Editorial Statement

The Pacific Economic Cooperation Council (PECC) is a unique tripartite partnership of senior individuals from businesses and industries, governments, academia and other intellectual circles. All participate in their private capacity and discuss freely on current, practical policy issues of the Asia-Pacific region.

PECC was established in 1980. It currently has 25 member committees from all over the Asia-Pacific region. Each member committee comprises tripartite senior representatives. In addition, PECC comprises two institutional members: the Pacific Trade and Development Conference (PAFTAD) and the Pacific Basin Economic Council (PBEC).

PECC is the only non-governmental official observer of APEC since the APEC's formation in 1989. PECC has provided information and analytical support to APEC. It also channels and facilitates the private sector's participation in the formal process.

The Chinese Taipei Pacific Economic Cooperation Committee (CTPECC) was formed in 1984, with the purpose of participating in PECC events as an observer. In November 1986, CTPECC's application for membership was approved by PECC at the 5th General Meeting. Since then, CTPECC has become a full and active member of PECC.

Asia-Pacific Perspectives is a key publication of CTPECC and an open forum welcoming submissions of analyses, perspectives, and commentaries on the Asia-Pacific region. The periodical focuses on political, economic, business and social issues.

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Email: d17699@tier.org.tw

ISSN: 1997-5511

Asia-Pacific Perspectives

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Asia-Pacific Cooperation in an Era of Rising Anti-Globalization

Eduardo Pedrosa

Asia-Pacific economic cooperation is at a crossroads. From its roots in the mid 1960s it has been underpinned by a drive towards deeper economic integration. That intellectual foundation has been challenged by the failure of the TransPacific Partnership to come into force which has been interpreted as symptomatic of a discontent towards globalization evident in the 2016 US presidential and Brexit campaign[1]. It remains to be seen whether this is a transition phase or if it is in inflection point in the process with economies turning inwards and eschewing the benefits of deeper integration.

The latter would have seismic repercussions on economic policy throughout the world but especially the Asia-Pacific. Some may see recent events fatalistically but there is much the region can do to avoid a slide into tit-for-tat protectionism. Evidence of the ability of governments to keep momentum going was evident in March in Manila with the announcement of an attempt to restart the ASEAN-EU FTA[2] negotiations. This initiative should trigger a deeper examination of where various economies stand with

[1] See https://www.washingtonpost.com/business/economy/withdrawal-from-trans-pacific-partnership-shifts-us-role-in-world-economy/2017/01/23/05720df6-e1a6-11e6-a453-19ec4b3d09ba_story.html?utm_term=.79c45a5dd97a for example.

[2] See: https://eeas.europa.eu/delegations/philippines/22452/eu-and-asean-gear-possible-re-launch-trade-talks_en

respect to how they benefit from the trading system. If successful, the deal would bring together Europe with its technologically advanced companies together with rapidly growing middle-income Southeast Asia. This is not to forget the very significant progress being made in Pacific South America with the Pacific Alliance or moreover, the progress being made with the Regional Comprehensive Economic Partnership agreement that would consolidate ASEAN's Plus One FTAs into a single accord.

Although the Brexit campaign and result is often cited as evidence of the malaise towards economic integration, subsequent actions by the UK government point to the need for a more nuanced understanding. At a meeting of Trade Ministers of the Commonwealth, UK International Trade Secretary Liam Fox stated that "It is the government's intention to make Britain a leader in free trade, working with our friends and allies in the Commonwealth to remove barriers and liberalise the glob al trading environment. The trade ministers' meeting is an important step towards realising this vision and I'm looking forward to strengthening foundations today for our trading future." This is a far cry from any kind of anti-globalization or anti-trade sentiment that was expressed during the Brexit campaign.

The EU-ASEAN decision, provides an important counterpoint in the debate over the next steps in globalization and integration narrative. While expressing caution over uncertainties arising from "growing protectionist and inward-looking policy stances" that often blame trade for the loss of jobs because of automation and industrialisation, EU Trade Commissioner Malmstrom told reporters after a meeting of economic ministers from both regions. "Closing borders and building walls, raising tariffs -- that will not be a solution, but will rather reinforce the problems." While further liberalization may be difficult given the political atmosphere around trade issues, core economic interests need to be considered.

