CHAPTER 4

THE TRANSATLANTIC DIGITAL ECONOMY

Digital information, services and products, and the infrastructure that supports them, have become the backbone of the modern global economy. They are transforming how we live, work, play, travel, interact, and do everything in between. Global data flows now contribute more to global growth than global trade in goods.[1] They also underpin and enable virtually every other kind of cross-border flow.

In this chapter we offer some lenses through which we can see more clearly the importance the transatlantic digital economy.[2] A first step is to understand the tremendously uneven nature of the digital economy. "Digital globalization" evokes the image of a seamless global marketplace in which unbridled data flows drive goods, services and money across national boundaries without friction. Reality is different. Digital connections are "thicker" between some continents and "thinner" between others — and they are "thickest" between the United States and Europe.

Emerging economies trade as intensively as advanced countries, but the latter were nine times more integrated with respect to information flows in 2015.[3] And cross-border data flows between the United States and Europe, at about 15 terabits per second, are by far the most intense in the world — 50% higher than data flows between the United States and Asia in absolute terms, and 400% higher on a per capita basis.[4]

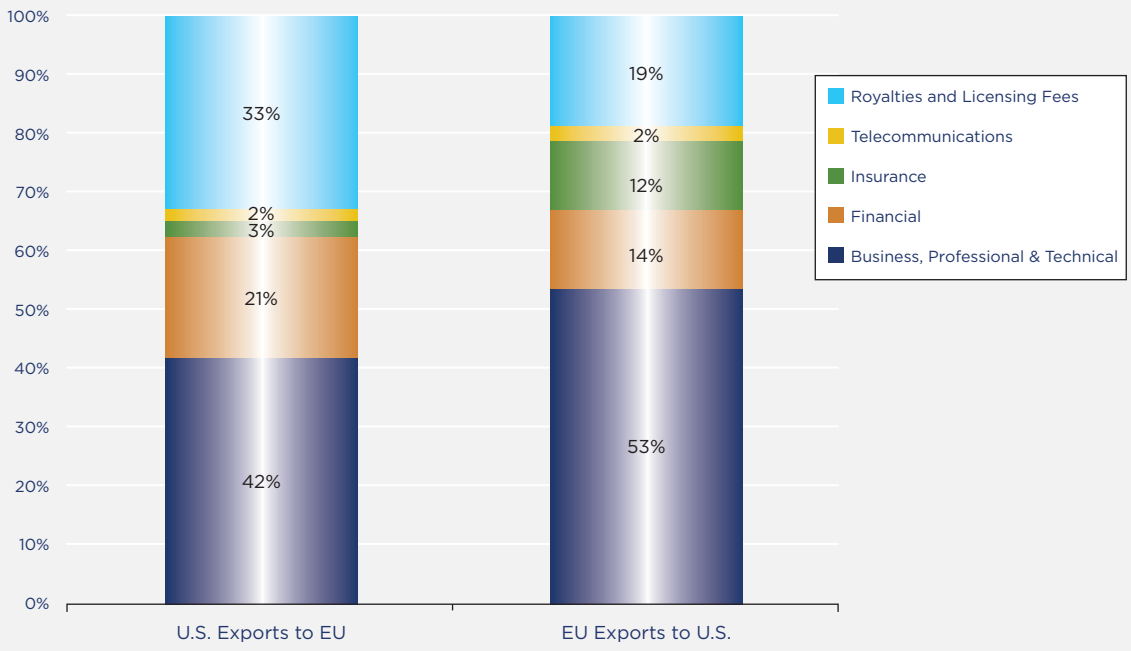
The United States and the European Union are each other's most important commercial partner when it comes to digitally deliverable services. Companies on each side of the Atlantic also use the transatlantic economic base to be more effective global competitors, making the United States and the EU the two largest net exporters of digitally deliverable services to the world. They are well positioned to take advantage of the global internet economy, which is projected to grow 8% a year over the next four years in G-20 economies and 18% a year in developing economies, far outpacing just about every traditional economic sector.[5]

Trade in Digitally Deliverable Services

The internet is to trade in services what the advent of container shipping was to trade in goods — a transforming capability that enables faster cross-border delivery of a variety of activities that were once considered nontradable.[6] This dynamic is reflected in trade in digitally deliverable services, which are services that can be purchased and delivered online across borders to anyone with internet access. This includes business, professional and technical services, financial and insurance services, telecommunications, software and royalties for intellectual property use. Digitally deliverable services are services "that may be, but are not necessarily, delivered digitally," according to the U.S. International Trade Commission.[7] This means that an export of engineering services from Frankfurt, Germany to Hartford, Connecticut could have been delivered online or in person, or some combination of the two. The statistic does not say exactly whether the specific service was delivered online or in person. But it does offer an indication of the potential for digital trade.[8] It also underscores the outsized importance of the United States and the EU to the global digital economy.

