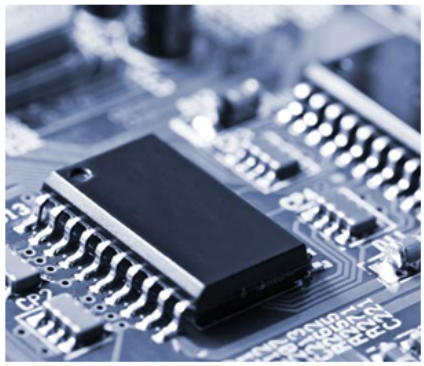

How the TPP Benefits Consumers: Through the Lens of Three Semiconductor-Enabled Products

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The U.S. International Trade Commission's recent report to the U.S. Congress on the Trans-Pacific Partnership Agreement (TPP) underscores the positive impact the TPP will have on the U.S. economy. The report focuses its analysis on quantitative metrics such as GDP growth, employment, import/export volumes, tariff savings and sectoral gains. Yet arguably the most meaningful impact the TPP will have on the average consumer relates to the TPP's non-quantifiable trade disciplines -- specifically, the provisions on encryption, e-commerce, cross-border data flows, and standards.

These provisions will immensely benefit U.S. consumers by protecting and promoting freedom of choice, lowering the cost of consumer goods, and strengthening consumer privacy and security. Furthermore, by contributing to a positive global trading environment for the semiconductor industry, these disciplines will allow consumers to continue reaping the immense benefits from semiconductor technology and innovation. By looking through the lens of four real-world products, this paper describes how these TPP provisions provide economic benefits to consumers of semiconductor-enabled products.

Key Takeaways

1) The TPP contains important provisions related to encryption, e-commerce, cross-border data flows, and standards that are critical to the semiconductor industry and directly benefit consumers by protecting and promoting freedom of choice, lowering costs of consumer goods, and protecting consumer privacy and security.

2) These benefits are demonstrated through profiling three common semiconductor-enabled products: smartphones, activity trackers, and digital video games.

How the TPP's Digital Trade Provisions Benefit Consumers

The TPP has often been referred to as the "21st Century Trade Agreement" for its new rules on cross-cutting issues never before included in previous trade agreements. The TPP's digital trade rules related to encryption, e-commerce, and standards are among these important "21st century" trade provisions that will directly benefit America's consumers.

1. ***Encryption:*** All modern technology products contain encryption (a digital lock and key) to keep consumer data safe. However, some countries have started imposing restrictions on commercial products with encryption, thus preventing companies from selling -- and consumers from buying -- the most secure technologies available. The TPP seeks to foster strong and innovative encryption to protect consumers and businesses by prohibiting Parties from requiring companies to use a specific standard or encryption technology, transfer proprietary information like source code, or impose import restrictions on foreign companies.[1] By ensuring that encryption rules are technology-neutral and non-discriminatory toward foreign companies, the TPP benefits consumers in three ways: 1) It allows consumers to choose the strongest, most innovative security technologies available in the global marketplace to protect consumer privacy and security; 2) It keeps costs low by ensuring that companies will not be forced to manufacture different versions of the same product to meet different (and potentially incompatible) country-specific technical regulations and standards; and 3) It promotes interoperability, allowing consumers to use devices in different markets.

2. ***E-Commerce and cross-border data flows:*** Today there are more than 3 billion internet users in the world,[2] with 1.46 billion people buying goods and services online. In 2015, retail e-commerce sales worldwide reached $1.67 trillion, and this number is projected to grow to $3.02 trillion in 2017.[3] The rapid growth of e-commerce reflects the benefits it brings to both buyers and businesses by expanding the marketplace: consumers can search for and access a greater variety of goods and services at lower cost, and businesses can reach larger numbers of customers from all over the world. However, the continued growth of internet-enabled, productivity-enhancing applications like e-commerce is increasingly vulnerable, threatened by country-specific regulations and practices that could break up, or "Balkanize" the Internet. The TPP's digital trade provisions related to e-commerce, including cross-border data flows, prohibiting digital customs duties, and non-discriminatory treatment for digital goods are critical to ensuring that U.S. consumers continue to reap the benefits of a free and open Internet for all legitimate commercial purposes.

