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Innovation for Women and Economic Development

Facilitating Women's Livelihood Development and Resilience with ICTs

Policy Partnership on Women and the Economy

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Executive Summary

This "Innovation for Women and Economic Development" report is a part of the multi-year project carried out by Chinese Taipei. The aim of this project is to promote awareness of women's needs in the APEC region by embracing new devices and services for developing their livelihood, to identify and share pertinent experiences and know-how related to ICT innovations that can be replicated to broaden women's ability to do business with the global value chain, and to help stakeholders formulate public-private partnerships (PPPs) that can both facilitate sustainable new business models and create an ideal policy environment for women.

To serve these goals, the following research activities have been performed over the last few years:

a. Existing practices were inventoried to identify the demand for women's use of ICTs to gain access to capital, market, and business opportunities. Based on this inventory, eight case interviews were launched to investigate the benefits to women using ICTs.[1] We found that ICT-related projects positive influenced female entrepreneurs in many respects, such as access to market, building networks. We also identified the difficulties women entrepreneurs faced when acquiring knowledge and access to capital were considered to be the root causes behind all difficulties. Regarding to the possibility of a sustainable project, it can be designed drawing upon the power of cooperation and partnerships among public and private stakeholders. The Phase 1 report "How ICT Economically Empowers Women Entrepreneurs: A Preliminary Case Study in Four APEC Economies" (APEC Policy Partnership on Women and the Economy, 2014) was published in 2014.

b. Based on 1st year's recommendations, we collaborated with Australia, Chile, the Republic of Korea, and the Philippines to implement the "BPW Business Incubator Online Training and Mentoring Pilot Program". The pilot program enabled us to conduct a quasi-experiment, two surveys, and interviews to discover possibilities for e-learning and crowdfunding to empower women entrepreneurs. We provided several policy recommendations which include more affordable and adaptive learning environment, encouraging more person-to-person interaction, and greater involvement of women specializing in ICT in designing e-learning

[1] Complete information of the inventory can be found here http://www.globalgender.org/en-global/database/index, and the Phase 1 report was published on the APEC website at http://publications.apec.org/publication-detail.php?pub_id=1627.

programs. [2] The Phase 2 report "Innovation for Women and Economic Development: Facilitating Women's Livelihood Development and Resilience with ICT" was published in 2015.

c. In response to the recommendations from the Phase 1 and Phase 2 studies, A final report, "Women Entrepreneurs and ICT-Learning: A Toolkit"(APEC Policy Partnership on Women and the Economy, 2016) was developed as a reference to guide female entrepreneurs to adopt new advances in ICTs for their business development. Meanwhile, a game-based mobile learning tool "*WE BOSS"* was launched in four languages and also available online, [3] based on the idea of promoting a more accessible, affordable, flexible, and female-friendly digital learning platform.

This report summarizes the key findings and recommendations of the previous research activities. Chapter 1 provides the background and an introduction. Chapter 2 reviews the barriers and challenges for women entrepreneurs in accessing ICTs. Chapter 3 summarizes the findings from previous activities along with a game-based e-learning software. Chapter 4 provides recommendations for further steps.

[2] The Phase 2 report can be found at http://www.globalgender.org/upload/media/program/APEC_MYP/Phase%202%20report%20_%20Innovation%20for%20Women%20and%20Economic%20Development.pdf

[3] http://weboss.azurewebsites.net/

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Chapter 1: Introductions

Women are key drivers of economic growth around the world. The number of women establishing their own businesses is increasing, which is changing and substantially contributing to the economic growth of many APEC economies. Chile had the highest female entrepreneurship rate of the APEC economic entities, and the Philippines had the largest number of APEC female entrepreneurs.[4] Southeast Asia's economic success is primarily due to women, who fill 60-80% of jobs in the export sectors and account for 35% of SME owners in the APEC region.

However, lack of relevant skills, limited access to training, and under-representation in business ownerships and managerial positions have all disadvantaged women and tend to hinder their economic participation globally. While building networks is likely to increase profit and business scopes, women are still more limited than men by time and location with regard to meeting other entrepreneurs and building networks. Therefore, female entrepreneurs face more challenges than males regarding entrepreneurship and enterprise operations. However, such problems can be solved by progressive development and infrastructure investment in Information and Communication Technology (ICT) technologies.

The various functions of ICTs play a vital role in the pathway of economic development by supporting the productivity growth and innovations across sectors. ICTs are also critical enablers of trade development itself as they help correct and improve every process with which trade is conducted. Through related infrastructure, contents and materials can be sent to remote locations, and users can communicate with each other. Furthermore, ICT is a factor of success for creating an effective online learning environment with high quality usability and accessibility for women entrepreneurs. ICT is also a powerful tool that can be used to improve employment-related knowledge and skills development.

In the past decades, more and more attention has been paid to promoting women-owned enterprises at both local and global levels. Innovative technologies have provided ample resources for overcoming time and mobility constraints, thus facilitating women's access to formal financial services, skills training, and business networks. Nevertheless, not all women have the same opportunities to access or to use the technologies to level the playing field. The Asia Pacific Women's Information

[4] From "Gender-related Constraints Faced by Women-owned SMEs", published by APEC Policy Support Unit, June 2016. The original data is from the IFC Enterprise Finance Gap Database and GEM Global Entrepreneurship Monitor 2014 Global Report.

Network Center (APWINC) conducted a survey on the ICT environment and women's needs, with the goal of improving the adoption of new ICT technologies by rural women in Southeast Asia. They found that rural women with poor ICT infrastructure were eager to learn; therefore, both basic and advanced computer skills and related knowledge should be offered to them. Local language training for women who are illiterate or have limited reading skills, funding support for long-term training, and microcredit and marketing initiatives are all important for developing education modules that meet the needs of rural women (APWINC, 2011).