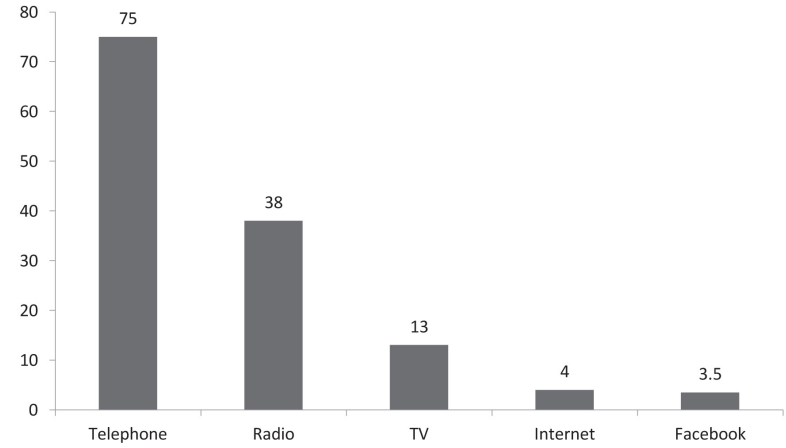
The rise of the Asia-Pacific has been understood in a geo-economic sense to come with a shift in the centre of gravity of the global economy from the Atlantic to the Pacific basin. While the post-1945 order was based on a common understanding and commitment to international institutions and norms, some argue that the shift to the Pacific Century has initially lacked such characteristics[3]. Instead, Asia-Pacific cooperation has proceeded on the basis of shared interests. To provide insights into those shared interests converge around specific policies, since 2006 the Pacific Economic Cooperation Council has been undertaking an annual survey of the regional policy community.

PECC's survey results provide some details on the concerns about globalization but also insights into ways in which integration processes can be improved to ensure that the next phases of growth are more inclusive. However, an additional complexity in understanding the current discourse over trade policy and structural changes in economies is the extent to which trade is responsible for the change and how much is due to rapid technological shifts.

As seen in chart 1, while it took the telephone 75 years to reach an audience of 50 million users, it took the internet just 4 years. While the change that took place with the industrial revolution 2 to 3 generations to reach a critical mass, adjustments today are taking place within an individual's working life. In short, economic policy is challenged not just by the globalization and integration but by a dramatically shorter technology cycle.

[3] See Economist Special Report: http://www.economist.com/news/special-report/21631795-under-american-leadership-pacific-has-become-engine-room-world-trade

Chart 1: Number of Years to Reach an Audience of 50 million



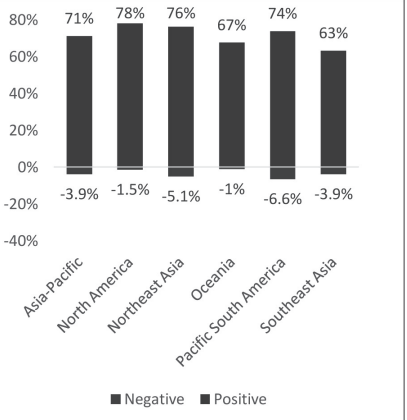
Source: http://blogs.wsj.com/economics/2015/03/20/50-million-users-the-making-of-an-angry-birds-internet-meme/

The Asia-Pacific's commitment to economic integration has served the region well. Since 1989 when its primary economic policy process, APEC, was founded, the average income per capita (in current US$) has risen by over 200 percent from US$5090 to over US$15,000, much better than the global rise of 160 percent. This has not been limited to emerging economies, for example, in the United States the GDP per capita has gone up from US$23,000 to more than US$55,000. The underlying question therefore is why is there a sense of anxiety over globalization?

PECC's 2016 survey on the State of the Region sheds some further light on the challenges facing trade policy and especially regional trade agreements. As shown in Chart 2, while 71 percent of respondents thought that the Free Trade Asia-Pacific, if it were to be achieved would have a positive impact on their economy, only 51 percent had a positive view on the

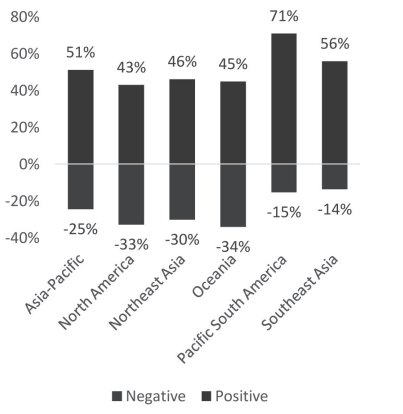
political environment for freer trade in the region. The disconnect between assessments of the political economy of trade and the FTAAP was deepest in North America, while 78 percent thought such an agreement would a positive impact on their economies, only 43 percent thought that the political environment for trade was positive from their perspective.