The TPP's provision on cross-border data flows is perhaps the most important provision protecting the benefits of the Internet and e-commerce. The flow of data across borders is the lifeblood of the Internet, enabling everything from social media status updates to bank transfers. In fact, the ability to move data as efficiently as possible through the network – based on network conditions, not national or regional borders – has been a key building block of the growth of e-commerce, and more broadly, the entire global economic order.

The global movement of data allows businesses to communicate with overseas customers in real time, researchers to share data and collaborate on experiments, investors to connect with and finance small business start-ups in developing countries, consumers to stream video and TV content, and much more. Despite these benefits, however, many countries have placed restrictions on the flow of information, stifling competition and disadvantaging American companies and consumers. Such restrictions include "forced localization" requirements, in which governments require companies to build physical infrastructure and expensive data centres within their country, adding unnecessary costs and burdens on providers and customers alike. The TPP combats this with a provision[4] that prohibits forced localization requirements, granting companies and entrepreneurs the ability to maintain servers anywhere in the world to deliver products and services that they might not have been able to otherwise.

Another barrier is the imposition of customs duties on digital products like music, movies and games, and differential treatment for digital and non-digital goods. The TPP combats these protectionist barriers by prohibiting customs duties for digital products, and requiring parties to apply the same non-discriminatory principles to digital products as they do non-digital ones. These provisions benefit American consumers and entrepreneurs in the following ways: 1) they allow end users (consumers) to choose the best available technologies and access the information, content, and applications they want regardless of location; 2) they keep costs low by allowing entrepreneurs and businesses to locate infrastructure based on market conditions and access services and customers globally at lower costs; 3) they allow consumers to continue to benefit from innovative data-intensive applications, for example in the areas of e-health, online education, virtual conferencing, streaming, and more; 4) they allow creators of digital content (for example, artists and entrepreneurs) to reap their fair share by eliminating customs duties and discriminatory barriers for digital products.

3. ***Market-based Standards:*** Data isn't the only thing that travels globally; products, technology, and people do, as well. Innovators should not have to design products differently for each market they seek to serve, and consumers should not have to buy different products to work in different markets—that is why we have the peer-reviewed global standards process, "where industry leads and the best technologies win."[5] However, many countries have and continue to impose unique domestic standards rather than adopting international, market-based standards. This leads to what has been termed "Galapagos syndrome," where products developed in one market are incompatible with overseas markets.

   Imposing domestic standards over international, market-based standards increases costs for manufacturers as they are forced to make different versions of the same product for different countries, losing benefits from large-scale production. These costs are passed down to consumers, who also have the added disadvantage of compatibility issues when traveling with that product overseas. Furthermore, domestic standards may not have the benefit of the best peer review processes traditionally found in global standards bodies, and thus could lock companies and consumers into using a technology that is inferior in quality, performance and security, higher in cost, or which could rapidly become obsolete.

   The TPP contains provisions designed to preserve market-driven standardization and global interoperability by promoting transparent and inclusive standards development, preventing countries from forcing less competitive national standards into innovative American products, and ensuring that companies are able to choose the technology that works best and suits their needs, rather than one mandated by a specific government. For example, the TPP's "technology choice" provisions ensure that companies are not required to purchase or utilize local technology over a technology of their choosing.

The Benefits of the TPP Digital Trade Provisions: Through the Lens of 3 Semiconductor-Enabled Products

All of these provisions directly benefit the consumer in one of three key ways: 1) they ensure freedom of choice 2) they lower costs; and 3) they promote privacy and security. How these provisions will work for consumers can be seen by looking at three commonly used, semiconductor-enabled products:

Product Spotlight: Smartphones

It seems more common today for a person to have two smartphones than not have one at all. This semiconductor-enabled product functions like a computer, able to send emails, browse the internet, transfer money, run applications, and of course, make phone calls. The TPP will benefit smartphones in ways that are passed onto the consumer.

