ITIF | INFORMATION TECHNOLOGY & INNOVATION FOUNDATION

November 6, 2020
Ms. Lisa R. Barton
Secretary
U.S. International Trade Commission
500 E St. SW

Re: ITIF Post-Hearing Response to Questions: Regarding Investigation No. TPA-105-008 on the Economic Impact of Trade Agreements Implemented Under Trade Authorities Procedures

Dear Ms. Barton:

Please find below the Information Technology and Innovation Foundation's (ITIF) post-hearing response to questions asked during testimony concerning investigation No. 105-008 into the Economic Impact of Trade Agreements Implemented Under Trade Authorities Procedures.

If you have any questions, please do not hesitate to contact me at ncory@itif.org.

Sincerely,

Nigel Cory
Associate Director, Trade Policy, The Information Technology and Innovation Foundation

Question: Dr. Susan Helper, former Chief Economist at the U.S. Department of Commerce, described in congressional testimony in 2017 that the loss of U.S. manufacturing jobs "begins when manufacturers move labor-intensive components or assembly overseas. Before too long, they do the same for higher-tech operations as well. For example, U.S. personal computer manufacturers started by offshoring the assembly of printed circuit boards, then moved complete product assembly overseas, then supply-chain management, and, finally, design and innovation (Pisano and Shih, 2009)."[1]

1) To what extent do you believe this process has taken place in the U.S. electronics industry?
2) What role has U.S. trade policy played in this trend, if any?

NAFTA AND USMCA'S ROLE IN FOSTERING A MORE INTEGRATED AND COMPETITIVE NORTH AMERICAN PRODUCTION NETWORK

The United States-Mexico-Canada trade agreement (USMCA) covers (by either keeping existing provisions or enacting new ones) a broad range of issues—from low/no tariffs to services market access to visas for skilled professionals to trade and customs facilitation to intellectual property—that together allow U.S. firms to work with counterparts in Canada and Mexico as part of increasingly complex and dynamic production networks. These firms and networks will be able to use USMCA provisions to ensure the efficient (quick, low-cost, and hassle-free) movement of goods, services, people, ideas, and data in order for the North American economy to become more globally competitive. Given this, ITIF disagrees with Dr. Helper's view that NAFTA allowed companies to compete based on who can exploit workers or the environment more, undercutting firms that would like to compete on innovation. Trade with Mexico has not undercut, but rather has supported, innovation by U.S. information communication technology (ICT) firms. As Dr. Helper also noted in her 2017 testimony, appropriately designed, trade deals can set rules so that everyone shares in the resulting gains. The United States should negotiate trade deals to ensure competition is based on technology and innovation—rather than on other nations' willingness to exploit workers or the environment. ITIF strongly believes that USMCA (and NAFTA before this) does. This submission provides the data and analysis to support this central point, especially as it relates to the ICT sector.

In essence, the United States (and Canada) with Mexico form a high-wage/low-wage partnership, bringing complementary labor forces, investments, innovation capacity, and industry strengths together to create a

region that's very competitive globally. Within this relationship, the United States represents the source of much of the research and development (R&D), design, innovation, and high-value-added manufacturing, while Mexico provides some of the lower-tech, lower-cost, and more labor-intensive manufacturing activity. This economic relationship makes regional North American manufacturing value chains more cost-competitive with Asian ones. USMCA is well-positioned to play an important role in supporting the flow of goods and services across North American borders as part of complex production networks that source intermediate goods and services from wherever is most competitive. The USMCA can thus play an important role in making North America a more globally competitive manufacturing environment. In analyzing NAFTA, USMCA, and supply chains, ITIF would disagree with Dr. Helper's view that Mexican and Canadian firms don't complement each other as part of the development of regional supply chains that these trade agreements ultimately support.