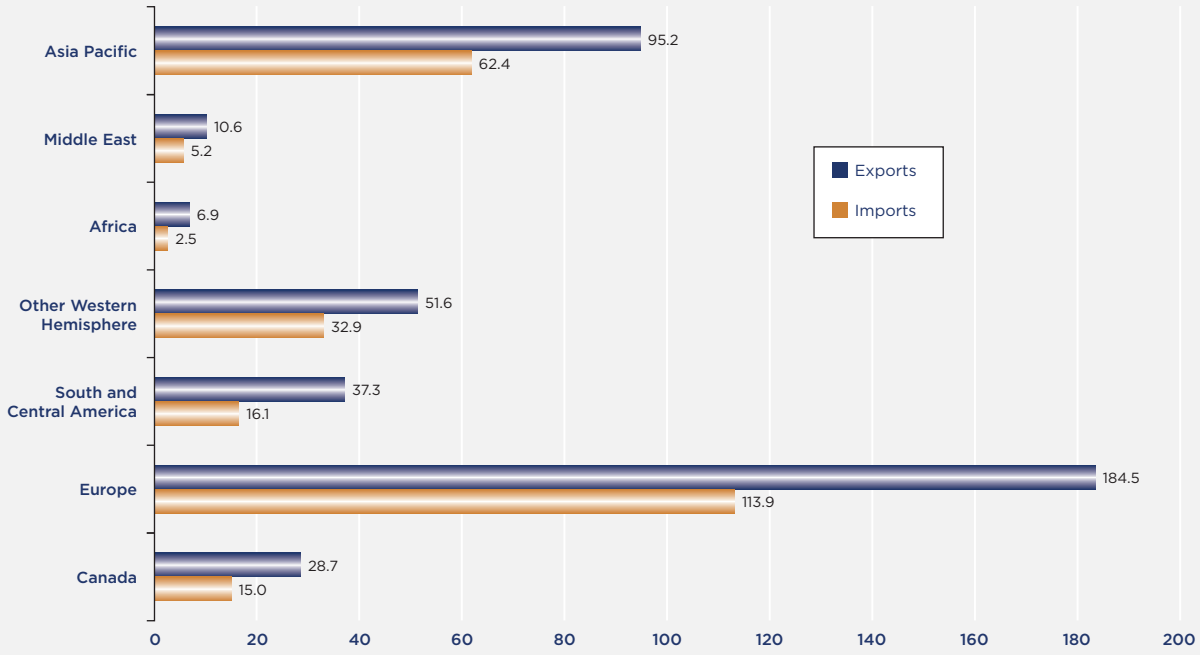
The transformative impact of digital services is not limited to just the services sector but extends to manufacturing and the traditional bricks-and-mortar economy as well. Digitally deliverable services such as consulting, engineering, software, design and finance are used in manufacturing industries such as transport equipment, electrical equipment and food products. In this regard, digitally deliverable services from the United States have become critical to the manufacturing competitiveness of European manufacturing and retail operations and vice versa. In addition, digitally deliverable services are not just exported directly, they are used in manufacturing and to produce goods and services for export. Over half of digitally deliverable services imported by the U.S. from the EU is used to produce U.S. products for export, and vice versa, thus generating an additional value-added effect on trade that is not easily captured in standard metrics.[9]

TABLE 1: U.S. - EU DIGITALLY DELIVERABLE SERVICES TRADE BY SECTOR, 2015.