A recent study conducted by the Group Special Mobile Association (GSMA) on gender gaps in low and middle-income economies across three continents found that mobile phone ownerships provided distinct benefits to women's access to education, health, business, and employment opportunities. Their survey found that more than 70% of women respondents reported an interest in entrepreneurship. However, women are still 21% less likely to own a mobile phone than men. Other obstacles include credit and capital access, marketing, training, and mentorship (GSMA, 2012). These challenges can become potential business opportunities if the factors that influence women's ownership of mobile phones can be identified.

Other studies have shown that ICT and information-based value-added services have become the best tools for fast and efficient development of SMMEs for women (West, Brookings Institution, 2012). Due to the importance of self-employment and financial independency for women, several projects have been dedicated to building support capacity to bridge the gap for women accessing ICT in the Asia Pacific. Despite innovative technology's ability to connect women beyond their traditional circles and overcome market information and financial barriers, the lack of comprehension of ICTs that can be replicated to broaden women's ability to do business has not been properly addressed. Furthermore, scale economies and sustainability remain a challenge for most projects promoting ICT for women's entrepreneurship.

In June 2012, Chinese Taipei initiated a Multi-Year Project (MYP) entitled, "Women and Innovative Economic Growth: Facilitating Women's Livelihood Development and Resilience with ICT" in the Women and Economy Forum (WEF) in St. Petersburg, Russia. This project was subsequently co-sponsored by 14 member economies, and APEC approved funding for it as a pilot initiative towards building capacity among WEF's members so that they could take full advantage of trade opportunities.

This project was also supported by the APEC Small and Medium Enterprise Working Group, whose 2009-2012 Strategic Action Plan encouraged all sectors to enhance ICT capacity in developing youth, women, and minorities' SMMEs, as noted in the 2011

SME Ministerial Statement.

The main goal of the project is to assess to what extent projects using ICT-enabled tools has facilitated women's economic participation with regard to business creation, particularly for integrating micro or small women-led businesses into the global value chain. We aim to:

1. Promote awareness of women's needs in the APEC region by embracing new devices and services for developing their livelihood;

2. Identify and share pertinent experiences and know-how of ICT innovations that can be replicated to broaden women's capacities for doing business with the global value chain.

3. Help stakeholders formulate innovative public-private partnerships (PPPs) in order to both facilitate sustainable new business models and create an ideal policy environment for women.

Chapter 2: Gender Barriers in Accessing ICT

Information and Communication Technologies (ICTs), as suggested by Gerster and Zimmermann (2003), "facilitate the creation, storage, management and dissemination of information by electronic means. This definition includes radio, television, telephone, fax, computer and the Internet". Four characteristics are suggested by the same authors to describe the modern ICTs:

(a) Interactivity: ICTs are effective two-way communication technologies.
(b) Permanent availability: ICTs are available 24 hours a day.
(c) Global reach: ICTs make geographic distances hardly matter anymore.
(d) Reduced costs: ICTs make costs of communication shrink to a fraction of previous values.

Teltscher (2002) suggested that ICT-enabled tools and e-commerce have served as a strong force that changed the global economy, since they (i) reduce costs and time, (ii) break the geographical boundaries, and (iii) allow people to reach out to wider markets for commercial information. However, he also questioned whether women had equal opportunities of access to ICTs, especially in developing countries. Hence, when provided with equal opportunities by obtaining access to information through ICT-enabled tools, women's economic empowerment can be significantly elevated. As many studies have shown, women can enjoy better paid jobs with improved productivity and working efficiency, or they can start up their own businesses and obtain access to new markets (Laizu, Armarego, and Sudweeks, 2010; Malhotra, Kanesathasan and Patel, 2012; UNCTAD, 2014).

However, despite this, the gender digital gap remains problematic for women in the developing economies where provision of ICT products cannot guarantee that women have the necessary skills to enjoy the benefits brought by ICTs (Antonio and Tuffley, 2014). In some parts of the world, the entrenched socio-cultural attitudes about the role of women in society also discourage, sometimes intimidate, them from using ICTs. This often results in a lack of confidence that hinders them from exploring wider markets or benefiting from better economic opportunities. Hence, having more access to resources can actually enlarge the gap between men and women, not only in developed countries, but also in the rest of the world (Gill et al., 2010).

2.1 The Barriers of Accessing ICTs

In recent years, increasing attention has been given to the promotion and growth of women-owned enterprises at both local and global levels. However, many women in

the less-developed world lack access to ICT devices and basic literacy skills. This disadvantages them from coping with the economic pressure or the risky environment to survive in the digital economy. The gap in ICT is relevant to gender inequality. Women's access to productive assets is a challenge, including ownership of mobile phones for economic growth and greater empowerment. It also extends to women's low level of participation in the use of ICTs in general.

The common barriers come from natural formations or structures that prevent/hinder movements or actions of women. The barriers primarily attributed to social behavior, culture, and traditions, and they usually forced women in the state of being restricted under constraints, for instance:

1. Women tend to be financially weaker than men or do not have control over economic resources. Lower average incomes makes accessing ICT devices/services more difficult, particularly where access to credit or financial support is gained through male family members. They are less able to afford to use, rent, or buy new technology devices.

2. Allocation of resources often favors boys or men resulting in lower levels of digital literacy and education, including training in languages which are predominantly used in ICT platforms and the Internet.

