Introduction

History has shown how access to technology revolutionizes the economy. In the 18th and 19th centuries, steam power and machines originated from the Industrial Revolution and changed completely how manufactured goods were produced. In recent decades, the proliferation of new technologies has clearly contributed to economic growth and increasing labor productivity. For instance, information and communications technology (ICT) products have played a significant role by reducing the cost of accessing information, streamlining procedures and creating new market opportunities, among others. As many economies gradually move towards a knowledge-driven economy, it is important that producers and consumers gain easier access to these products.

Since its inception, APEC has been at the forefront of efforts to improve access to ICT products by reducing their barriers to trade. APEC’s leadership was critical to the conclusion of the negotiations of the WTO Information Technology Agreement (ITA) in 1996, a plurilateral agreement where signatory parties committed to eliminate tariffs for a range of ICT products. Similarly, APEC supported efforts within WTO to conclude negotiations on the expansion of the ITA in December 2015.

Despite the success of the ITA in reducing tariffs, non-tariff measures (NTMs) restricting the trade of ICT products still remain, and progress to tackle these measures has been minimal in WTO. These measures do not just increase trade costs, but also delay the introduction of new technologies into the market. In addition, NTMs could hinder trade by restricting the interoperability of ICT products across systems or applications. Lengthy administrative procedures also obstruct trade in the ICT sector, where products have a short life cycle and could quickly become obsolete.

This policy brief aims to provide a snapshot of trade of ICT products in the APEC region and the types of NTMs most commonly affecting these products. When possible, the policy brief shows real examples of how trade flows were affected after the introduction of a specific NTM. Policy alternatives to NTMs that are less trade-restrictive and could facilitate governments to achieve their objectives are also included.

Trade of ICT Products in APEC

As mentioned in Policy Brief No. 6, estimating the market size of ICT products using trade flows for the products included in the ITA is not an easy task, since a number of products were listed using only a description (23 of these products in the ITA and expanded ITA are not associated to any HS code at the 6-digit level, which is used to collect international trade statistics) and not all the HS 6-digit subheadings listed in the ITA and expanded ITA are fully covered (145 of the 346 HS subheadings included in the ITA and expanded ITA are partially covered). Another complication of estimating the market size of ICT products is that the ITA involved a negotiation process to determine which products are included. Therefore, not all ICT products are part of the agreement.

Noting that many of the HS subheadings include products that share some similarities, this Policy Brief takes the approach of including all HS subheadings that appear in the ITA and expanded ITA when calculating the trade flows of ICT products.

For APEC, trade of ICT products is significant (Figure 1). APEC exports grew 4.1% per year between 2007 and 2015, faster than the world ICT exports (2.7% per year), and totaled USD 2.6 trillion in 2015, representing around 75% of the world ICT exports. Likewise, during the same period, APEC imports grew at an average annual rate of 4.9%, faster than the world ICT imports (3.3% per year), and totaled USD 3.0 trillion in 2015, accounting for 73% of world ICT imports. These figures attest to the importance of APEC’s work in discussing ways to reduce/eliminate NTMs affecting ICT products, which can be trade-distorting and unnecessarily increase transaction costs.

Figure 1: APEC: Total Trade of ICT Products (USD billion)

Exports
NTMs in the ICT Sector

In 2002, the WTO Committee of Participants on the Expansion of Trade in Information Technology Products listed a series of NTMs reported by a number of ITA participants that could be an unnecessary barrier to trade. Conformity assessment procedures were the most common NTMs, followed closely by standards and regulatory environment. Other measures listed were related to customs procedures, import licensing, rules of origin, transparency and availability of information, government procurement and visa restrictions on IT professionals. In addition to those measures, local content requirements, import ban to used equipment and export incentives have been identified in recent years as recurrent NTMs affecting trade of ICT products.

Examples of NTMs Affecting Trade of ICT Products

Conformity Assessment Procedures

The WTO World Trade Report 2012 mentioned that “conformity assessment refers to testing, inspection and certification, as well as to a supplier’s declaration of conformity”. Before ICT products are released for sale, it is necessary that products be examined in order to ensure that products are suitable for customers’ use (e.g. meet health and safety requirements). However, in many situations, these procedures have become a barrier to trade in several ways.

For example, high testing, inspection and certification costs, as well as unnecessary duplication of procedures in both exporting and importing economies, have been reported by several experts as an obstacle to trade, in particular for SMEs. An OECD study mentioned a case in which a small firm had to spend USD 70,000 to obtain a conformity mark. The U.S. International Trade Commission additionally mentioned that “duplication in mandatory U.S. and European Union testing and certification for computers, telecommunications equipment, and other information technology products costs U.S. companies and consumers more than $1.3 billion annually”. At the end, consumers pay higher prices due to these higher costs of testing, inspection and certification that do not necessarily provide additional benefits.