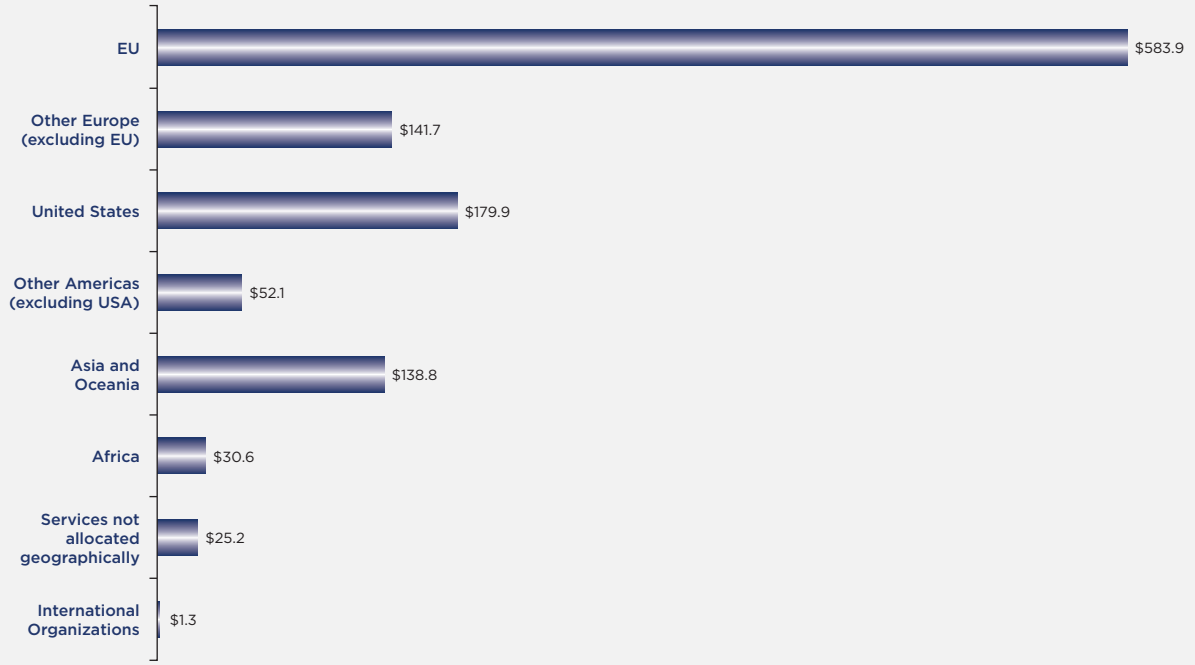
Sources: U.S. Bureau of Economic Analysis.
Data as of December 2016.

TABLE 2: U.S. TRADE IN DIGITALLY DELIVERABLE SERVICES, 2015 (BILLIONS OF DOLLARS)



Source: Bureau of Economic Analysis
Data as of September 15, 2016.

TABLE 3: DESTINATION OF EU EXPORTS OF ICT-ENABLED SERVICES, 2014 (BILLIONS OF DOLLARS)



Source: U.S. Department of Commerce, Office of the Chief Economist using data from the Organization for Economic Cooperation and Development

Table 1 categorizes U.S.-EU digitally deliverable services trade into five sectors. For both economies, the most important exports are represented by business, professional and technical services, which accounted for 53% of digitally deliverable services exports from the EU to the United States and 42% of digitally deliverable services from the United States to the EU in 2015. The second most important category consists of royalties and license fees, most of which are paid on industrial processes and software, underscoring how integral such transatlantic inputs are to production processes in each economy. For the United States, the larger share of royalties and license fees (33%) reflects strong European demand for U.S.-produced television and film.[10] The third largest digitally deliverable services export category for each side is financial services.

