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Additional Questions for the Record: Responses

**The Honorable Lee Terry**

**1. From NAM's perspective, what does an effective trade policy for cross-border data transfers look like, and how does it support U.S. manufacturing?**

An effective and pro-manufacturing U.S. trade policy for cross-border data transfers would encompass four main attributes:

- The modernization and passage of new Trade Promotion Authority (TPA) legislation that would direct U.S. negotiators to ensure that governments not implement trade-related measures that impede digital trade in goods, services, restrict cross-border data flows or require local information technology storage or processing of data. The Bipartisan Congressional Trade Priorities Act of 2014 (H.R. 3830) included strong provisions regarding this issue that should be included in new legislation to be introduced this year.
- The negotiation of new trade and investment agreements, including the Trans-Pacific Partnership (TPP), Transatlantic Trade and Investment Partnership (TTIP) and the Trade in Services Agreement (TISA) that contain binding commitments to allow manufacturers and other industries to transfer, access, process or store information across borders; prohibit the imposition of restrictions that would require the establishment or use of local servers generally or as a condition of access to the market; and ensure non-discriminatory treatment of digital products and services.
- Active work by U.S. government officials to prevent the adoption of new provisions by foreign governments that would impede cross-border data flows, including work to educate other government, identify such measures as part of the annual trade barriers reports and use other tools to ensure that such provisions do not impede commerce.
- Use of trade agreement enforcement tools by the U.S. government when foreign governments violate commitments made not to restrict cross-border data flows or not to require the localization of information technology infrastructure, such as updating eligibility criteria for preference programs, including potentially the Generalized System of Preferences and the African Growth and Opportunity Act (AGOA) to ensure countries' commitment to creating a strong enabling environment for digital trade.

Such a policy would advance opportunities for manufacturers in the United States to increase exports and sales overseas. As explained in my written testimony, international trade and investment are highly important to provide manufacturers in the United States access to new customers overseas and to increase sales in a highly challenging global economy. Increasingly, manufacturers are using digital platforms, including sharing data and information across borders, to expand sales overseas, and creating new products that create new demand that is served by growing manufacturing and jobs domestically. A strong U.S. trade policy that actively addresses this issue of growing importance is important for manufacturers of all sizes in the United States.

**2. The Internet of Things has dominated recent headlines and in your testimony you discuss "machine-to-machine" technologies. How are manufacturers utilizing "machine-to-machine" technology today?**

As noted in my written testimony, manufacturers are at the forefront of building "machine to machine" technologies (M2M or the Internet of Things (IOT)) to transfer data remotely between machines and other systems. In 2013, the market for IOT was estimated to be worth $1.3 trillion, by 2020, the market is expected to be worth $3.04 trillion by 2020 according to market research firm IDC.[1]

As explained in "How Smart Connected Products are Transforming Competition:"

> Embedded sensors, processors, software, and connectivity in products (in effects, computers are being put inside products), coupled with a product cloud in which product data is stored and analyzed and some applications are run, are driving dramatic improvements in product functionality and performance. Massive amounts of new product usage data enable many of those improvements.[2]

Among the many ways that manufacturers are using M2M and IOT technology include:

- Increasing industrial automation through sensors, controllers and other information technologies.
- Using global positioning software (GPS) to locate lost devices, navigate and track machinery.
- Maximize user safety in hazardous locations by enabling remote control of machinery (*e.g.*, monitor and control mining machinery from control room above mines).
- Coordinate and optimize activities and tasks among multiple machines working towards a common purpose by analyzing data from each component in the systems (e.g., farm tractors, backhoes, tillers, and other farming equipment working in sync to maximize the output of the farm (grain, produce, etc.) with the minimum input (water, fertilizer, etc.)).
- Deliver over-the-air (OTA) software updates remotely to improve the productivity or address maintenance issues for a wide range of consumer and industrial products that are M2M enabled.
- Reduce equipment downtime and increase utilization of assets by analyzing performance usage data to identify potential issues and address them proactively (*e.g.*, measuring equipment temperature or vibrations remotely leads to proactive maintenance visit to avoid product failure).
- Offering consumers and businesses innovative products and services powered through the cloud.

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[1] Stephen McBride, "IoT Market to Reach $3.04 trn by 2020," **ITP.NET** (Nov. 14, 2014), accessed at http://www.itp.net/600792-iot-market-to-reach-304trn-by-2020-idc.

[2] Michael E. Porter & James E. Heppelmann, "How Smart, Connected Products are Transforming Competition," **Harvard Business Review** (Nov. 2014), accessed at http://www.ptc.com/File%20Library/Topics/Harvard%20Business%20Review/HBR_How-Smart-Connected-Products-Are-Transforming-Competition.pdf.