3. In some conservative societies, women are barred from public places. Sometimes gender-based cultural attitudes prevent young girls and women from accessing and using ICTs, or discriminate against them having access to education in science and technology. They are encouraged to enter the job market or get married rather than seeking for higher education.

According to the phase 1 & 2 case studies, there are some constraints that particularly affect women in accessing ICT and utilizing them to engage economic activities as follows.

2.1.1 Micro-side constraints (Factors affect the willingness and ability)

1. Equitable access: The first critical step for women and girls to benefit from ICT would be to access, use and ideally own mobile devices. However, many women and girls are unable to access inexpensive internet to increase their income or participate in business due to economic, social or cultural reasons.

2. Lack of gender-sensitive learning content: The design concepts of ICT devices are often created without taking into account the specific needs of women and girls. Existing content would continue counterproductive gender

stereotypes or rely on materials which are culturally irrelevant or inappropriate.

3. Gender gaps in education attainment: Women are less likely than men to have completed formal education, resulting in illiteracy and often lack of vocational and technical skills needed to support the development of highly competitive businesses. In addition, enduring gender bias often discourages women and girls from learning ICTs.

4. Time Constraints: Women typically spend more hours on unpaid care works. Their roles as worker, caregiver and homemaker limit their leisure time. Due to multiple responsibilities, women are less likely to have the spare time to fully participate in accessing education and training through ICTs. The struggle to balance work and family responsibilities is a serious concern for women. Women who find themselves in this circumstance is difficult to choose between professional development and personal life. It also renders them less able to engage in economic activities.

5. Lack of role models in technology and business fields: Role models are crucial in supporting women and girls to choose non-traditional fields by providing essential information on how to raise voices, increase self-confidence and have professional achievement. However, over-representation of men in technology and business areas would limit women's access to qualified mentors through network recommendations. If young girls and women cannot visualize themselves in STEM or business fields because they have never seen role models, they will be much less likely to ever explore their potentials in science- oriented specialty.

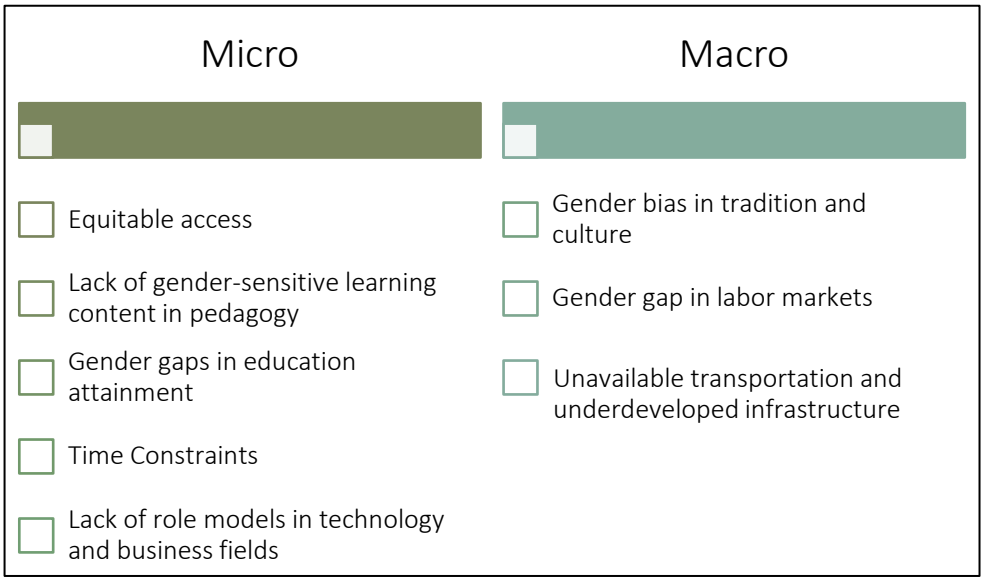
2.1.2 Macro-side constraints (Factors from environment or government)

1. Gender bias in tradition and culture: Tradition and culture are part of society; both of them shape modes of life, the fundamental rights, and value systems. They also define expectations about attributes and appropriate behaviors of women or men. Gender identities are critical because they affect the daily life in the family, but also in the workplace and society. Women are traditionally considered to be passive and dependent, and it also impacts on women think about themselves within their gender roles.

2. Gender gap in labor markets: Gender division of the labor market is a central feature of gender inequality. A large number of females have entered the labor market and they are entering traditionally male dominated domains

during recent years. However, the quality of employment has not necessarily improved. For instance, women are more likely to be discriminated by limited or unequal access to productive resources or assets needed to earn the same income as men in the labor markets. It is because women continue to face gender pay gap and occupational segregations.

3. Unavailable transportation and underdeveloped infrastructure: The majority of women who live in rural or remote areas are consistently excluded from accessing ICT facilities that are easily found in urban centers. Safety concerns as well as the costs of transportation deter women's ICT access and limit their opportunity to lean and to benefit from the technology. Moreover, social norms and cultural behaviors would also affect the laws and regulations of women's free living. Some women have difficulty to leave the house without family members' permission.



2.2 The Challenges of Running Business for Women

Traditionally, women's entrepreneurship is both about women's position in the family and role in the local community development. The recent Global Entrepreneurship Monitor (GEM) found 126 million women starting or running businesses around the world, and 98 million operating established businesses. Today, women entrepreneurs accounted for up to a third of all businesses operating in the formal economy worldwide. However, majority of these are small or micro businesses with little growth potentials because women are faced with particular challenges than men and need much efforts to overcome. It is important to have an understanding of the multiple

gender dimensions that impact on empowering women to change their economic status. It is also necessary to understand that women are less likely to prioritize ICTs in their daily lives as they have more difficulties in accessing or using ICT-based services.