Chart 2: How do you think the FTAAP if its achieved will impact your economy?



Source: PECC SOTR 2016-2017 ANNEX B

Chart 3: How do you assess the political environment for Asia-Pacific freer trade and investment in the coming five years?

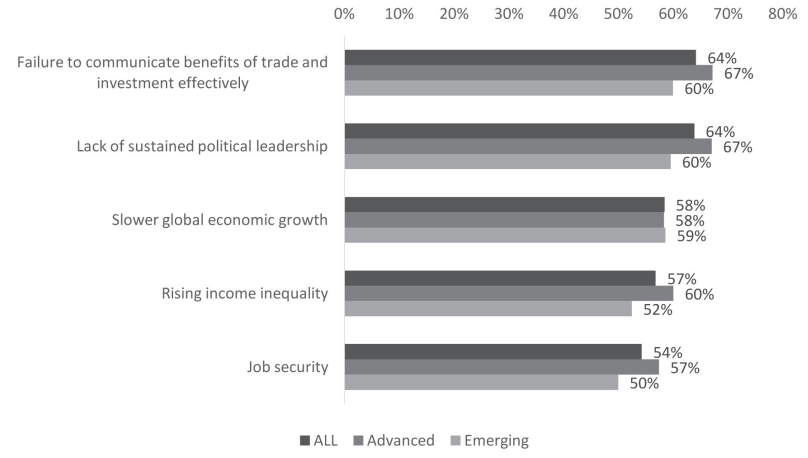


Source: PECC SOTR 2016-2017 ANNEX B

Two key findings emerge from the survey results: all the factors given were thought to influence attitudes towards trade; and that respondents from more advanced economies gave higher scores to all factors (except for slower overall economic growth) compared to their counterparts from emerging economies. This survey findings point to some important actions that governments around the region need to take: better communicate why trade and investment is important; the importance of sustained political commitment to trade but critically to also the need to address concerns about rising income inequality and job security. Moreover, respondents in advanced

economies rated labor market issues such as rising income inequality and job anxiety as having a bigger impact on attitudes towards trade than their counterparts from emerging economies.

Chart 4: Factors Influencing attitudes towards freer trade and investment in your economy? (% of respondents who selected serious or very serious impact)



Source: PECC SOTR 2016-2017 ANNEX B

In the aftermath of the Global Financial Crisis of 2008-2009, APEC leaders endorsed a strategy to make growth more Balanced, Inclusive, Sustainable, Innovative, and Secure. This has resulted in a number of APEC initiatives focusing on these growth attributes, in particular to help address inequality work to ensure that the micro and small and medium enterprise (MSMEs) are able to better benefit from globalization. While much of the growth in trade in recent years has been through global value chains led by multinationals, technology, in particular ecommerce platforms provide a way for small firms to reach the global market. Evidence from some platforms suggest that an enormous leap in net profit margins from around 5 percent to

over 54 percent if firms are able to use ecommerce[4]. This potentially changes the game - levelling the playing field for smaller firms with significant positive distributive gains.

The Future of Economic Integration in the Asia-Pacific

While technology may well provide a way to level the playing field and enable smaller firms to reap the benefits of globalization, it remains unclear, given the political economy of trade policy, whether the system can be sustained and eventually evolve into a newer more inclusive form of globalization. A more inclusive phase of globalization would be ideal. Should economies turn inward and adopt protectionist measures the costs would be high – most likely lose-lose scenarios. For instance, Dr Ken Kawasaki, co-chair of PECC's Global Economic Partnership Agreement Consortium estimates that if the US imposes import tariffs on China, US real GDP estimated to decrease by 1.72 per cent under a 45 per cent import tariff imposed on China.