Other problems that could turn conformity assessment requirements into a barrier to trade are associated to lengthy procedures. Chen et al. (2006) found that “lengthy inspection procedures by importers reduce exports by 3%”. Furthermore, they could become a barrier in cases where there are unreasonable demands for testing (e.g. requirements not proportional to risks involved), lack of recognition of industry Mutual Recognition Arrangements by governments, and disparities in the level of testing required by different governments or regulators.

Diverse conformity assessment procedures among several economies could represent an impediment to trade. The WTO Committee of Participants on the Expansion of Trade in Information Technology Products identified six types of conformity assessment procedures regarding electromagnetic compatibility (EMC) and interference (EMI) with different levels of flexibility. A report by Copenhagen Economics (2010) estimated that ITA participants would increase their imports by 26% and their exports by 10% if they harmonize their conformity assessments to the most flexible of the six types, by allowing a Supplier’s Declaration of Conformity (SDOC) in which the testing of the equipment by a recognized testing laboratory is not mandatory and the choice of testing rests on the supplier or manufacturer.

Standards/Technical Regulations

The use of different standards and technical regulations across economies could be an obstacle to trade for ICT companies. In order to export to several economies with differing standards, these firms will have to increase production costs by adapting their products based on the domestic standards in every single economy. SMEs are particularly affected, since it is more difficult for them to redesign products and meet distinct standards.

ICT products are affected in cases where international standards are not adopted as domestic standards, or not used to support the development of domestic standards. Indeed, a unique domestic standard could become a non-tariff barrier (NTB) and protect the local industry, as foreign producers will have to incur higher costs to compete in the local market. A lower supply of products would force consumers to pay more. A unique domestic standard can also create disincentives to export for some local producers, since they will have to adjust their production processes to meet international standards or those requested in overseas markets.

In 2006, the adoption of the plug type N (see Figure 2) in Economy A became mandatory in an effort to harmonize the use of plugs within the economy and increase safety. However, this move was considered a NTB, as Economy A became the only one in the world to adopt it, despite the fact that most appliances in Economy A used other commonly found plugs worldwide, such as types A, B or C (see Figure 2). Other plugs already in use in many other economies also have safety features, such as a grounding pin or earthing clips, such as types F, G and I (see Figure 2).
Figure 2: Types of Plugs

<table>
<thead>
<tr>
<th>Plug Adopted in Economy A</th>
<th>Most Common Plugs Used in Economy A Before Harmonization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type N</td>
<td>Type A, Type B, Type C</td>
</tr>
</tbody>
</table>

Examples of Common Plugs with a Grounding Pin or Earthing Clips

<table>
<thead>
<tr>
<th>Type B</th>
<th>Type F</th>
<th>Type G</th>
<th>Type I</th>
</tr>
</thead>
</table>

Source: International Electrotechnical Commission

The adoption of the plug type N has been the subject of criticisms in Economy A, as it was associated to a measure to restrict imports of electric and electronic products and support local producers16. Shops which continued to sell products with other plugs since July 2011 could be imposed with fines of more than USD 960,00017. Commercial associations also lambasted the measure as it represented a technical barrier against local exporters and forced firms to increase their costs by obtaining a certification related to the new standard, after they had obtained certificates for other international standards18.

Import Licensing

Import licenses are generally more trade-restrictive and less transparent than tariffs and could increase the risk of corruption18. The implementation of import licensing regimes has affected ICT products on a number of occasions by acting as a trade barrier. They are usually implemented as a quantitative import restriction. Even in cases where import licenses are automatic, it implies additional costs and time to apply for them20. This is particularly relevant for SMEs, since their costs are higher than those of larger firms due to their limited access to information and lesser resources available to meet the technical requirements needed to obtain these licenses21.

There are also occasions where the conditions to obtain an import license or authorization are too strict that it considerably reduces the number of importers and competition for local firms. This was a case of an economy which introduced strict import requirements on mobile phones and tablets, such as a minimum number of years of experience in importing similar devices and owning a significant number of service centers within the economy22. A measure like this is a de-facto discrimination on small import traders and a barrier to access the market.

The implementation of import licenses or new licensing requirements can certainly affect import flows. For example, Economy B implemented licensing requirements to the imports of parts of optical disc mastering and replicating machines (HS 847990) in March 201323. Subsequently, imports of such goods declined significantly that year and the following year (Figure 3). When comparing these imports before the implementation of the measure (year 2012) and 2014, they went down from USD 490 to USD 341 million (-30.5% change), despite the fact that global imports by Economy B increased by 6.4% during the same period.