To make meaningful progress on women's economic participation, both improving gender equality and connecting effectively women with ICTs are important issues to be addressed. The major challenges that are critical to women who are either starting or growing their own businesses are as follows:

1. **Business challenges**

The main problems faced by women-led businesses are constraints in obtaining loans and stable funding. Access to finance is one of the most common challenges that women entrepreneurs face, and they are further in the need for their spouse's countersignature on documents. Legal institutional and sociocultural barriers often limit women's access to the financial services, particularly in the rural areas.

In addition, it is difficult for women to mobilize financial resources due to their lack of access to land and housing properties. Women entrepreneurs are also limited in their ability to collect information due to lack of training using ICT-based devices. It would lead to procrastination in processing applications, grant approvals, making payments, and seeking for contracting.

2. **Socio-cultural challenges**

In some regions, information centres or cybercafés are located in places that women may not feel comfortable to visit because of security problem or lack of transportation. Women also have problems of gender-defined multiple roles, heavy domestic responsibilities, scarce leisure hours, and public centre's not being open when women could visit them. Even though the sites are still open in the evening, women might find it would be difficult to return safely to their homes in the dark.

Another aspect is about culture. Gender bias or stereotype in attitudes impact women in using ICTs. Many traditional cultural attitudes discriminate against women having access to education in technology on the basis of the presumption that ICTs accessing and using is not for women. Also, women are often discouraged in their entrepreneurial efforts in family and community. Heavy household responsibilities are major challenges and could result in women opting out of the ICT-driven developmental efforts.

3. Infrastructure challenges

First, ICT equipment tends to be expensive, both at initial setup and with subsequent costs. Women-friendly and culturally sensitive public access points for ICT are necessary. To be clear, gender inequality exists in the purchasing power and literacy levels, thus not all women have access to ICTs and probably far fewer have access to broadband.

Second, the technology solutions that enable ICT-learning are crucial to its widespread adoption. For instance, without well-designed and well-maintained platform, e-learning would be difficult. Besides, an application with learning materials that constantly crashed or was not user-friendly would hinder women's literacy in technology and business knowledge.

Third, protection of users' privacy and safety is necessary. As more and more women entrepreneurs start to use networked ICT and interact online, they share personal information without preventing inappropriate behaviour associated with the use of ICT devices. Negative social attitudes such as cheating, cyber-bullying, malicious photographs or messages towards ICT devices are usually serious barriers for women.

Chapter 3: Using ICTs to Support Women's Entrepreneurship

The usage of ICT opens new pathways for education, communication, and information sharing. Accordingly, ICT can bring important benefits by enhancing business performance and helping reduce barriers to women's business development. Women could also have greater opportunities from a broader market through acquiring knowledge related to international trade, human resource management, accounting and so on. In return, women's greater participation in business empowers them and promotes gender equality. The social status and life quality of women would be greatly improved because of economic participation, job creation and poverty reduction.

In this chapter, we summarize the findings from our phase-one inventory study and the phase-two online learning study along with a game-based e-learning software which aimed at harnessing ICT-enabled tools designed to enable, or to advance, the economic empowerment of women in four APEC partner economies – Chile, the Republic of Korea, the Philippines, and Chinese Taipei.

3.1 Empowering Women Entrepreneurs through ICT: The Four pillars

A total of thirty-four projects have been identified in the inventory study, eight of which were taken via a face-to-face interview with both the organizers and participants.[5] Regarding the major findings in the first phase, we found that ICT and related services can empower women from three perspectives: (i) creating environment for women to participate in community-based activities, (ii) increasing business & employment opportunities for women; and (iii) establishing business enabling networks that address women's needs.

In order to explore possible approaches for a sustainable ecosystem that can be tackled by women in APEC regions to facilitate their long-term economic empowerment, regional constraints and project implementation models have to be identified and further examined by the eight in-depth interviews. The interviews followed strictly the

[5] The eight projects selected for the case studies were: (1) Chile: I-Kuna; (2) The Republic of Korea: Gyeonggi Women's Development Center(GWDC), Women Enterprise Supporting Center (WESC); (3) The Philippines: Digital Literacy for Women of PhilCeCNet, Computer Training Projects of PTTC; (4) Chinese Taipei: "She Economic"- Empowerment with E-Commerce of Kaohsiung, Phoenix Micro-business Start-up Loan and Consulting Plan, Digital Inclusion for Small and Medium Enterprises Project. ◦ For further information, please refer to the phase 1 report: http://publications.apec.org/publication-detail.php?pub_id=1627

four dimensions associated with women's full business involvement in San Francisco Declaration, i.e., (1) access to capital, (2) access to markets, (3) skills and capacity building, and (4) women's leadership.

The principle findings from phase-one inventory and interviews are as follows:

1. Access to Capital

Although a direct intervention of deploying ICT tools to facilitate women entrepreneurs' access to finance is absent, some of the cases demonstrate is indirect. Take the Korean project for example, GWDC, provided financial support for the tenants to start their businesses with the offer of patent applications, trademark registrations, homepage creation and about 4,000 dollars for participation in various business oriented fairs. In addition, they invited participants to apply for loans with interest rates as low as 2.9%. It was made easier for GWDC participants to receive loans as their abilities were recognized by having been accepted on to the program. Furthermore, GWDC even payed for partial costs for receipt of ISO9001. Similarly, Chinese Taipei's Phoenix Plan provided women-friendly loans for up to 27,000 USD for participants who gained the certificate on completion of a short start-up training course.