First, the increased functionality and connectivity of a smartphone requires strong protection of consumers' private information. The TPP will ensure that smartphone producers will be able to use the encryption technology they believe is best for their product and most secure for the consumer. The TPP does this by prohibiting parties from requiring the use of a specific (i.e. domestic-only) standard or encryption technology. By enabling producers to sell smartphones with industry-driven encryption technology based on peer-reviewed global standards -- rather than government-mandated technologies based on country-specific domestic standards -- consumers will benefit by being able to access the strongest, most innovative encryption technology to protect their personal, private data. Thus, the TPP leads the way for enhancing privacy and security.

Second, the TPP will help lower costs for consumers. The most straightforward way it does this is by eliminating tariffs on virtually *all* manufactured goods, including smartphones and the variety of high-tech components that go into smartphones, like semiconductors. However, there are many other ways that the TPP will keep costs low for the consumer: both the encryption and market-based standards provisions in the TPP ensure that companies will be able to innovate without the constraints and expense of designing different versions of products to accommodate different standards and technology requirements in different markets. Research has shown that creating or requiring domestic standards for sophisticated products, like electronic goods, results in higher costs and lower trade volumes compared to an international standard.[6] By preventing countries from imposing less competitive national standards on innovative American products, the TPP keeps costs low by allowing producers to make products on more efficient, larger scales. These savings are invariably passed down to consumers.

Lastly, the market-driven standards provisions help promote global interoperability and compatibility, allowing consumers to choose products that function across different networks and in different countries. Smartphones, for example, use different wireless communication and mobile data methods to access mobile and internet networks. LTE, 4G and Bluetooth are all examples of wireless transmission standards. Ten years ago, these options were not practically available for consumer use. If a country had mandated the use of only one of these technologies, or a different locally developed technology standard, those

products today could be stuck in the past by being forced to use outdated, non-competitive, and globally incompatible technology standards. The TPP technology choice provisions ensures that smartphone producers are able to choose and use the standards and technologies that work the best and suit their customers' needs, expanding consumer choice and network coverage anywhere in the world.

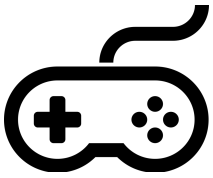
Product Spotlight: Activity Trackers

An activity tracker is a wearable piece of technology that monitors and tracks fitness-related metrics such as distances, calories, heartrate and quality of sleep. The physical device is typically accompanied by a software service and mobile app that displays a person's fitness data in a user-friendly format. Semiconductor sensors are the enabling technology that allows an activity tracker to collect and interpret the data it receives, like hand motion from walking or a wearer's pulse, and convert it into data that can be understood by the user.

This data is then synced and transferred from the tracker to the cloud, to another device like a laptop or smartphone, and even to other applications, where the data can be stored, analyzed, and viewed. Through this process of collection, processing, communicating, synchronizing, and storing, data from an activity tracker travels through remote sensing and server architecture located in multiple countries around the world. Thus, like all revolutionary wearable technologies that depend on brains, eyes, ears, and memories located long distances away, fitness trackers rely on the free and unimpeded flow of data around the world. However, national laws increasingly restrict the transfer of information across national borders, creating barriers to trade and threatening to cripple innovative Internet-based applications.

The TPP seeks to keep the global information highway free and clear from these burgeoning roadblocks with specific provisions designed to protect the movement of data. This includes preventing companies delivering Internet-based products and services – like wearable fitness trackers – from having to localize their physical infrastructure and data centers in every country they seek to serve, an unnecessary and costly expense that would inevitably be passed down to the consumer. By ensuring entrepreneurs have the ability to maintain servers anywhere in the world without having to build expensive duplicates in each market, the TPP not only keeps costs low for the consumer, but also protects the speed and quality of services and products by preventing the fragmentation of the Internet. Moreover, the TPP's robust market access commitments related to cross-border services, including those delivered digitally, ensure that consumers in TPP markets will have access to the diversity of fitness tracking (and other) services available in the global marketplace, rather than being confined to localized products and services.