These survey findings support the general narrative that, for the time being at least, emerging regions are likely to continue to with the trade integration initiatives. The very positive views of the political economy of trade in both Southeast Asia and Pacific South America certainly point to this. The aforementioned announcement to try to restart the ASEAN-EU negotiations is also a positive sign. Much hinges on the Regional Comprehensive Economic Partnership negotiations that brings together 10 member ASEAN with China, Japan, Korea, Australian New Zealand and India. Not yet mentioned are the ongoing EU-Japan FTA negotiations – which have also set 2017 as the deadline for completion which, if completed, would be a systemically important rule making deal.

[4] See http://mddb.apec.org/Documents/2014/SOM/ISOM-SYM/14_isom_sym_012.pdf

Beyond immediate concerns over the future of trade deals, some deep thinking is needed on the future course of globalization. As much as trade deals are not the cause of all of today's problems, neither are they a panacea. Trade policy needs to be put in its proper context – overall economic policy frameworks. APEC's broad agenda and non-binding nature make it an ideal process for addressing concerns arising over globalization. Much of that work will be in improving the structural efficiency of regional economies especially the ability of labor markets to deal with changing competitiveness of sectors within economies. APEC already has work in this area which could help to define the next phase of globalization.

(Eduardo Pedrosa is the Secretary General of the Pacific Economic Cooperation Council)

Trends in the Development of Global Carbon Markets Since the Adoption of the Paris Agreement, and the Implications for the Asia Pacific Region

Liou, Je-Liang and Julia Yang

With the signing of the Paris Agreement, global carbon markets can be expected to grow more rapidly

Following the formal adoption of the Paris Agreement under the United Nations Framework Convention on Climate Change in late 2015, it can be anticipated that emissions trading schemes (ETS) with an emphasis on cost-effectiveness will come to play an ever more important role in the next stage of global planning to reduce greenhouse gas emissions.

According to analysis published by the World Bank (2016), of the 162 Intended Nationally Determined Contributions (INDCs) that had been submitted as of May 1, 2016, 90 made reference to future plans for using ETS, carbon taxes or other policy tools to implement carbon pricing, with the aim of clarifying the cost of carbon dioxide emissions. Thirteen of the INDCs noted that it had either already been decided to use ETS, or that there were plans to do so. It can thus be seen that, besides the existing 17 ETSs, new ETSs will come into being in the future, and the scale of ETS coverage will expand. If the ETS proposed by China is included in the calculations then preliminary estimates would indicate that the existing and planned ETSs will come to account for around 20-25% of total global carbon dioxide emissions, making ETS the most widely used method for controlling greenhouse gas

emissions, out of the various different policy tools that are available. On the basis of the above trends, it seems certain that, following the adoption of the Paris Agreement, ETS will emerge as one of the most important policy tools for greenhouse gas management, and that there will be rapid growth in the development of various types of carbon market deriving from ETS.

ETS will also create new "green" business opportunities

The basic principle behind ETS is that, when faced with the need to reduce greenhouse gas emissions, some companies will find it cheaper to reduce their emissions through internal management tools, these companies can meet the reduction targets that have been set and still have some of the emission allowances that they were issued with by the regulatory authorities left over, while other companies will find that the allowances they have been allocated are insufficient to meet their needs; if the cost of reducing emissions is too high, these companies may experience serious difficulties. ETS provides a platform whereby, through the operation of the market mechanism, companies that have surplus emissions allowances and companies that have insufficient allowances can trade with one another. The company selling its surplus allowances gains revenue from the sale, while the company in need of extra allowances is able to reduce the financial burden of meeting emissions reduction targets; indirectly, ETS helps to realize the achievement of emissions reduction targets to help safeguard the environment.

The original concept behind ETS was that it would provide a way for companies required to meet emissions reduction targets to do so with a reduced financial burden. The creation of the ETS mechanism has actually

given rise to a carbon market that provides incentives for companies to develop and invest in new technologies for emissions reduction, with financial mechanisms (such as the development of new types of financial derivatives products) being used to stimulate the emergence of a "virtuous circle" in related industries. ETS thus effectively has two functions: helping to meet environmental targets, and boosting the development of "green" business opportunities relating to greenhouse gas emission reduction technology.

