam's General Statistics Office annual enterprise surveys segmented using IFC's definition of SMEs.

Table 34. Number of Formally-Registered Firms by Size and Sex of Owner

(Unit: Number of Firm(s) and Percentage(s))

	Total	**Women-Owned**	**Men-Owned**
Total (# firms)	452,967	95,906	357,061
%	100.00	21.17	78.83
Micro (# firms)	265,592	55,049	210,543
%	100.00	20.73	79.27
Small (# firms)	163,090	36,139	126,951
%	100.00	22.16	77.84
Medium (# firms)	18,409	3,864	14,545
%	100.00	20.99	79.01
Large (# firms)	5,876	854	5,022
%	100.00	14.53	85.47
Small and Medium Enterprises (# firms)	181,499	40,003	141,496
%	100.00	22.04	77.96

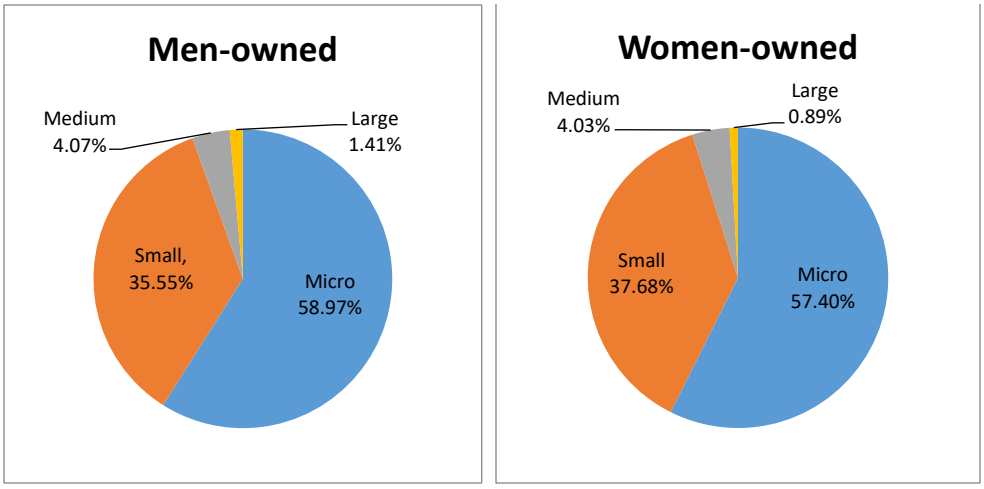
Source: General Statistics Office, 2015, Enterprise Census

[154] General Statistics Office (GSO)

[155] Based on data from 2014 GSO Enterprise Census

[156] Based on data from 2014 GSO Enterprise Census

Figure 48. Structure of Formally-Registered Firms by Size and Sex of Owner



Source: General Statistics Office, 2015, Enterprise Census

Demographic

The average enterprise in this survey has been in operation for ten years, and it was the first business for 94% of women and for 87% of men. Both men and women tend to maintain ownership of their previous businesses, with a slightly higher percentage of men having closed or sold the previous business (13% for men, 7% for women). While there are no major differences in the level of education and number of years in business between men and women entrepreneurs, men owners tend to be older and more likely to be repeat entrepreneurs and therefore arguably more experienced[157].