Only two out of the eight projects provided capital related services. However, for sociocultural or gender-based inequality reasons, access to capital appears to be more difficult for women. Some of them mentioned that they would rely on informal money lenders or sources e.g. their family, friends or their own savings for their businesses. This leaves room for future innovative ICT improvements.

2. Access to Market

It seems that many hurdles exist for small business owners who are trying to gain access to bigger markets; for instance, (i) participants from Chinese Taipei's "She Economic" – mostly small owners whose products are perishable – prefer to sell in their weekly fair, with their education platform serving more like online advertising, (ii) the price of shipping, international packaging and delivery is much higher than the price of the product, thereby discouraging customers who require only small purchases, and (iii) for both small and more advanced business owners, logistic infrastructure and regulatory constraints remain problematic and unresolved.

One of the advantages of e-commerce platforms is that they broaden the market by serving as efficient promotional tools in order to connect customers, from the comfort of their homes anywhere in the world, to the seller. However, the degree of acquiring such trading platforms varies across the different economies. It is

noticeable that many participants expressed concerns about deploying them, and they were also reluctant to become involved in international markets, either for socio-cultural reasons, or simply because their products were hand-made or perishable.

The instability of the technical infrastructure is not the only barrier that hinders their exploration of newer and bigger markets, though; the expense of being involved in international markets and the potential costs of maintaining their e-commerce platform are also seen to be obstacles.

3. Skills and Capacity Building

The power of knowledge has emerged as the principle benefit of women's participation in the digital training courses. The power of obtaining ICT and business-associated knowledge through attending training courses, while not necessarily increasing women's economic growth, can reduce the degree of discrimination women have to face. Most of the respondents across the four economies made positive comments about their ICT-enabled tools training, since not only does it equip them with skills, it gives them the knowledge and self-confidence to improve their business practices or pursue job opportunities, while, at the same time, widening their social circles.

The fact that women have long been discouraged from learning about ICT because it is too difficult, or too expensive; however, if we integrate gender awareness and sensitivity into course designing will make it possible for them to attend classes and gain knowledge previously withheld from them through historical prejudice. Judging by the cross-case comparisons, therefore, it seems clear that sensitive course designing is essential, especially if the courses are designed to meet the needs of underprivileged, resource-poor women.

4. Women's Leadership

Networking among women participants appeared naturally in many of the cases chosen by the four economies. Five out of eight cases reported that the networking opportunities in their programs offered participants contact with a wide range of people from different backgrounds, or with people with similar goals, all of which brought benefits such as in terms of cooperation and business matchmaking opportunities.

In the Korean and Pilipino cases, gender-based inequalities were found, although they were somewhat reduced as participants' ICT skills increased, or as their businesses started to become operational. In contrast, in Chile as a whole, there is

little gender-based inequality since women have traditionally headed craft-based organizations. In Chinese Taipei, though, the reasons for gender-based discrimination remains unclear from the cases studied. However, all the Chilean respondents considered their only role was to be “stay-home mothers and wives”; also, some Chinese Taipei respondents feared that the more successful their businesses became, the more their harmonious family lives could be damaged. Hence, women in both Korea and the Philippines are still trapped by social norms and expectations, even when they become successful micro-entrepreneurs. The result is that they would rather stay as they are than look for bigger markets.

Some of the participants in most cases have had the advantage of gathering together and even starting their own formal or informal societies, some of which involve the creation of more business opportunities, such as by business matching or developing trade fairs, while others served more as emotional sisterhood style “comfort zones”. Although the power of friendship is important for women’s self-confidence at the start-up stage, participants seemed more willing to participate in activities offered by those association that focus primarily on business, rather than on “sisterhood”, because they found them to be more supportive at a practical level.

Therefore, it is beneficial for women, especially underprivileged women, to build up their leadership when their self-confidence has been increased by, (i) obtaining ICT skills, (ii) receiving the emotional comforts offered by newly made friends, and (iii) having their social circle expanded.

3.2 The Advantages of Online Learning

ICT-related projects positive influenced female entrepreneurs in many respects, such as access to market, building networks, and access to capital. Thus an environments which can provide these services all the time is a whole new opportunity for women’s economic participants and running business. Women entrepreneurs can be encouraged and supported by:

- Creating an environment where women feel comfortable participating in community-based development activities and advocating for their needs and priorities;
- Creating business and employment opportunities for women as owners and managers; and
- Creating business-enabling networks that address women’s specific needs, e.g.,

participating in the “She Economic” program and establish the “Kaohsiung Association of Women Entrepreneurs.

Moreover, online learning (or e-learning) is more cost-effective than most face-to–face teaching lessons if we take into account the course coverage and the opportunity cost of commuting (Strother, 2002; Bates, 2005). E-learning can also provide lifelong learning, social access, and better quality of education as well. Therefore, e-learning has been strongly advocated by governments and private sectors for its potentials to facilitate social and economic development for women (Bates, 2005).

Considering the advantages of e-learning, it seems that e-learning has its potential to become the right approach which could be applied to help women entrepreneurs to conquer their difficulties and fulfill the ultimate goal of economically empowered. Study (Markocić, Porter, and Omolaja, 2012) also argued that women showed better interest toward learning online than men because e-learning is much more flexible than traditional learning. It also shows that women and elderly learners are better motivated and perform better than men during the learning processes.

However, the advantages of e-learning may sometimes turn into barriers for women. For example, lack of face-to-face interaction may decrease their motivation. The requirement of computer and internet connections may cause economic burden, and insufficient self-regulated learning ability may lower the learning effect. Therefore, in order to evaluate whether e-learning could become an effective tool to improve women’s economic status, we adopted an experimental approach and designed two surveys (pre-test and post-test) for our study.