The emergence of an Asia Pacific carbon market will help to strengthen competitiveness

Within the Asia Pacific region, there are several ETSs that are already in operation or at the planning stage. These include ETSs in Japan, South Korea and China, all of which are geographically close to Taiwan. ETS has thus come to be seen as an important tool for national-level management of greenhouses gas emissions. China is planning the establishment of a nationwide ETS; if the current preliminary planning comes to fruition, the scale of this ETS may eventually surpass that of the European Union (EU), making it the largest ETS in the world. It can therefore be anticipated that a variety of new carbon markets (including spot markets, and carbon allowance linked derivative products) will emerge as a result of these developments.

From a theoretical perspective the greater the number of participants in a carbon market the greater the market's effectiveness (in terms of cost reduction). In addition, if the carbon rights products of the future can be traded freely between different ETSs, then this should further intensify price competition. At the same time, the more lively trading activity is in the carbon markets, the more the markets will contribute to the development of

new "green" industries in the area of greenhouse gas emissions reduction and control technologies, helping to create a "virtuous circle" of industry growth. This is why, over the past few years, the question of how to integrate different ETSs within the same geographical region to create regional carbon markets has become a much-discussed issue.

Responding to these developments, in 2013 the World Bank launched the Networked Carbon Markets project, the aim of which is to clarify the conditions needed (and the technical requirements) for linking together ETSs in different parts of the world, as a preparatory step towards future ETS linkage. Besides developing their own domestic ETSs, some countries in the Asia Pacific region are already starting to hold technical meetings to explore the potential for future regional ETS integration. For example, Asia Pacific region ETS linkage was a major focus of discussion at the 2016 Asia-Pacific Carbon Forum, which was jointly organized by the International Emission Trading Association (IETA), the Global Green Growth Institute (GGGI), the Asian Development Bank (ADB), and the Institute for Global Environmental Strategies (IGES); discussions of this kind are clearly set to become a focal point of the next stage of ETS implementation.

Opportunities for future participation by Taiwan

In 2015, the *Greenhouse Gas Emission Reduction and Management Act* was formally enacted in Taiwan; the Act clearly stipulates that ETS may be used as an emission reduction tool as part of a cap-and-trade system in order to help meet national emission reduction targets. At the same time, the emergence of a regional carbon market should provide opportunities for participation by Taiwanese companies in industries related to emission reduction technology. The first priority for Taiwan is to implement the

necessary technology coordination and other preparatory work before regional ETS linkage formally takes effect. Taiwan already has several years of experience in implementing ETS-related ancillary mechanisms, and so there should be considerable potential for technology exchange and collaboration with other countries that are just starting to plan the establishment of their own ETSs; by sharing Taiwan's experience in establishing key elements of the relevant mechanisms, Taiwan can establish technology-based partnerships within the region, which will facilitate linkage with regional ETS mechanisms in the future. When viewed from the perspective of promoting the development of related industries, it should be possible for Taiwan to make use of existing models for international emission reduction projects to forge collaboration on emission reduction pilot projects with other countries that are interested in planning new ETSs, and to encourage participation in these projects by Taiwanese business enterprises so that they can share in the development of the latent business opportunities.

(Liou, Je-Liang is an environmental economist and the Associate Research Fellow of The Center for Green Economy, Chung-Hua Institution for Economic Research and the mentor of Green Impact Academy. Julia Yang is the Founder of Green Impact Academy. Green Impact Academy acts as a Meet Market aggregator in green industries, providing talent development, marketing, and financial plumbing services to accelerate the growth of the green economy.)

The Overview of Informal Sector in Thailand

Jack Huang

Informal economy has been recognized as an important issue widely among developing countries and the increasing size of informal sector, especially during the economic downturn in 2008 and 2010, has had huge impact to society and economic growth. The informal economy, also known as informal activity, underground economy, grey economy, etc., can be generally regarded as a job without formal registration and does not comply with labour regulation. In many studies, informal economy has related to many social issues due to the lack of necessary protection. The issues such as poverty trap, low productivity and unsustainability, have attracted more and more attention by both policymakers and private sector managers. Therefore, it is worth to examine the situations on the ground and the solutions that different authorities deal with the informality.

Informal sector and informal employment can be found worldwide. However, the scale and size of informal economy is much larger in developing countries than in those developed ones, especially in Africa and Southeast Asia. If we exclude the agricultural sector, informal sector still accounts more than 50% of the total workforce in Asia-Pacific region (ILO, 2012)[1], and contributes more than 55% of GDP in Sub-Saharan countries

[1] International Labour Organization (2012), "Informal Economy in Asia and the Pacific".