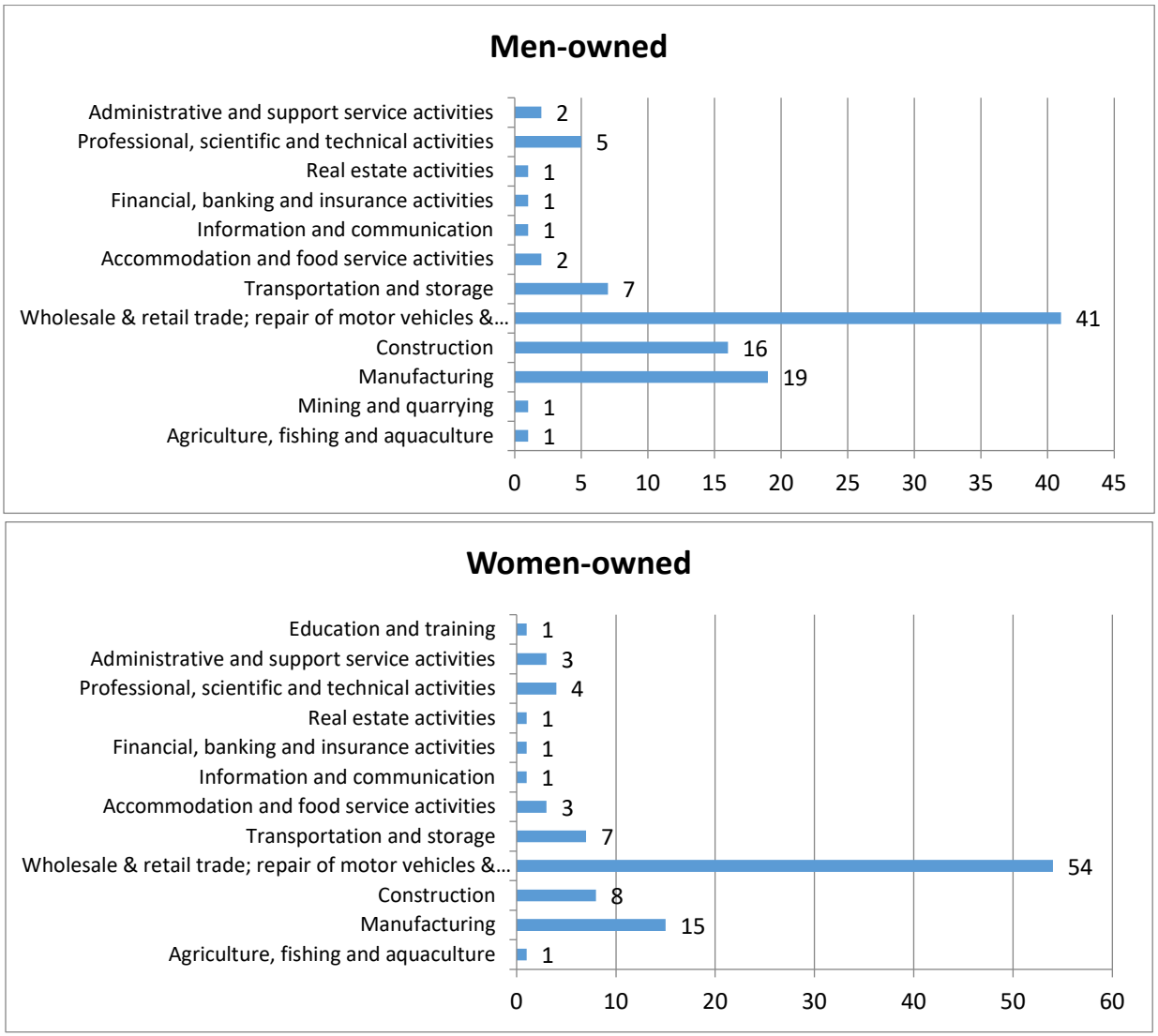
Sector Focus

More than 50% of Viet Nam's women-owned SMEs operate in retail and wholesale trade (54%), followed by manufacturing (16%); construction (7%); and transportation and storage (7%). By comparison, just over 40% of men-owned SMEs operate in trade; 20% in manufacturing, and 16%in construction (see Figure 50). While the labor market is sex-segregated with restrictions affecting women's participation in "male sectors", this data shows that women entrepreneurs have begun to take part in traditionally male sectors such as construction and transportation[155].

157 Based on data from 2014 GSO Enterprise Census

Figure 49. Numbers of Enterprises by Sector and Sex of Owner

Unit: Percentage(s)



Source: General Statistics Office, 2015, Enterprise Census.

Annual Revenue

The 2015 Enterprise Census found that women-owned small enterprises averaged annual revenues 0.9% higher than their male counterparts (average annual revenue of USD 548,000 for small women-owned enterprises against USD 543,000 for men); while among medium-sized enterprises, men owned achieved 1.2% higher average revenues (average annual revenue of USD 5.69 million for women- versus USD 5.76 million men-owned medium-sized enterprises).