In the second-year study, an experimental study on the effectiveness of raising women’s business potentials using an e-learning program specifically designed for women business was conducted consequently.

In this experimental study, we used a focus-group approach by selecting 20 women entrepreneurs participating in a BPW Business Incubator ONLINE Training and Mentoring Pilot Project. We conducted two surveys, before and after their e-learning courses, to evaluate the effectiveness of the program, in particular how it is used to connect women to new and wider markets, broaden their social networks and provide them with information that opens up important economic opportunities. These findings will become an important knowledge base and reference that will help in developing e-learning related approaches and tools in the third phase.

3.2.1 Beneficiaries from e-learning

From our quantitative and qualitative survey results, we can conclude that there was a

high rate of satisfaction toward the e-learning program, such as:

1. Flexibility of E-learning

Although participants needed less advice after they started their business (drop from 76% to 34%), they still had a continuous need for skills with foreign markets (32%) and management (52%). Furthermore, up to 72% of participants reported lack of time for training. In the post- test, 90% of participants agreed that e-learning could help them flexibly manage their time, and 75% of them agreed that 20 hours' e-learning is suitable.

By comparing the pre-test and the post-test results, we find that e-learning can serve to solve the "time" problem. One of the most important functions of online e- learning is that it allows users to obtain needed information or tools without the limitations of time and place. Women entrepreneurs often find it more convenient and can thus manage their time more flexibly.

2. Work-life Balance

In the pre-test, we find that our participants did not consider work-life balance as a serious problem for their business. In the pre-test, about 40% of participants considered "combining family and work life" as an obstacle, but the percentage dropped to 33% after their business start-up. In the post-test, we find that only one-fifth of participants selected work-life balance among their e-learning materials. Therefore, we believe that work-life balance is a continuing problem for some participants but not a major issue for most of them.

3. Interactions with Others and Mentors

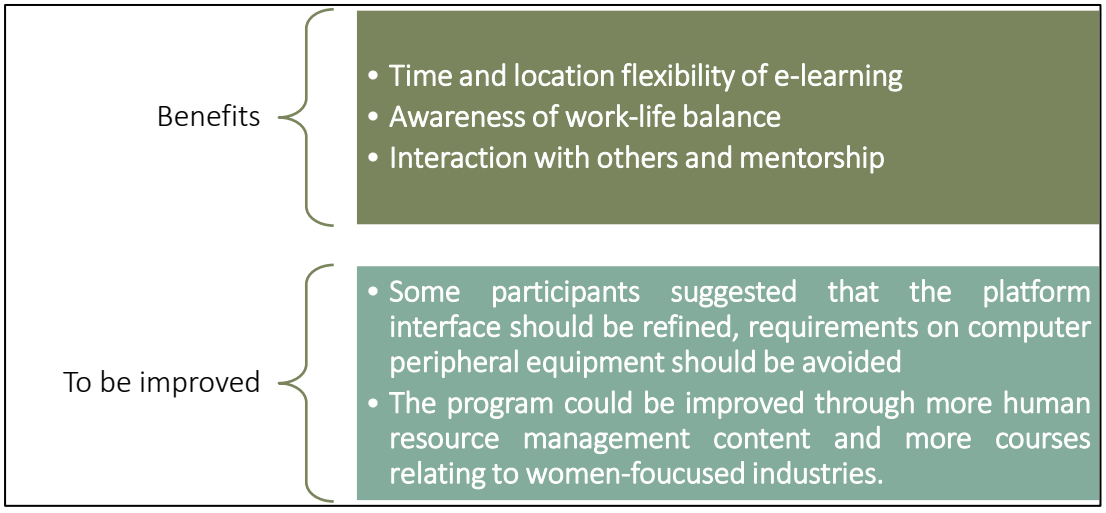
Most of the participants affirmed the necessity of interaction with others and the usefulness of advice from mentors. The excellent comments on the mentors' effectiveness indicate that e-learning programs should include mentors who can provide consultation and assist with study plans. Furthermore, it is recommended that e-learning programs for women should include a peer contact feature for interaction with other learners, since many express the need for greater human interaction. The interaction system on the platform should be very flexible, depending on participants' individual needs.

Although e-learning program played an important role to meet the female entrepreneur's needs, there are some improvements still needed:

First, some participants suggested that the platform interface should be refined, requirements on computer peripheral equipment should be avoided, system compatibility problems should be addressed, and the required hours for completing the course should be reduced. Beautiful design and a friendly interface would increase motivation, but requirements on peripheral equipment may increase the hardware barrier, while designing for system compatibility would lower the software barrier. Furthermore, participants who were short of time preferred a program requiring fewer learning hours.

Second, although most of our participants reported high satisfaction with the course materials and topics, including many that our participants expected, their suggestions and responses indicated that the program could be improved through more advanced courses, more human resource courses, and more courses relating to women- focused industries. Some also indicated an expectation for more cases, examples, and practices in the course materials. Furthermore, course offerings more directly relating to their areas of interest would increase motivation and prevent drop-outs. Nevertheless, many of our participants agreed that they would be willing to recommend e-learning to other women entrepreneurs and continue to use the e-learning program for further learning.

We should also note that the suggestions we received from survey participants varied depending on their personal background. Different ICT environments also impacted their e-learning in different ways. Therefore, the impact of different ICT environments on e-learning outcomes for women entrepreneurs should be an area for further study.