(AfDB, 2013)[2]. In practical, informal economy is the diversified activities that comprises more than half of the labour force in many sectors and it also provides a basic income for those low-skilled or unqualified people who are not able to compete in the normal market. Due to different statistical requirement, informality can be distinguish in different aspects. For example, 'informal sector' refers to the positions or behaviours conduct in an economic environment but they are not supervised by official regulation. The 'informal employment' is another form which mainly focuses on the labour side. It emphasizes the situation that a worker is lack of necessarily social protection in terms of payment, healthcare, pension system and legal rights, etc. The different concepts can overlap with each other, for instance, a labour may work in a legally registered company but with very little protection in his subcontract or even without any contractual guarantee. In any case, the informal economy is gaining more and more attention and both global and national agendas need to put efforts with the aim of formalising informal activities or creating decent jobs.

In Thailand, one of the fast growing countries in Southeast Asia, the informal economy is still remaining as a primarily challenge affecting its economic growth and social development. Informal workers in Thailand, according to the definition under Labour Protection Act (LPA), can account 55.9 per cent of workforce in 2015[3], which equals to 21.4 million of total working population. If we include informal workers and their families, the number will make up 76 per cent of Thailand's total population. Moreover,

[2] African Development Bank (2013), "Recognizing Africa's Informal Sector".

[3] This figure excludes the informal employment in agricultural sector. If we include the informality in agriculture, it will reach higher number of total working population in Thailand.

the informal jobs performed outside the protection scheme, workplace regulation and official monitoring result to many social problems and economic inefficiency. In the individual level, it is believed that informal labours in Thailand are largely not protected by any social insurance and also lack of awareness of their legal rights. Because of primary education level and limited accessibility to skill training, many informal workers keep trapped in poverty, insecure environment and low-income as a vicious cycle. On the other hand, form the macroeconomic point of view, increasing underground sector and informal employment may create economic burdens to Thai government. Such non-registered activities, like street vendor, construction labour, house maid and Tuk-Tuk driver, etc., usually perform outside the formal sectors that taxed by government and their fruit of labour are not listed in official balance sheet. Meanwhile, low productivity, inappropriate resource allocation and information asymmetry in labour market can cause extra costs and impede health economic growth. Furthermore, if the informal sector continually plays as a final resort for Thai people who cannot find a job in formal economy, in a long term, uncontrollable informal may hurt Thailand's global competitiveness and its own financial health.

The major employment related social protection in Thailand, is governed by legislations including Labour Protection Act, Labour Relations Act, Workmen's Compensation Act and Social Security Act, which mainly applicable to formal employees. Despite there are a few regulations and programs covering some informal employment social protection issues, such as Homeworkers Protection Act, Ministerial Regulation on the Protection of Agricultural Workers, National Health Security Act, National Health Security Act, National Savings Fund Act, Social Security Act, the enforcements of those regulations and programs are especially weak among informal

employees. With this awareness, the Royal Thai Government has addressed its attention to reduce informal employment countrywide and set as a key agenda with the objective of moving informal employment towards formal and decent jobs.

The progress in dealing with informal issue not only led by Thai government, but also contributed by other international agencies. For example, Social Protection Floor Joint Team (SPFJT) was collectively coordinated by International Labour Organization (ILO) and Thai government, which aims at supporting implementation of rights-based social protection system for people in needs. Such needs include the adequate compensation of work-related injuries, or providing training programs to graduated workers from informal sectors.

In sum, the informal economy in production sectors and the informal workers have conducted unrecorded activities that worth thousands of millions USD every year in Thailand. It is also believed that those informal workers suffering from the unfair wage and unstable income, the lack of access to social security and very little negotiating power with their employers. Indeed, many researches even show that the increasing size of informal economy may negatively affect economic growth and social development. In long term, Thai government needs to provide an universal basic social protection and implement necessary policies which can graduate those underground workers to formal sectors.