One of NAFTA's greatest strengths has been the creation of continentally integrated markets and production networks, particular for sectors like autos, where parts and components may cross the borders of North American countries as many as eight times before being installed in a final assembly plant.[2] Indeed, while motor vehicles are the top import from Mexico for the United States, motor vehicle parts are the top export.[3] (More than half of U.S. ICT and automobile exports come from ICT firms selling inputs to their Mexican counterparts.) As Wilber writes, "The integration of the auto sector in North America was a natural result of comparative advantage: Cheaper labor in Mexico results in a higher share of manual tasks being performed in Mexico compared to the U.S. and Canada. On the other hand, employment in high wage engineering and R&D jobs are located in the U.S. and Canada."[4] Wilber continues, "NAFTA has been crucial for North America to remain competitive in world markets by relocating parts of its auto manufacturing based on the cost advantages of three countries." While U.S. content of imported vehicles from Mexico was 5 percent before NAFTA, it is 40 percent today.[5] As Hufbauer et al. observe, "A large portion of two-way trade among the NAFTA economies represents imported intermediates that raise the competitiveness of US firms, enabling them to improve their export profile in world markets." The countries compete together as "Factory North America" against similar regional production networks in Europe and East Asia. Currently, tariff-free trade allows these supply chains to operate relatively seamlessly across North America.

Similarly, medical devices cross North American borders as many as 10 times as they are refined toward final production. This deep integration is demonstrated by the fact that U.S. inputs actually account for 40 percent of the value of Mexico's goods exports to the United States, and 25 percent of Canadian ones. (By comparison, on net, just 4 percent of the content of manufactured goods entering the United States from

China was originally produced here.)[6] Moreover, when examining trade flows at the intra-industry level, ITIF finds that the United States runs trade surpluses with Mexico in a number of high-tech sectors, including computer electronics, pharmaceuticals, and chemicals (see below).

As ITIF's report "Boosting Exports, Jobs, and Economic Growth by Expanding the ITA" details, expanded global revenue (whether from Mexico or elsewhere) leads to hiring in the United States.[7] A review of the annual reports of the top 10 U.S. ICT firms finds a revenue/employee ratio of approximately $500,000, which suggests these firms will hire approximately 15,000 new employees to fill this expanded demand. And while certainly some of those employees will be located in foreign markets to meet foreign demand, a large number of them will be high-skill positions in R&D, design, marketing, sales, management, logistics, etc.—positions often located in the U.S. headquarters of these firms. And even when some of those jobs are filled abroad, they often support U.S. employment at home, because employment in U.S. parents is likely to increase with increases in U.S. affiliate activity. In fact, one study finds that an increase in U.S. affiliate employment of 1 percent is associated with an increase in parent employment of 0.2 percent.[8] In other words, U.S. affiliate activity abroad is often a complement to, rather than a substitute for, the activity of parent companies in the United States.[9]

This is why U.S. policymakers need to not only consider national, but regional, competitiveness and U.S. firm's leading role in regional production networks as part of global value chains (GVCs). GVCs, as described by the Organization for Economic Cooperation and Development (OECD), represent a system "where different stages of the production process are located across different countries."[10] To generalize, firms in multiple countries (or a single multinational firm with operations across multiple countries) work together by splitting up the production process into "specialized tasks" (e.g., product design, testing, material sourcing, manufacturing, distribution, marketing, retail, and other activities) that eventually lead to the lowest production costs and highest quality for consumers. A significant share of exports now are produced through GVCs, with the amount of foreign-produced value in U.S. exports growing from 11 percent in 2002 to 15 percent in 2011.[11]

U.S. trade policy needs to reflect the fact that the 21st-century global trading system is structured around GVCs that connect end users to complex goods and services, both physical and digital. The global economy has become increasingly interlinked, as nations—and enterprises therein—specialize in productive activities wherein they enjoy the greatest levels of comparative advantage. This phenomenon has become especially pronounced in the globalization of value chains for the ICT sectors, electronics, aerospace, and automotive

sectors, with Asia becoming a central player in many of these supply chains. This internationalization of supply chains means that the success of original equipment manufacturers (OEMs) depends greatly on the health and vitality of suppliers in other nations and the ability to pursue trade, ideally on mostly unimpeded terms, with them.