3.2.2 Key elements for building e-learning platform

Based on the pilot program, a few policy recommendations could be referenced for further designing of online learning program for women entrepreneurs:

1. Creating more affordable and sustainable e-learning systems. Although many existing e-learning programs have pursued various strategies to bring practical benefits to women entrepreneurs, most of them face limitations in scaling up to match the diversified needs of women for their business development. Collective actions and institutional supports are needed to realign resources to make these existing programs more tangible and effective.
2. Design e-learning programs that also encourage person-to-person interaction. Women entrepreneurs generally benefited from interactions with mentors and consider interaction with others as vital not only for learning but also for networking. Higher rates of participation and satisfaction will be expected if e-learning programs can be designed to address the face-to-face networking needs of women entrepreneurs.
3. Expand course content while retaining time flexibility in e-learning programs. Many participants agreed that time flexibility was one of the most attractive features that led to their decision to enter the e-learning program. However, once they entered the program, their differing priorities became very crucial in deciding whether they completed the e-learning process. Therefore, in developing e-learning programs, emphasis should be given on adaptive ways of learning, in terms of learning objectives, courses, and individual learning processes, as well as a broad diversity of course options, including more advanced-level course options as skill levels develop.
4. Encouraging women specializing in ICT or women in ICT-related businesses to design e-learning programs tailored for women entrepreneurs' real needs. Work-life balance and gender discrimination are no longer the main obstacles for women entrepreneurs. Our case study showed that women entrepreneurs perceived access to capital and access to market to be their major challenges in business survival and/or expansion. Since e-learning provides opportunities that might not be otherwise available, we recommend greater involvement of women specializing in ICT or women in ICT-related businesses to design e-learning programs that will help women entrepreneurs overcome those challenges.

3.3 The Initiative of an Innovative Learning Tool – WE Boss

The successful factors come from a continuous and easy accessible training in information technology, e-commerce and entrepreneurship. This may involve combining ICT literacy education and business knowledge learning at the same platform. Under this circumstance, a game-based learning APP will create an innovative, friendly and time-saving way of learning for women entrepreneurs.

In response to the recommendations from the previous studies, this project launched an innovative business learning tool, 《WE boss》, specifically designed for women entrepreneurs with considering the key elements that women entrepreneurs may concerned.[6]

This tool is a game-based application that women entrepreneurs can enjoy the learning process on their smart phones, notebooks, tablets, or computers anytime anywhere. The main ideas of 《WE boss》 are as follows:

1. Overcoming Challenges: Through gameplay, women build up self-confidence by learning how obstacles can be overcome.

2. Self-Learning: Games create a 24-hour learning environment that can lower the time costs. They can also create compelling needs to learn, ask, examine, assimilate and master certain skills and content areas.

3. Failure Simulation: Gameplay can make learners experience failure within a friendly environment that allows for learning by trial and error. They can also boost the motivation to explore the rules of running a business and acquire problem-solving skills.

4. Entertainment: The application will simulate interactive scenarios that reflect real-life situations, thus making learning fun and entertaining.

5. Easy Access: Beside online access, an offline application will be provided to facilitate a countable learning tool in all environments. In addition, the user-friendly design and illustration will make the application easy to follow.

About the name of the application《WE boss》, “WE” stands for womenomics, while “boss”” with lowercase letters indicates micro business.《WE boss》is objected to assist women to experience of starting up a business. In this game, users could take turns to answer questions through time-limited quizzes and acquire knowledge of several categories such as: entrepreneur mindsets, production, marketing, finance, human resource, work-life balance, and research and development management.

Considering the diversity of cultures within APEC area, various figures and unique music were created to represent women from different regions, culture, occupations and life styles. Also, the visual design is full of bright and vivid colors and the interface is easy to understand. The colorful visual design and friendly interface are both served to create vibrant atmosphere and attract more women users.

[6] http://weboss.azurewebsites.net/

In addition, 《WE boss》 could be a powerful database and social network that connects resources from different sectors and shares information throughout the community. Entrepreneurs can use it to find relevant local connections, access to the markets, and establish business strategies or management techniques.

Since games have great potential of learning and provide assessment tools, a well-designed learning game would produce incredible impact on users. Therefore, we believe 《WE boss》 will help women to build confidence, discover their strength and weaknesses, and understand the ability they need for their business growth.

Chapter 4: Further Steps

Using ICT to support women's entrepreneurship in Asia Pacific region had been well recognized by APEC leaders. As stated in the 2014 APEC Leaders' Declaration, "*We recognize the pivotal role of women in the development and prosperity of the Asia-Pacific, and are committed to taking concrete policies and innovative measures to further enhance women's economic empowerment and their access to markets and ICT technology, eliminate all barriers that hinder women's economic participation, and ensure women's equal opportunities, participation and benefit in innovative development, economic reform and growth*"

To put things in perspective, our project examined the question: ***How have women in the APEC member economies responded to and have been empowered by ICT-focused educational programs?***Following the four pillars of San Francisco Declarations, our two-phase study results suggest that women in Asia-Pacific region are highly enthusiastic in embracing ICT as a practical channel for entering into the business world.

Consequently, creating an enabling environment where women can effectively use ICTs to explore and eventually to benefit from business opportunities is the main purpose for the sustainability of the project. In response, government support is needed to bring more stakeholders that can offer different resources to make the project stronger, better, and more sustainable.

We also design a women-friendly and public-accessible e-learning platform,《WE boss》, with an aim to support more educational programs to adopt innovative technologies for women's participation in business development along with a consideration to mitigate gender inequality in the global digital society. As difficult as it may seem, further cooperation among Member Economies and across different APEC Working Groups or Fora will increase the possibility of the making of a sustainable model for current ICT-enabled educational programs to maintain or for more participants to join in the future.