(Jack Huang is the Consultant in UN Office of Information and Communication Technology, OICT)

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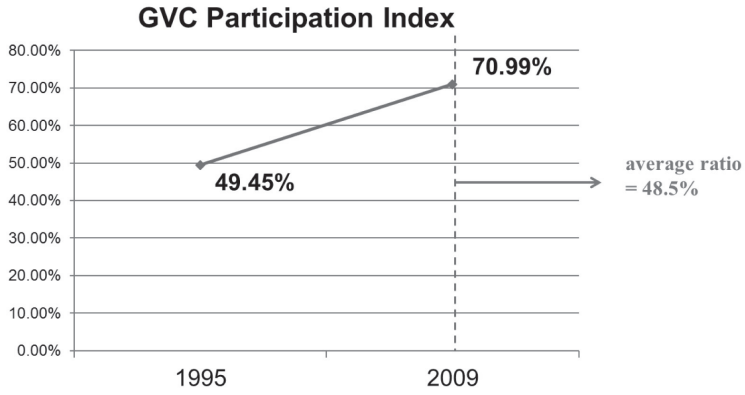
To the New Age: Global Value Chain and Circular Economy

Lin, Chih-Yi (Francine)

I. Global Value Chain and Taiwan's Manufacturing Industry Contribution

Taiwan has been participated deeply in global value chain since 1995. According to OECD/WTO TiVA Data, Taiwan's GVC participation Index was 49.45% in 1995, and increased to 70.99% in 2009 which was more than global average ratio of 48.5% in 2009 (Graph 1).

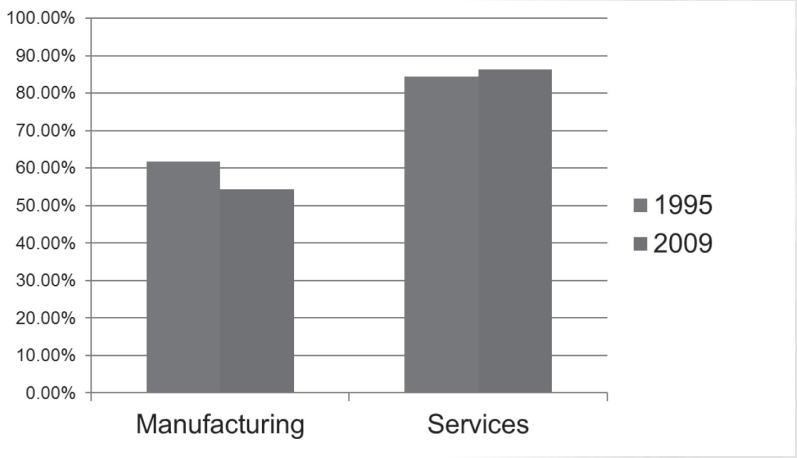
Graph 1. GVC Participation Index in Taiwan



Source: OECD/WTO TiVA Data.

However, Taiwan's manufacturing industry has created less export added value since 1995, and also has created lower export added value that services industry has created. According to OECD/WTO TiVA Data, the VAX ratio[1] of Taiwan's manufacturing industry in 1995 was around 60%, and decreased to near 50% in 2009; in contrary, the VAX ratio of Taiwan's services industry in 1995 was around 80%, and increased lightly to near 90% in 2009 (Graph 2).

Graph 2. GVC Exports Value-Add in Taiwan

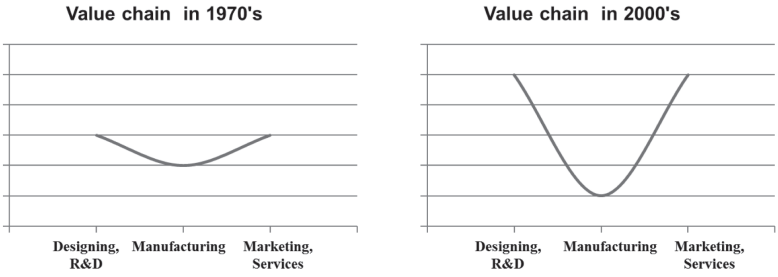


Source:OECD/WTO TiVA Data.

Richard Baldwin (2013) indicated that, comparing the smile curve in 1970's with the one in 2000's, designing/R&D as well as marketing/ services account larger than manufacturing when it comes to added values (Graph 3). Considering the added-value of manufacturing industry has been shrinking, it is crucial for Taiwan to rethink our roadmap of economy development in future.

[1] VAX ratio = added value in export / total export amount

Graph 3. Smile Curves in 1970's and 2000's



Source:Richard Baldwin (2013).