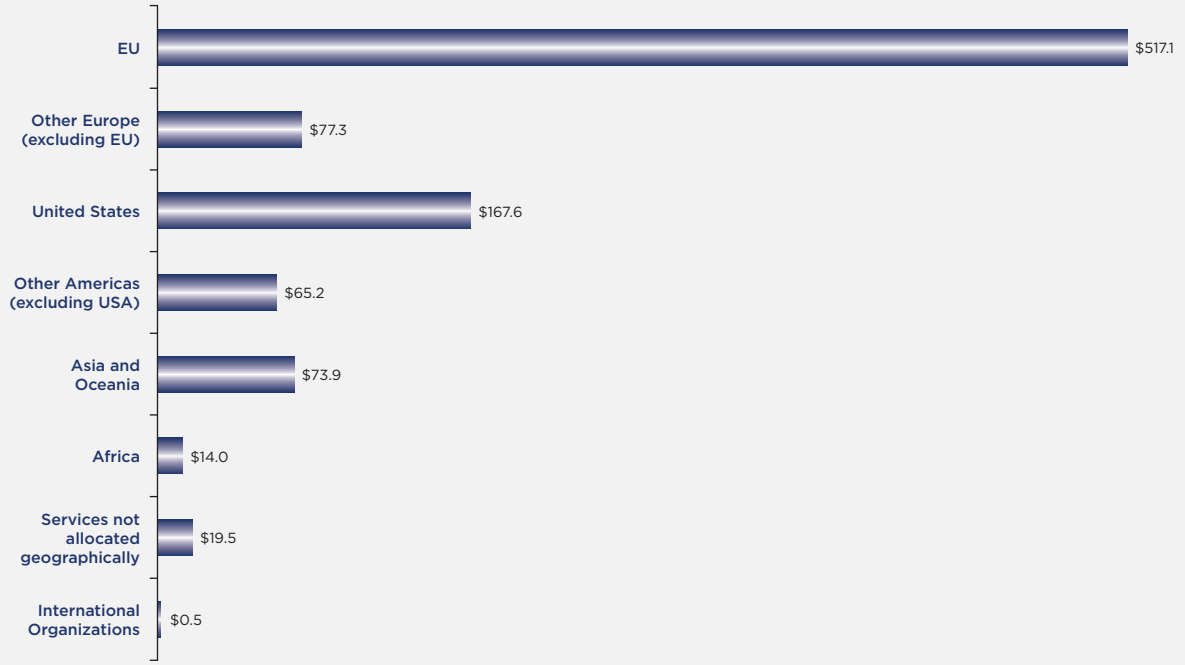
In 2015 the United States registered a $167.0 billion trade surplus in digitally deliverable services with the world. Its main commercial partner was Europe, to which it exported $184.2 billion in digitally deliverable services and from which it imported $113.2 billion, generating a trade surplus with Europe in this sector of $71 billion. U.S. exports of digitally deliverable services to Europe were more than double U.S. trade with Latin America and almost double U.S. trade with the entire Asia-Pacific region (See Table 2).

In 2014, the last year of available data, the 28 EU member states collectively exported $1.2 trillion and imported $935.1 billion in digitally deliverable services, to countries both inside of and outside of the EU (See Table 3). Excluding intra-EU trade, EU member states exported $569.6 billion and imported $418.0 billion in ICT-enabled services, resulting in a surplus of $151.6 billion for these services. ICT-enabled services trade represented 56% percent of all services exports to non-EU countries and 52% of all services imports from non-EU countries.[11]

The EU member states with the largest estimated value of ICT-enabled services exports were the United Kingdom ($159.0 billion), Germany ($149.2 billion), France ($128.0 billion), and the Netherlands ($115.3 billion). Some member states, like the UK, the Netherlands, and Sweden, transmitted more than half of their ICT-enabled services exports to destinations outside of the EU. Other member states, like Poland, Austria, and Belgium, were more likely to export to other EU member states. The United States purchased 16% percent, or $179.9 billion, making it the largest non-EU consumer of EU ICT-enabled services exports.[12]

In 2014, the EU imported $935.1 billion in ICT-enabled services, 49% of all EU services imports that year. 55%

TABLE 4: ORIGIN OF EU IMPORTS OF ICT-ENABLED SERVICES, 2014 (BILLIONS OF DOLLARS)



Source: U.S. Department of Commerce, Office of the Chief Economist using data from the Organization for Economic Cooperation and Development

percent of the ICT-enabled services imports originated from other EU member states. (See Table 4). Another 18% percent came from the United States, making it the largest non-EU supplier of these services.

Digitally Deliverable Services Supplied Through Foreign Affiliates

The digital economy has transformed the way trade in both goods and services is conducted across the Atlantic and around the world. Even more important, however, is the delivery of digital services by U.S. and European foreign affiliates. In fact, affiliate sales of digitally deliverable services has exploded on both sides of the Atlantic in recent years — another indicator reinforcing the importance of foreign direct investment, rather than trade, as the major driver of transatlantic commerce.