Figure 3: Economy B Imports of Parts of Optical Disc Mastering and Replicating Machines (USD million)

Source: WITS, UN COMTRADE. APEC Secretariat, Policy Support Unit calculations.

Statistics also shows that the removal of an import licensing requirement or the increased flexibility of licensing regimes could boost imports. For instance, Economy C eliminated an automatic licensing requirement to the imports of electrical transformers with power capacity above 500 KVA in July 201224. By looking at the annual imports between 2011 and 2013, before and after the implementation of the measure, Economy C’s imports of these electric transformers went up by 180%, whilst Economy C’s imports of all products only increased by 11.9%.
Local Content Requirements

The implementation of local content requirements (LCR) is aimed at encouraging domestic production by requiring certain stages of the production process to be conducted locally, or for domestic raw materials or components to be used. These measures are considered NTMs affecting trade, since they restrict foreign producers from competing against local firms.

LCRs have affected the ICT sector in different ways, for instance, by requiring all equipment to use a specific component made locally (for example, only SIM cards produced in the economy can be used in mobile phones). Other recent cases reported by experts are related to the imposition of data localization requirements, by using local servers or restricting cross-border data processing; the establishment of higher incentives such as tax rebates or subsidies if products are made locally; or the obligation for investment projects’ winning bidders to cover a specific percentage of the cost with the use of local goods and human resources.

These measures have affected trade in the ICT sector. For example, in mid-2011, Economy D provided additional incentives to firms in the solar panel industry if photosensitive semiconductor devices (HS 854140) were made within the economy or the economic integration bloc it belongs (Bloc E). Before the implementation of this measure, most of Economy D imports of photosensitive semiconductor devices came from Bloc E or Economy F (located outside Bloc E). This measure reduced significantly imports from Economy F in comparison to other sources between 2011 and 2013, and there was a substitution effect in the import sources, as Bloc E became the largest foreign supplier in Economy D, with its share in Economy D’s imports increasing from 43% to 72%, and Economy F’s share reducing from 47% to only 14% (Table 1).

Table 1
Economy D: Imports of Photosensitive Semiconductor Devices (USD million)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission Devices</td>
<td>Economy D</td>
<td>4,490</td>
<td>1,007</td>
<td>133</td>
<td>-83%</td>
<td>47%</td>
<td>14%</td>
</tr>
<tr>
<td>Optical Fibre</td>
<td>Bloc E</td>
<td>4,190</td>
<td>1,747</td>
<td>701</td>
<td>-59%</td>
<td>43%</td>
<td>72%</td>
</tr>
<tr>
<td>World</td>
<td>World Trade</td>
<td>9,640</td>
<td>2,960</td>
<td>977</td>
<td>-68%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>HS 854140</td>
<td>World Trade</td>
<td>74,179</td>
<td>55,285</td>
<td>51,615</td>
<td>-17%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: WITS, UN COMTRADE, APEC Secretariat, Policy Support Unit calculations.

LCRs in investment projects can also affect trade. A previous study by the APEC Policy Support Unit identified the case of Economy G, which decided to increase LCR in tenders related to the development of the 4G network in early 2012. This was done to support the local producers as imports of transmission devices and optical fiber had been increasing in previous years. After this decision, Economy G’s imports of transmission devices and optical fiber fell by 12.6% and 14.6%, respectively in relation to the previous year. APEC economies were affected by this measure, as the region exports the highest levels of such products globally. For APEC economies, this measure caused a decline in their sales of transmission devices and optical fibers to Economy G by 15.9% and 10.6%, respectively (Table 2).

Table 2
Economy G: Imports of Transmission Devices and Optical Fiber (USD million)

<table>
<thead>
<tr>
<th>Product</th>
<th>Origin</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>Variation 2011-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission Devices</td>
<td>From World</td>
<td>213</td>
<td>235</td>
<td>206</td>
<td>-12.6%</td>
</tr>
<tr>
<td></td>
<td>From APEC</td>
<td>183</td>
<td>206</td>
<td>173</td>
<td>-15.9%</td>
</tr>
<tr>
<td>Optical Fibre</td>
<td>From World</td>
<td>29</td>
<td>45</td>
<td>38</td>
<td>-14.6%</td>
</tr>
<tr>
<td></td>
<td>From APEC</td>
<td>14</td>
<td>24</td>
<td>22</td>
<td>-10.6%</td>
</tr>
<tr>
<td>Total Imports All Products</td>
<td>From World</td>
<td>179,685</td>
<td>225,499</td>
<td>223,149</td>
<td>-1.0%</td>
</tr>
<tr>
<td></td>
<td>From APEC</td>
<td>93,539</td>
<td>117,456</td>
<td>114,771</td>
<td>-2.3%</td>
</tr>
</tbody>
</table>

Source: WITS, UN COMTRADE, APEC Secretariat, Policy Support Unit calculations.