II. A new model: Circular Economy

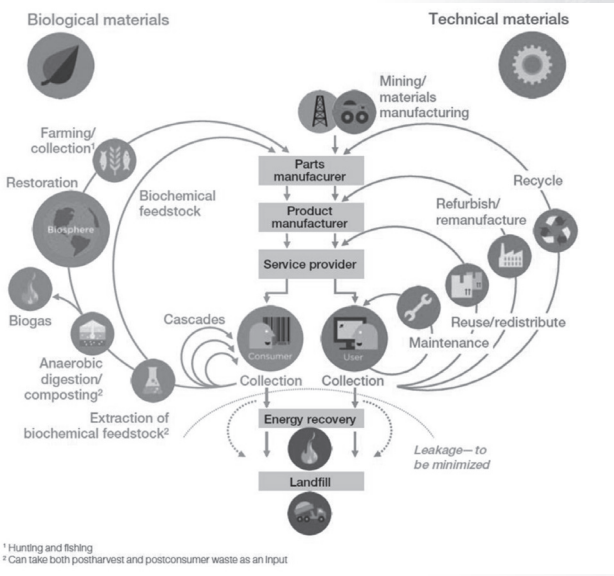
There is a brand new economic model that we could take into account for the next step: the circular economy. A circular economy, unlike the current model we produce and consume, is an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, and aims for the elimination of waste through the superior design of materials, products, systems and business models. Waste does not exist, and products are designed and optimized for a cycle of disassembly and reuse. Furthermore, the energy required to fuel the circle should be renewable by nature, to decrease resource dependence and increase systems resilience[2].

According to Ellen MacArthur Foundation, circularity introduces a strict differentiation between consumable and durable components of a product.

[2] Ellen MacArthur Foundation, 2014, "Towards the Circular Economy: Accelerating the scale-up across global supply chains".

For consumable products in the circular economy, they are largely made of biological ingredients or nutrients that are at least non-toxic and possibly even beneficial, and can safely be returned to the biosphere, either directly or in a cascade of consecutive uses. For Durable products, such as metals and most plastics, they are designed from the start for reuse, and products subject to rapid technological advance are designed for upgraded. Unlike in today's buy-and-consume economy, durable products are leased, rented or shared wherever possible. If they are sold, there are incentives or agreements in place to ensure the return and thereafter the reuse of the product or its components and materials at the end of its period of primary use (Graph 4).

Graph 4. System of Circular Economy



Source:Ellen MacArthur Foundation circular economy team drawing from Braungart & McDonough and Cradle (C2C).

Circular economy model can add up to substantial cumulative advantages over a classical linear model through following the power of the inner circle, the power of circling longer, the power of cascaded use, and the power of pure inputs. Particularly, the power of cascade use refers to diversifying reuse across the value chain, such as when cotton clothing is reused first as second-hand apparel, then crosses to the furniture industry as fiber-fill in upholstery, and the fiber-fill is later reused in stone wool insulation for construction before the cotton fibers are safely returned to the biosphere. In the process of diversifying reuse across the value chain, added value is created and economic profits are generated.

According to McKinsey, Ellen MacArthur Foundation & the World Economic Forum, circular supply chains will contribute over $1 trillion to the global economy by 2025, and are expected to create 100 thousand new jobs as well as to save $500 million material costs by 2020. Moving to circular supply chains, new business models, suppliers assessing process, and going digital are suggested. First, new business models from linear to circular are required. Second, assessing related suppliers to ensure a common vision and goal to apply renewable and non-toxic components is necessary. Finally, upgrading technology system and digitalizing to coordinate and keep track of the full process will support circular supply chains to run well.

III. Outlook: Circular Economy in Taiwan

Indeed, there are several successful stories for circular economic models in Taiwan. For instance, recycling PET materials are used for textile and clothing industries, such as athletes' clothing in 2016 Olympics. Besides, reused coffee grounds are multi-cascaded used to a wide range of industries, such as textile and clothing industries, PU plastic materials, and essential oils

as well as shampoos, etc.

Moving forward, a circular economy will reshape and upgrade Taiwan's position in global value chains. Under the new model of a circular supply chain, Taiwan can make efforts on recycling/ reused materials application R&D, as well as on recycling/reused products selling or solution services providing, which implies that Taiwan economy will transform from "Manufacturing" to "Designing" and to "Services", and thus create more added value than before according to smile curve theory.

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