More specifically, data captured from embedded sensors, software and processors enable manufacturers to gather and exchange information on product usage, performance and environment that can be leveraged to improve a variety of manufacturer's value chain activities:

- Product design:
  - Leverage data collected from the product to design better performing and higher quality products (*e.g.*, remove features customers do not use, increase ease of use of existing features, identify root-cause of component failure).
- Marketing and sales:
  - Improve market segmentation by analyzing usage data to create a better understanding of how the product is used to provide features and services specifically tailored to different customer segments, and deliver ongoing services or improve product performance (*e.g.*, automatic replenishment of spare parts or consumables to avoid product downtime; continuously update and improve products through remote software upgrades and configurations).
  - Change business models to offer usage-based billing or product as a service, selling the utility of the product instead of the fixed asset.
  - Extend product offering to include products and services powered through the cloud.
- Manufacturing processes:
  - Increase efficiency of the factory floor through smart connected factories – automating manufacturing processes.
- Service:
  - Improve existing service efficiency through remote service, predictive and preventive maintenance, improved parts management and efficient field service (*e.g.*, utilizing real-time and historical failure, performance and maintenance history data collected from all products sold, manufacturers can predict product failure and proactively fix the issue before the product actually fails, preventing costly product or production downtime.
  - Optimize warranty contracts – leverage data collected from the product to prevent warranty issues, identify breach in warranty by end-use monitoring, and update and adjust warranty contracts based on how customers are actually using the product.
  - Provide value-added services, by extending the product offering beyond the physical product to include additional services in which the customer may be interested based on product-usage data.
- Logistics:
  - Use technology to track and monitor shipments in real time, which is especially important for agriculture, food, medical and pharmaceutical and other time-sensitive products.

In developing and utilizing these technologies, manufacturers work to ensure that the privacy and security of information collected and transmitted by such by including safeguards at the beginning of the design process

**a. Are those uses threatened when foreign governments place commercial restrictions on data flows?**

Government restrictions on cross-border data flows and limitations on the locations of information technology infrastructure severely undermine the ability of manufacturers to make use of these technologies and to compete successfully in foreign markets. In particular, such limitations prevent the aggregation, sharing and analysis of information developed in different countries that could be used to enhance product development, usage, maintenance or access to customers. Such restrictions also add additional costs, limiting the ability of manufacturers to allocate resources most efficiently and effectively. Such restrictions also add additional capital costs in the form of servers and other data storing infrastructure to partition and secure data based on foreign regulations to ensure compliance, limiting the ability of manufacturers to allocate resources most efficiently and effectively. Such restrictions can also prevent companies from shipping products to certain jurisdictions. That is why we also need to be diligent so U.S. government actions do not unnecessarily prompt reaction abroad that could impact data flows and avoid circumstances that cause countries to impose restrictions on cross-border data flows because of those actions.

The US International Trade Commission's 2014 report on *Digital Trade in the US and Global Economies, Part 2* estimated that removing barriers to digital trade would increase U.S. real GDP by up to $41 billion and employment by up to 400,000 full-time equivalent positions.[3]

In order to prevent artificial restrictions on the deployment and adoption of IOT, we recommend that the TPA and future trade agreements include binding provisions to limit any regulations to specific policy objectives and that are done so in a manner that is nondiscriminatory and are not trade restrictive.

**b. Have these restrictions, or proposed regulations, discouraged adoption of "machine-to-machine" technologies?**

While the development of M2M, IOT and cloud technologies have created new opportunities, government initiatives that restrict cross-border data flows and require the localization of information technology infrastructure have a chilling effect on manufacturers' use of these technologies and inhibits many of the opportunities to optimize product development, marketing and sales as well as service activities that benefit both the manufacturer and the end user discussed previously on an international scale. While M2M and IOT technologies might be deployed in some geographical markets, some manufacturers have been hesitant to put in the most advanced technologies in countries where such restrictions are imposed or threatened due to the complexity and high cost of compliance.

**3. The U.S. is engaged in several major trade negotiations including TPP, TTIP, and TiSA. How can previous agreements guide the ongoing trade negotiations with respect to cross-border data flows?**

Over the last decade, U.S.-negotiated trade agreements have increasingly dealt with digital and electronic commerce issues as technology has increasingly become part of how trade is conducted. As restrictions on cross-border data flows started to arise, more recent trade agreements have started to tackle this issue more precisely, most significantly in the Korea-U.S. Free Trade

[3] U.S. International Trade Commission, "Digital Trade in the U.S. and Global Economies Part 2," Publ. No. 4485, Inv. 332-540 (August 2014), accessed at http://www.usitc.gov/publications/332/pub4485.pdf.

Agreement (KORUS FTA), which included general language indicating that the Parties should not impose restrictions on cross-border data flows as well as specific language limiting the use of such restrictions related to financial data.