TRADE LINKAGES WITH MEXICO AND CANADA

At the global level, GVCs do not impact the basic methodology used to calculate a country's trade balance: exports minus imports. But when factoring in GVCs at the bilateral level, this formula becomes tricky for estimating a country's relative competitiveness with a trading partner. This stems from trade-accounting methodologies not being able to capture the realities of modern trade. Analyzing bilateral trade deficits through the value-added (VA) trade balance factors in GVCs by tracking how the bits of value added from one input to another flow from the source country all the way to their final destination, rather than just calculating trade flows as static border-to-border exchanges. In summary, for $1,000 in imports to Country B from Country A, a value-added trade balance might separate that value into $200 imported from Country A, $500 imported from Country C, and $300 imported from Country D.

GVCs are indicative of why trade and investment should not be seen through a zero-sum or must-be-equal-gains lens. Dr. Helper makes the point that it is plausible that when a firm expands in Mexico, it expands its Mexican supply base more than it would if it expanded in the United States. Given the nature of global production and R&D networks, it is very much in the U.S. interest for U.S. industry to work in Canada and Mexico as opposed to China and elsewhere. The goal is to ensure U.S. industry is globally competitive, otherwise it'll be less able to offer low-cost goods to U.S. consumers and hire U.S. workers in R&D, support, and other roles as well as to enter and to compete in foreign markets. A U.S. ICT or auto industry that focused solely on U.S. production would be less competitive, innovative, and successful.

ITIF's report "Global Trade Interdependence: U.S. Trade Linkages With Korea, Mexico, and Taiwan" shows this as part of its detailed and granular analysis of U.S.-Mexico trade. It examines trade linkages between the United States and three key partner nations—Mexico, Korea, and Taiwan—analyzing the extent of inter- and intra-industry trade across six key sectors: automobiles, chemicals, computers and electronics, machinery, other transportation equipment (including aerospace), and pharmaceuticals.[12] The report demonstrates both that U.S. industries in these sectors depend greatly on trade with suppliers in study partner nations and that these nations are key importers of U.S. goods in these industries. Reduced trade barriers, decreasing transportation costs, and increasing adoption of digital tools have all complemented each other in facilitating

the emergence of these GVCs.[13] USMCA supports these by generally building a smoother, more integrated North American economy.

The report examines U.S. trade with the three partner countries through the following lenses (note that the reference years provided in these tables vary according to data availability, with the most recently available data being used wherever possible):

- Value-added trade balances
- Intra-industry trade in value added
- Composition of product trade in terms of capital, intermediate, or final goods
- Domestic value added as a share of countries' gross exports and imports
- Industry-level trade in value added with each partner country across six industries: automobiles, chemicals, computers and electronics, machinery, other transportation equipment (including aerospace), and pharmaceuticals
- Domestic value added as a share of gross exports and imports, by industry
- Intermediate and final goods trade linkages among countries, by industry

The following sections analyze U.S.-Mexico trade using some of these more disaggregated trade metrics.

United States and Mexico: Industry-to-Industry Trade

This examines trade at the industry-to-industry level. In other words, what is the trading relationship between a U.S. industry and its foreign counterpart? (Put differently, what is the value in trade, for example, between the U.S. ICT industry buying Mexican ICT parts, and the Mexican ICT industry buying U.S. ICT parts?). This metric provides key details on industrial linkages between the partner countries. At the industry-to-industry level, the United States maintained a trade surplus in intermediate goods with Taiwan and Mexico from 2002 to 2014, and went from a surplus to a deficit with Korea over the same time period. A surplus means industries in partner countries are more reliant on key parts and components for production than the United States; the larger the surplus, the more dependent the partner country is on the United States for key inputs.

Expressing intra-industry trade as a share of total value-added trade provides some sense of how closely linked the United States and its trading partners are. A greater share of total trade bundled up in critical components

for industrial production suggests closer economic ties. In 2002, intra-industry trade accounted for 20 percent of U.S.-Taiwan VA trade, 16 percent for Mexico, and 15 percent for Korea. By 2014, this figure increased by 0.4 percent for Taiwan and decreased by 0.3 percent and 1.4 percent for Mexico and Korea, respectively. These statistics show U.S.-Taiwan industries are most closely linked, followed by Mexico and Korea, and that the U.S.-Taiwan and U.S.-Mexico relationships have been more stable than the U.S.-Korea relationship.