Import Ban of Used ICT Equipment

It is common to find governments banning imports of used manufacturing goods because of health and sanitary concerns, environmental matters and perceived lack of quality of used goods in comparison to new goods. While some of the concerns are legitimate, others could be addressed by using alternatives that help governments to achieve policy objectives, instead of implementing an import ban on used ICT products.

Import bans considerably affect the trade of ICT products, since parts and components of used ICT products could be reused again, either individually or into a remanufactured product. ICT products usually include components that have a long lifespan and can be used for many years. Some recovered parts and components could be used to produce remanufactured goods with a life expectancy and warranty similar to new goods. This will have a positive effect on the environment, as
products could be recycled and reused following strict quality compliance.

Additionally, it is possible that some discarded ICT products may still be operational and safe for consumers, and this represents an opportunity for people in other places to access ICT equipment at a lower cost. An import ban would restrict these opportunities.

In July 2012, Economy H banned a list of used ICT products to be imported, including radio broadcasting receivers. This significantly affected many radio manufacturing firms in APEC, which are the main exporters of radios to Economy H. In fact, imports of these radio devices by Economy H fell by 62% between 2011 and 2012, and imports remained below the levels before the ban was implemented until 2014. (Figure 5)

![Figure 5: Economy H: Imports of Radio Broadcasting Receivers (USD million)](image)

**Source:** WITS, UN COMTRADE, APEC Secretariat, Policy Support Unit calculations.

**Discriminatory Export Incentives**

In recent cases involving ICT products, discriminatory export incentives have consisted of tax refunds or credits to exporters. The problem with these measures is that exporting firms receiving the benefits obtain resources that importers and producers located overseas do not have access to, giving them an unfair advantage over their competitors.

These benefits could trigger a quick increase of the exports covered by the scheme. For example, in July 2013, Economy J granted tax credit on import duties to exporters of 160 products (37 of which belong to the ICT sector based on the products included in the ITA) up to 2% of the export value. Economy J’s exports for those 37 ICT products increased from USD 9.6 million to USD 16.5 million (90.4%) between 2013 and 2014. The introduction of export refunds or credits also represent a fiscal cost to governments. In this particular example, Economy J’s tax credits for the exporters of these 37 ICT products was around USD 329,000.

Economy J is not a big world producer/exporter of any of the 37 ICT products in the list, so the distorting effect of the measure in the world markets was not significant. On other occasions, this type of measure could have a significant distorting effect in trade. If an economy implementing the export incentive scheme is a top world producer of any of the targeted goods, local companies would have an incentive to increase their domestic production and exports, which could lead to a fall in world market prices that would probably not have happened in the absence of the measure. Other foreign producers could also be affected by lower prices.

**Concluding Remarks: Policy Alternatives to NTMs Affecting ICT Products**

NTMs have a negative impact on the trade of ICT products. It is possible in many cases to find alternative measures that could help governments to achieve their policy objectives in a non-discriminatory and less trade-restrictive manner. In order to evaluate these policy alternatives, governments also have to take into account the need for a proper balance between safety/security issues and trade facilitation. It is important that governments address their domestic concerns by implementing measures that would have the lowest impact on trade.

Conformity assessment procedures are important to ensuring that products are safe for consumption, but such procedures should not be stricter than necessary. Also, these procedures should be less cumbersome for products that represent a low risk. In addition, it would be much cheaper and less of an impediment to trade for companies if the authorities recognize the results of conformity assessments in other economies, through mutual recognition of test results, the acceptance of conformity marks that are widely accepted, and the use of the Supplier’s Declaration of Conformity.

In terms of standards/technical regulations, if an economy needs to adopt a standard, it is essential that the authorities seek opinion of ICT firms and take into account international standards when available, such as those from ISO, IEC and ITU. In addition, mutual recognition of technical standards facilitates trade and allows foreign products to participate in the domestic market. Harmonization could increase trade as well, but in some cases it could significantly increase the compliance costs.

Import licensing schemes are only reasonable when the benefits outweigh the costs of implementing them and when they are strictly necessary to achieve a policy objective in the least trade distorting manner. If the intention of an import license is based on health and safety concerns, in order to facilitate trade, an alternative might be to use risk assessment techniques at customs to determine if the cargo should be subject to inspection at port of entry or to ex-post verifications. Also, to collect information, authorities could record information directly from import manifests to substitute the use of import licenses.