As noted in my written testimony, the importance of ensuring cross-border data flows has also been dealt with in several multilateral agreements and initiatives, including in the Asia Pacific Economic Cooperation (APEC) forum's "Digital Prosperity Checklist" (2008), the APEC Innovation Principles (2011), the APEC Privacy Framework (2012), the Organization for Economic Cooperation and Development (OECD) Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data" (July 2013) and U.S.-EU Information and Communication Technology (ICT) Principles (2011).

While much work has been done recognizing the issue, creating new, binding and enforceable legal obligations in trade agreements is needed to address fully the types of barriers that are arising, as specified in my written testimony

**4. Is it fair to say that previous trade agreements recognizing the importance of the free flow of data have supported the development and growth of industries critical to the U.S. economy and jobs, such as manufacturing?**

Prior trade agreements have been very important to growing manufacturing in the United States. By reducing barriers, requiring fair treatment of U.S. products, services and investments, and promoting adequate and effective protection of intellectual property rights, U.S. free trade agreements (FTA) have been critical drivers of increased exports and sales by manufacturers and other businesses to our FTA partners. America's 20 existing trade agreement partners account for less than 10 percent of the global economy but purchase nearly half of all U.S. manufactured goods exports. By improving provisions on cross-border data flows in future trade agreements, the competitiveness of America's manufacturers and other businesses will be further enhanced in overseas markets.

**5. Your testimony mentioned that world trade in manufactured goods expanded from $4.8 trillion in 2000 to $11.5 trillion in 2012. How much of this expansion would you attribute to advancements in information and communication technologies?**

As explained in my written testimony and during the hearing, the increased ability of manufacturers in the United States to export has been substantially aided by the advancements and utilization of information and communications technologies (ICT). The use of ICT had been shown to increase productivity in the U.S. economy and has a particularly powerful effect on small and medium sized enterprises (SMEs) and their ability to export.

For example, a 2013 study by the Boston Consulting Group (BCG) showed that tech-savvy small and medium-sized enterprises (SMEs) create more new jobs and drive more revenue gains than SMEs using little technology, and are far more likely to have international customers. BCG estimates that if more SMEs in the United States employed the full range of available IT tools, including basic productivity software, Internet connectivity and new Cloud-based services, these

businesses could inject an additional $357 billion into the economy and hire 2.1 million more employees.[4]

While data are not available on the specific impact of ICT technologies on the growth of manufacturing exports in particular, it is useful to note that the increase in manufacturing trade coincides with the growth of the Internet's role throughout the economy. For example, according to the U.S. Census Bureau, 52 percent of U.S. manufacturers' shipments were associated with e-commerce in 2012, compared with just 18 percent in 2000.[5]

**a. Do you believe these same advancements played a role in the U.S. producing a record high $1.38 trillion in manufactured goods in 2013? If so, how?**

Yes, the advancement and utilization of ICT technologies and cross-border data flows has had and will continue to have an important positive impact on manufacturing exports. In particular, the utilization of such technologies has enabled manufacturers to compete more successfully in a tough global economy by lowering costs, improving efficiencies and to growth product, supply and distribution networks more effectively overseas. From utilizing cloud computing to provide an internet storefront or data flows to manage a global production network or improving an end product's capability through Internet and data flow enabled software updates, manufacturers are increasingly using ICT and data flows to make better products more efficiently and to reach directly consumers around the country and the world.

**The Honorable Jerry McNerney**

**6. You suggested that issues related to data flow should be included in trade agreements. What form should this take – privacy, openness, security, IT?**

New trade agreements should build upon existing provisions related to digital trade and include new and binding commitments to allow manufacturers and other industries to transfer, access, process or store information across borders; prohibit the imposition of restrictions that would require the establishment or use of local servers generally or as a condition of access to the market; and ensure non-discriminatory treatment of digital products and services. In including such provisions, it is important to ensure that any regulations on cross-border data flows and related issues:

1) Be limited to specific and legitimate public policy objectives, consistent with international treaties;
2) Be established pursuant to transparent procedures allowing comment by all interested parties;
3) Not constitute unnecessary barriers to trade in services;
4) Take into account and not seek to supplant competitive market forces that are already achieving regulatory objectives.

[4] See, e.g., **Boosting Exports, Jobs and Economic Growth by Expanding the ITA**, Information Technology & Innovation Foundation (March 2012), accessed at http://www2.itif.org/2012-boosting-exports-jobs-expanding-ita.pdf; **Ahead of the Curve**, Boston Consulting Group (Oct. 5, 2013), accessed at https://www.bcgperspectives.com/content/articles/technology_software_globalization_ahead_curve_lessons_technology_growth_small_business_leaders/.

[5] U.S. Census Bureau, accessed at http://www.census.gov/econ/estats/2012/all2012tables.html.