In summary, of the three partner countries, the United States has the closest industrial linkages with Taiwan, with a sizable share of bilateral trade occurring between firms within the same industry. Moreover, Taiwan and Mexico depend on the United States for critical inputs into their production processes; actually more so than the United States depends on them reciprocally, albeit less so than in 2002. Finally, the United States depends more on these partner countries for final products (although intermediate-goods imports remain vital, of course), while these partner countries (especially Taiwan and Mexico) depend more on the United States for key inputs to their production processes (e.g., U.S. exports of semiconductor manufacturing equipment to Taiwan).

Mexico and ICT Industry-Level Analysis

For advanced economies such as the United States', competitiveness depends in significant part on how well their technology-based industries perform. These industries are also key drivers of innovation and productivity growth.[14] NAFTA deepened trade linkages across North America. In particular, the machinery, ICT, and automobile industries are deeply linked and account for approximately 40 percent of two-way value-added goods trade and more than one-half of industry-to-industry input trade. In value-added terms, the United States' goods imports from Mexico totaled $267 billion and goods exports totaled $178 billion in 2014. Weak relative competitiveness in machinery, ICT, and automobiles mainly stem from U.S. firms locating their manufacturing processes in Mexico due to lower labor-unit costs which results in cheaper U.S.-branded tech products for U.S. consumers.

Comparing gross trade flows against value-added flows, tech-based industries make up 50 percent of gross trade and 48 percent once adjusted for value added. But, within the composition of trade flows, tech-based trade is skewed more toward imports than exports. Tech-based industries account for 42 percent of gross exports and 56 percent of gross imports, and 45 percent of value-added exports and 49 percent of value-added imports. These figures show exports to Mexico are more tech-based and imports less tech-based than gross values suggest. In general, trade with Mexico is less tech-based, but the United States depends on Mexican production facilities in large part to supply cheap tech-based products for consumers.

Table 1: U.S. Trade With Mexico, Adjusted by Value Added, 2014 (Millions)[15]

Mexico	Gross			Value Added			Intra-industry		
Industry	Exports	Imports	Balance	Exports	Imports	Balance	Exports	Imports	Balance
TOTAL	$193,345	$293,916	-$100,571	$178,587	$267,366	-$88,778	$42,200	$29,078	$13,123
Chemicals	$22,208	$5,499	$16,709	$23,099	$7,019	$16,080	$6,113	$1,559	$4,554
Pharmaceuticals	$1,628	$327	$1,301	$1,646	$277	$1,369	$70	$5	$65
Computers and Electronics	$14,504	$51,281	-$36,777	$16,867	$44,530	-$27,662	$8,858	$1,995	$6,863
Machinery	$18,231	$17,217	$1,014	$17,306	$18,931	-$1,625	$1,151	$2,132	-$981
Automobiles	$21,697	$86,986	-$65,289	$18,739	$56,295	-$37,556	$10,126	$12,514	-$2,389
Other Transportation (Including Aerospace)	$4,218	$2,700	$1,518	$3,367	$5,364	-$1,998	$812	$1,931	-$1,119

U.S.-Mexico trade linkages hinge on the ICT and automobile industries. These two industries account for one-third of imports. In value-added terms, the United States exports $16.8 billion and imports $44.5 billion in ICT, and exports $18.7 billion and imports $56.3 billion in automobiles. This results in an ICT deficit of $27.7 billion and an automobile deficit of $37.6 billion. It is important to note that value-added imports for ICT and automobiles have much smaller values than gross imports. This is mainly due to Mexico's position in GVCs as a production hub, similar to China's. In other words, a significant portion of Mexico's tech-based exports contain the value of inputs that come from other countries.