Product Spotlight: Digital Video Games



Gone are the days when the only way to play a videogame was by purchasing a physical medium (i.e., a game cartridge or CD) to play on a game-specific console or computer. Today, more than half of all computer and video games in the United States are sold digitally, rather than in physical form.[7] Games, movies, software, e-books, TV and music are all forms of "digital goods" that are traded globally. However, although a video game is a video game whether in digital form or physical form, some countries treat digital products differently from their physical counterparts, imposing discriminatory taxation (in the form of customs duties), outright blocking, or other forms of content discrimination.

The TPP prevents countries from putting digital products at a competitive disadvantage by requiring that basic nondiscrimination principles apply to both physical and digital products. Moreover, the TPP completely prohibits customs duties for digital products. Lower taxes and no discrimination ensure that consumers will be able to access their favorite videogames at lower costs both in the United States and abroad.

The encryption and cross-border data flow provisions are also important for gamers. Online purchases of digital content require strong security to protect credit card information and user account data. As described above, the TPP's encryption provisions will ensure companies will be able to continue to incorporate innovative encryption features in products like video games and video game software without fear of being denied market access, having to reconfigure a product to meet country-specific requirements, or having to turn over source code or other proprietary algorithms to a regulator (who could intentionally or unintentionally leak this information to a domestic competitor). Additionally, the TPP contains a provision that ensures suppliers can use whatever authentication methods are best suited for their product, including electronic signatures, to secure online payments and other electronic transactions.[8] The ability to use innovative authentication methods further enhances consumer security and privacy.

Regarding cross-border data flows, the TPP ensures that players will be able to continue to connect and interact with other players via multi-player games. The videogame industry is characterized by very large numbers of players, often in the tens of thousands, who engage in international and multi-lingual communication on a constant basis.[9] The growing interaction between technologies, operators and

players would come to a grinding halt if data interchanges were impeded by digital roadblocks erected at national borders.

Conclusion

The TPP does not simply benefit big global technology companies, but provides direct and important benefits to the average American consumer. By addressing and preventing some of the ways a country could restrict access to certain technologies and products, the TPP serves to enhance consumer security and privacy, lower costs, and promote freedom of choice. The TPP provision prohibiting the use of a country-specific encryption algorithm for commercial products (as opposed to any algorithm deemed by a company to be the best and most secure) ensures that companies and consumers are able to choose and use the most innovative and secure technologies to protect consumer data. The prohibitions against local content requirements (requirements to purchase and use domestic technology) and forced localization keeps costs low by ensuring companies do not have to build duplicative and costly infrastructure in each market they serve. The e-commerce provisions seek to preserve a free and open internet for all legitimate commercial purposes, allowing consumers unrestricted access to new and transformative Internet services, content and applications of their choice when online. Semiconductor-enabled products like smartphones, fitness trackers, video games and many, many other products are an integral part of daily life for most Americans. By giving consumers greater choice of products available to them, including more secure and more affordable products, the TPP benefits all Americans as a whole.

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[1] TPP: Ch. 8, Annex 8-B. Section A.
[2] http://www.internetlivestats.com/
[3] http://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/.
[4] TPP: Ch 14, Article 13.
[5] TPP Digital Two Dozen, USTR https://ustr.gov/sites/default/files/Digital-2-Dozen-Final.pdf
[6] Portugal-Perez, Reyes and Wilson (2010) examine the impact of different kinds of standards on imports of electronic products into the EU; their econometric analysis "confirms the importance of international harmonisation of standards on the commercialisation of more complex goods, such as electronics, as well as on their production and consumption" (p.1895). See also Ezell and Atkinson (2010, pp.84-90); OECD (2000); USITC (1998).
[7] http://www.statista.com/statistics/190225/digital-and-physical-game-sales-in-the-us-since-2009/.
[8] TPP Ch. 14, Article 14.6: Electronic Authentication and Electronic Signatures.
[9] http://ec.europa.eu/justice/news/consulting_public/0003/contributions/organisations/isfe_en.pdf.