4.1 Recommendations on the Four Pillars

Following the key pillars, our recommendations for using innovative technologies and/or services to assist women in establishing and expanding their livelihood and enterprises are shown below:

1. Access to Capital

Some of the initiatives provide financial loans to support women start-ups as seed

funding in their early stage. However, lack of financial literacy, and dependency on family consent over credit decision have limited their ability to gain access to capital. Most women still rely on their own savings or informal mechanisms for financial supports in their businesses. The absence of direct utilization of ICT-enabled tools to gain access to capital also signals the fact that innovative ICT solutions to facilitate access to capital have not been introduced to women entrepreneurs in APEC economies.

- Encouraged innovative ICT solutions e.g. crowdfunding to ensure that women entrepreneurs have, both formal and informal, access to finance.
- Ensure privacy, ownership, and cyber security when preparing ICT-enabled solutions for women's access to capital.
- Secure women's access to finance and capital by pursuing partnerships among relevant stakeholders, e.g. academics of digital learning, NGOs, private sectors including financial and ICT service providers and distributors.

2. Access to Market

E-commerce is one of the key enablers for entrepreneurs' market expansion. Entrepreneurs can reach potential customers in the global marketplace by utilizing e-commerce or other ICT-enabled tools to break geographic boundary. However, there are significant barriers that make it difficult for women entrepreneurs to take full advantages of deploying e-commerce platform: (i) product type (ii) expensive transaction cost. In our research, most of women engaging in e-commerce are owners of micro or small businesses, selling perishable food products. Their target market is normally restricted to domestic or even regional level as the expensive shipping cost is not acceptable or unaffordable for either customers or the business owners.

- Design and provide training programs emphasizing on cost-effective packaging, branding, and food processing hygiene practices for women owners of micro and small enterprises to meet customers' demand and governmental regulations in a self-sustaining manner.
- Establish the investment rules and public-private-partnership environment so that private capital can be attracted to invest in rural infrastructure to lower the transportation and marketing costs.
- Encourage women entrepreneurs to use e-commerce platform by promoting partnership between project sponsors/organizers and ICT service

providers/distributors to design sustainable plans with affordable rates for women entrepreneurs.

3. Skills and Capacity Building

Participating in training courses on ICT-enabled tools or business related skills is beneficial for women participants because: 1). Confidence built up and self-esteem improved; 2). Knowledge on e-business-related skills increased; 3). Social circles enlarged; and 4). Businesses digitized. However, inflexible or non-customisable course modules and curriculum reflect the lack of gender-sensitive perspective.

- Promote a women-centric learning environment by offering time-flexible curriculum or customizable course modules.
- Mainstream gender perspectives in the learning projects by providing gender-sensitive trainings to the trainers.
- Encourage women entrepreneurs to utilize e-learning services e.g. online learning or mobile learning platforms, which are convenient, flexible, and can break the geographical boundary.
- Encourage the involvement of women specialized in ICT or women in ICT-related businesses to design/plan ICT applications/programs tailored for women entrepreneurs' needs.

4. Women's Leadership and Agency

Participating in ICT-training projects brings opportunities for participants to network with people outside of their original social circles. Some of these people serve as the participants' role models e.g. government officers or successful women entrepreneurs. Such social and business circle expansion serves not only women's professional advancement, but also as emotional comforts. The networking activities for women business owners at start-up stage tend to focus on emotional comforts, whereas women owners of mature businesses tend to focus more on entrepreneurial activities, such as partnership opportunity seeking, knowledge and best practices sharing, leadership and communication skills building.

- Increase the visibility of successful women entrepreneur role models.
- Enhance effective networking between the role models and the project participants via social media operated on mobile-based applications.

- Encourage the involvement of successful women entrepreneurs in open and inclusive dialogue on development of mainstreaming ICT-related policies and strategies that improve the environment that foster business growth.

4.2 Recommendations: WE boss

The《WE boss》was designed as both a learning and networking platform for women during the early preparation and start-up stage of running a business. Some related initiatives and activities are welcome to echo《WE boss》as a support for women's empowerment in the APEC region, such as:

1. Integrate《WE boss》with e-learning programs and ICT-enabled tools through organizations or communities within each economy already supporting women entrepreneurs. E-learning programs will be most adapted when there is guidance from organizations that engage women entrepreneurs. These could be government business development organizations, cooperatives and NGOs or private groups. These groups could then incorporate other interventions such as coaching and mentoring to make the learning more effective.

2. An e-learning programs and/or ICT-enabled tools can be advanced by implemented a platform that integrates various components of the learning process. These components could cover: assessment, e-learning tools, e-learning content, links to relevant resources, coaching and mentorship, communities, feedback system and an analytics for community managers, economies and APEC. The platform will also serve as an organized repository of resources, guiding users through the process and making it easy to find relevant and accurate information at various stages of their business development journey.

3. Provide as many components of the platform as possible through mobile. By making tools and content easily and cheaply accessible on mobile, users can use the resources at anytime, anywhere (for example, while waiting in line or watching the children outside of the home). This accessibility increases the chances of continued use of the tools and resources and sustainability of learning.

4. Incorporate analytics and feedback into the platforms. Develop tools that include features to acquire feedback from users as well as support the build-up of data about the use of the tools and the outcomes. This will create "intelligence" that users, community managers and organizations and policy makers can use in enhancing existing platforms and creating new ones.

5. Allow for decentralized implementation with the capability for information sharing

across stakeholder groups (organizations or economies). Due to the various needs of each economy, the supports for women's empowerment within each economy are different. The platforms should be flexible enough that content can be open and shared across different groups. Content creation can also be integrated and modularized such that each group can create new content for their own interests or modify content created by others.

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