There is a slight difference when comparing gross and value-added U.S. exports with those from Mexico. The United States exports more in ICT to Mexico when measured by value added. This results in GVCs and U.S. ICT components contained in the ICT products being exported to Mexico from the rest of the world. Meanwhile, U.S. automobile exports to Mexico are much smaller in value-added terms than gross terms. This is due to the North American automobile value chain, wherein U.S. automobile exports to Mexico contain a fair number of components from Canada. Most of Mexico's automobile and ICT exports are final goods meant for end users. Examining intra-industry trade, U.S. ICT firms maintain a healthy surplus of $6.8 billion with Mexican ICT firms, while U.S. automobile firms hold a deficit of $2.4 billion against Mexican automobile firms. The importance of Mexico within North American value chains is quite clear when examining intra-industry trade.

More than half of U.S. ICT and automobile exports come from ICT firms selling inputs to their Mexican counterparts. On the import side, Mexican ICT and automobile firms sell few inputs to their U.S. counterparts (although the automobile industry maintains a small intra-industry deficit). Overall, however, this illustrates the reality of North American automobile value chains, wherein automobile components move automobile value chain, wherein U.S. automobile exports to Mexico contain a fair number of components from Canada. In fact, automobile parts and inputs traverse the U.S-Mexico border multiple times as they are being refined and produced.[16] Most of Mexico's automobile and ICT exports are final goods meant for end users.

In summary, Mexico plays a vital role in North American value chains, especially in ICT, automobiles, and other transportation industries. The trade deficit the United States maintains with Mexico can partially be attributed to the United States taking advantage of lower labor-unit costs in Mexico to produce more competitive products for the American market. While the United States depends on Mexico for a lower-cost production environment, Mexican firms source a large number of inputs from U.S. firms, as established by robust intra-industry trade surplus levels.

United States and Mexico: Domestic Value Generated in Exports and Imports, by Industry

Deepening GVCs lead to countries' exports containing value from a more diverse range of sources. Some industries may be more plugged into GVCs than others. These industry differences also differ by country. Domestic value added as a share of gross exports highlights the extent of foreign inputs used in exported goods, and domestic value added as a share of gross imports highlights inputs made in the domestic country, exported for further refinement or for use as an input, and imported back to the domestic country. Many factors influence how firms located in different countries establish themselves along GVCs, such as transportation networks, the presence of supporting industries, and market access, among many others.

As table 2—which shows domestic value added as a share of gross exports, by industry, from 2002 and 2011—illustrates, most industries in the study countries have integrated themselves more deeply into GVCs. In general, services industries contain a much larger share of domestic value added than goods industries. This is due to services industries historically being labor-intensive rather than capital-intensive (and also because barriers such as licensing have historically made services trade more difficult). Many countries experienced dramatic economic growth during this period, leading to more competitive global industries. This is evident in the decrease in U.S. value added returning to the United States in imports from other countries. Simply

put, as industries in other economies developed, their products became more competitive and, as such, foreign firms did not need to rely on U.S. inputs as much as before.

Table 2: Domestic Value Added as a Share of Gross Exports, by Industry, 2002 and 2011.[17]

Domestic VA as Share of Gross Exports	United States			Mexico			Taiwan			Korea		
	2002	2011	Change	2002	2011	Change	2002	2011	Change	2002	2011	Change
Economy Wide	89%	85%	-4%	67%	68%	2%	70%	57%	-14%	73%	58%	-14%
Manufacturing	84%	81%	-3%	56%	57%	0%	63%	49%	-14%	68%	53%	-15%
Chemical Manufacturing (Including Pharmaceuticals)	88%	82%	-6%	83%	74%	-9%	63%	41%	-21%	66%	47%	-19%
ICT Manufacturing	80%	87%	7%	37%	36%	-1%	59%	55%	-3%	66%	58%	-8%
Electrical Machinery	85%	78%	-8%	56%	52%	-4%	61%	50%	-11%	74%	62%	-13%
Automobiles	76%	65%	-12%	54%	50%	-3%	72%	52%	-20%	73%	62%	-10%
Other Transportation (Including Aerospace)	83%	78%	-5%	68%	67%	-1%	69%	53%	-16%	72%	62%	-11%
ICT Services	96%	95%	-2%	97%	97%	0%	86%	84%	-3%	88%	83%	-5%
R&D Services	97%	96%	-2%	95%	97%	2%	87%	84%	-2%	92%	86%	-6%