The adoption of local content requirements has often been justified as a way to create jobs and support infant industries in order to help them become competitive in the future. However, it is possible to support competitiveness by introducing other measures, such as those already endorsed by APEC Ministers in 2013: 1) the creation of a business-friendly environment and support of investment infrastructure development; 2)
spurring innovation through R&D, research collaboration and effective protection of intellectual property; 3) education and workforce training; 4) opening markets; and 5) facilitating access to firms, especially SMEs, to supply chains, capital and emerging technologies.38

Concerns on the import of used ICT products are usually addressed via import bans, as a way to ensure consumer safety and health. However, many of these prohibitions have been too restrictive in a way that eliminate any trade of remanufactured goods and could prevent people from accessing technology at a lower price. Instead of implementing a broad ban on used ICT products, authorities should focus on ensuring that used ICT products meet technical standards in order to be safe for consumption. These products can also be subject to specific testing procedures in order to ensure quality control.

Using discriminatory export incentives may not necessarily be the most effective way to achieve policy objectives in a less trade-restrictive manner. These incentives tend to be expensive for the government in the long run, as it encourages lobbying and exposes governments to regulatory capture. If the intention of these incentives is to improve export performance and diversify exports, a more cost-effective way could be by promoting macroeconomic stability and economic openness, together with the development of infrastructure and human resources, as well as the creation of competent export and investment promotion agencies, making available market information systems and encouraging associations for firms to be part of global value chains.39

As tariffs are going down, it is essential that governments pay attention to NTMs that are affecting trade negatively. APEC was in the forefront promoting the negotiations of the ITA and extended ITA. In the same way, APEC could find some common ground among its members on NTMs and present initiatives to eliminate or reduce certain practices affecting trade of ICT products at the regional, plurilateral or multilateral level.

APEC can play an important role in examining policies that could assist economies to achieve their objectives in a less trade-restrictive manner. APEC should find ways to continue promoting transparency in NTMs (e.g. by encouraging economies to notify their measures in NTM). Learning about successful experiences in implementing policy alternatives, as well as being engaged in public-private discussions on possible initiatives aiming to reduce trade transaction costs of ICT products could be some possible options to explore as well. In addition, the rapid advancement of technologies, such as the Internet of Things, are increasing the ICT product scope and coverage, and some governments have started or are attempting to regulate them. APEC should continue to promote discussions on good regulatory practices concerning these new technologies.

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2 The expansion of the ITA included 201 products. According to WTO, these products were valued at over USD 1.3 trillion and accounted for approximately 7% of the global trade. See https://www.wto.org/english/tratop_e/inftec_e/itaintro_e.htm
5 Ibid
7 See presentations from Session I of the WTO ITA Workshop on Non-Tariff Barriers (NTBs) Affecting Trade in IT Products. Available at: https://www.wto.org/english/tratop_e/inftec_e/workshopmay15_e/workshopmay15_e.htm
12 WTO (2005), “Guidelines for EMC/EMI Conformity Assessment Procedures”, G/IT/25, 17 February, p. 1. The conformity assessment procedures identified by this WTO Committee in descending order of complexity are as follows: 1) certification by a regulator or delegated entity; 2) certification by a third party; 3) Supplier’s Declaration of Conformity (SDoC) type 1 (testing lab is recognized by regulator and suppliers register equipment with regulator); 4) SDoC type 2 (testing lab is recognized by regulator and no registration of equipment is required); 5) SDoC type 3 (testing by recognized lab is not mandatory and equipment is registered by regulator); 6) SDoC type 4 (testing by recognized lab is not mandatory and registration of equipment is not required).
14 Standards and technical regulations are actually different. While standards are voluntary and are designed by private organizations, technical regulations are rules issued by governments that are compulsory. Noting that official regulatory bodies in occasions adopt existing standards, this Policy Brief uses indistinctively the term “standards” or “technical regulations” indistinctively.
15 See https://sidra.ibge.gov.br/tabela/229#resultado
20 In fact, the WTO mentions that applications for automatic import licenses should be processed by the authorities within a maximum of 10 days.
22 See http://www.globaltradealert.org/print/12489
23 See http://www.globaltradealert.org/print/10379
24 See http://www.globaltradealert.org/print/4150
25 See http://www.globaltradealert.org/print/7576
26 See http://www.globaltradealert.org/print/12819
28 Ibid
29 Ibid
31 See http://www.globaltradealert.org/print/11661
33 See http://www.globaltradealert.org/print/9163
36 Ibid
37 Ibid