Focusing on the ICT and automobile manufacturing industries reveals interesting trends. Over that same 10-year period, U.S. ICT manufacturing firms relied slightly less on foreign inputs for production. This is not indicative of U.S. firms pulling out of GVCs, but rather them concentrating their activities on higher-value-added activities such as R&D; producing key inputs such as semiconductors; or distributing while outsourcing lower-value-added manufacturing activities to either their affiliates in other countries or contracting that work out. From 2002 to 2011, the share of domestic value added embodied in gross U.S. ICT exports increased 7 percentage points, from 80 percent to 87 percent. In addition, the value of U.S.-made ICT content returning to the United States as a share of gross imports decreased from 11.5 percent to 6.7 percent.

Table 2 contains some other interesting insights. Manufacturing exemplifies below-average levels of economy-wide domestic VA for all four countries, though most significantly so for Taiwan and Mexico. Further, while the share of domestic value added in manufacturing exports did not undergo significant changes in the United States and Mexico between 2002 and 2011, Taiwan and Korea experienced large declines, falling below Mexico. However, its extent of domestic value added as a share of gross exports in ICT manufacturing, at 37 percent, was about half its economy-wide level for domestic value contribution in exports. Korea experienced an 8 percentage point decline in domestic value added in ICT manufacturing from 2002 to

2011, while Taiwan experienced a 3 percentage point decline, although these declines were less than economy-wide losses.

ITIF's report also analyzes whether trade in a given industry's inputs leans more heavily toward the United States or one of its partner nations. In other words, it evaluates how dependent a U.S. tech-based industry is on a partner country for inputs. Across 10 tech-based industries, and with each partner country, ITIF examined three metrics:

1. Imports as a share of imported intermediate goods: This refers to U.S. intermediate imports from a partner country in a given tech-based industry as a share of total intermediate imports from that country. In other words, how important a partner country is as a source of components and inputs for production in a given tech-based industry.

2. Exports as a share of exported intermediate goods: This refers to U.S. intermediate exports to a partner country in a given tech-based industry as a share of total intermediate exports to that country. In other words, how important the United States is as a source of components and inputs for a partner nation's production in a given tech-based industry.

3. Linkage factor: Metric 2 divided by metric 1, which describes whether trade in intermediate components within a given industry is more critical for the United State or the partner country. A value of 1 means the relationship is even—the United States depends just as much on its partner for sourcing components and inputs as does the partner country on the United States. A value closer to 0 means the U.S. industry is more dependent on its partner nation's industry for inputs, and a value much greater than 0 means a partner nation's industry is more dependent on the United States for its inputs.

In 2002, ICT manufacturing constituted a much larger portion of U.S. trade in both directions, with imports from Korea and both imports from and exports to Taiwan representing a higher proportion of trade than any other industry. Imports from Mexico were the only field in which ICT manufacturing grew proportionate to total trade from 2002 to 2014. Linkage factors decreased with all partners, falling by nearly one-third with Korea and by half with Taiwan and Mexico, causing U.S. ICT manufacturing to become more reliant on each nation than it was on the United States by 2014.

Tables 3 and 4 assesses final goods (as opposed to intermediate goods) trade linkages between the United States and partner countries in 2014 and 2002. The deep linkages between these nations in ICT manufacturing are, again, also readily apparent. As table 3 shows, as a share of all U.S. final goods imports, nearly 23 percent from Mexico, 21 percent from Taiwan, and 17.2 percent from Korea are in ICT

manufacturing. As table 4 shows, in 2002, 49 percent of U.S. imports of final goods from Taiwan were ICT products, more than twice as many as in 2014, while 44 percent of U.S. exports to Taiwan were machinery goods, which has since fallen to 9 percent. Mexico produces significantly fewer final ICT goods than it did in 2002, while the proportion of automotive manufacturing imports has held steady. Final machinery goods now make up a larger share of U.S. exports to Mexico, but increases in imports from Mexico have made that relationship more balanced.

Table 3: Final Goods Trade Linkage Between U.S. and Partner Countries, by Industry, 2014.[18]

	Taiwan			Mexico			Korea		
U.S. Trade Relation With Partner Country	Imports as a Share of Imported Intermediate Goods	Exports as a Share of Exported Intermediate Goods	**Linkage Factor**	Imports as a Share of Imported Intermediate Goods	Exports as a Share of Exported Intermediate Goods	**Linkage Factor**	Imports as a Share of Imported Intermediate Goods	Exports as a Share of Exported Intermediate Goods	**Linkage Factor**
Chemical Manufacturing	1.31%	3.18%	2.43	1.31%	3.26%	2.49	1.23%	4.94%	4.01
Pharmaceutical Manufacturing	1.08%	2.15%	1.99	0.17%	2.46%	14.58	0.15%	0.81%	5.50
ICT Manufacturing	20.88%	13.69%	0.66	22.82%	7.24%	0.32	17.27%	5.91%	0.34
Electrical Equipment Manufacturing	7.24%	2.29%	0.32	7.34%	2.64%	0.36	5.20%	1.58%	0.30
Machinery Manufacturing	16.48%	9.35%	0.57	6.84%	20.08%	2.94	9.65%	16.25%	1.68
Automobile Manufacturing	2.28%	3.40%	1.49	25.62%	8.15%	0.32	46.39%	4.95%	0.11
Other Transportation Manufacturing (Including Aerospace)	4.18%	3.94%	0.94	1.48%	2.66%	1.80	2.02%	3.25%	1.61
Telecommunication Services	0.00%	0.10%	-	0.00%	0.03%	-	0.00%	3.60%	-
ICT Services	0.01%	0.33%	43.04	0.00%	0.00%	-	0.00%	0.98%	-
Research and Development Services	0.00%	0.00%	-	0.00%	0.00%	-	1.59%	20.83%	13.13

Table 4: Final Goods Trade Linkage Between U.S. and Partner Countries, by Industry, 2002[19]

	Taiwan			Mexico			Korea		
U.S. Trade Relation With Partner Country	Imports as a Share of Imported Intermediate Goods	Exports as a Share of Exported Intermediate Goods	**Linkage Factor**	Imports as a Share of Imported Intermediate Goods	Exports as a Share of Exported Intermediate Goods	**Linkage Factor**	Imports as a Share of Imported Intermediate Goods	Exports as a Share of Exported Intermediate Goods	**Linkage Factor**
Chemical Manufacturing	0.38%	1.21%	3.16	0.40%	2.45%	6.14	0.29%	0.32%	1.10
Pharmaceutical Manufacturing	0.11%	0.30%	2.63	0.36%	3.36%	9.33	0.18%	1.65%	9.21
ICT Manufacturing	49.11%	10.35%	0.21	33.71%	13.57%	0.40	35.25%	21.12%	0.60
Electrical Equipment Manufacturing	3.25%	2.12%	0.65	5.45%	4.91%	0.90	3.40%	1.15%	0.34
Machinery Manufacturing	9.33%	43.50%	4.66	1.64%	15.48%	9.42	3.98%	18.55%	4.66
Automobile Manufacturing	1.31%	1.25%	0.96	25.37%	14.71%	0.58	30.43%	1.03%	0.03
Other Transportation Manufacturing (Including Aerospace)	2.52%	14.57%	5.77	0.75%	1.16%	1.55	0.26%	8.10%	30.58
Telecommunication Services	0.00%	0.06%	-	0.01%	0.13%	21.91	0.00%	1.67%	-
ICT Services	0.00%	0.17%	-	0.00%	0.00%	-	0.00%	0.18%	-
Research and Development Services	0.00%	0.00%	-	0.00%	0.18%	-	0.58%	5.50%	9.43

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