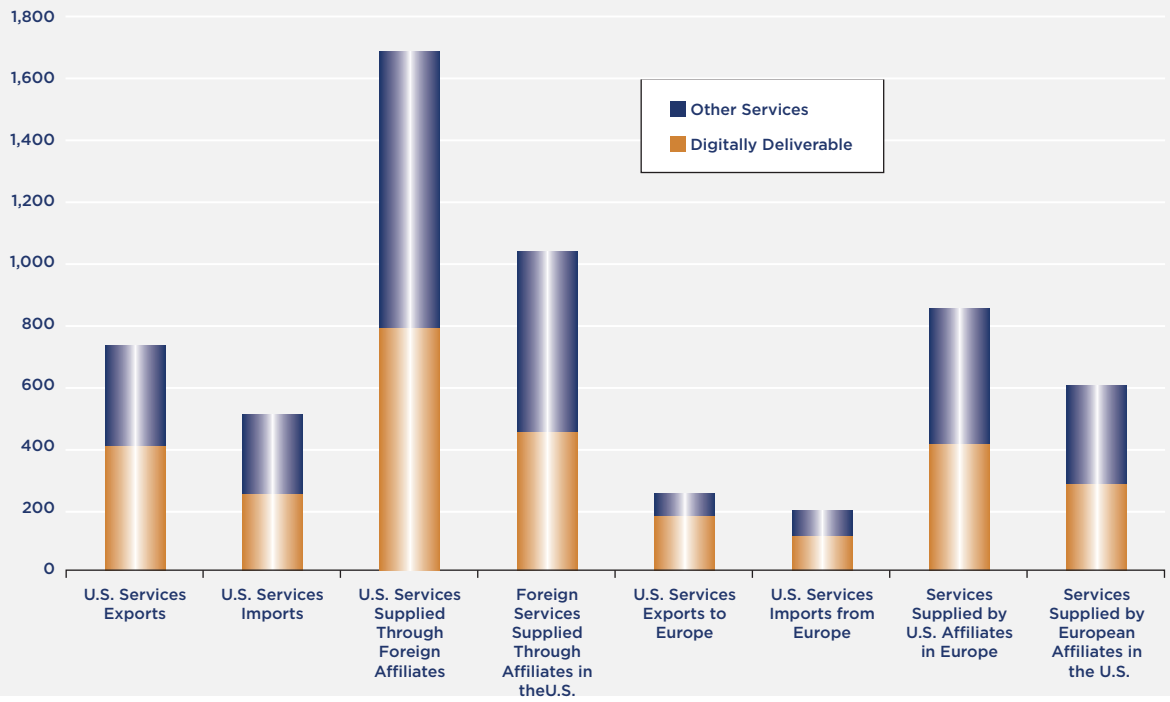
Table 5 underscores the relative importance of digitally deliverable services supplied by affiliates of U.S. companies located in Europe and affiliates of European companies in the U.S., versus U.S. and European exports of digitally deliverable services. In 2014 U.S. affiliates in Europe supplied $428 billion in digitally deliverable services, whereas European affiliates in the United States supplied $270 billion in digitally deliverable services. Digitally deliverable services supplied by U.S. affiliates in Europe were 2.3 times greater than U.S. digitally deliverable exports to Europe, and digitally deliverable services supplied by European affiliates in the United States were 2.4 times greater than European digitally deliverable exports to the United States.

The significant presence of leading U.S. service and technology leaders in Europe underscores Europe's position as the major market for U.S. digital goods and services. Table 6 underscores this dynamic. In 2014, Europe accounted for almost two-thirds of the $228.4 billion in total global information services supplied abroad by U.S. multinational corporations through their majority-owned foreign affiliates. This is not surprising given the massive in-country presence of U.S. firms throughout Europe, with outward U.S. FDI stock in information overwhelmingly positioned in Europe. Roughly 65% of U.S. overseas investment in the "information" industry was in Europe in 2014.

Inter-firm Trade in the Transatlantic Digital Economy

While affiliate sales are a more important means of delivery for digital services than cross-border trade, as we discussed in Chapter 3 the two modes of delivery are more complements than substitutes, since foreign investment

TABLE 5: U.S. DIGITALLY DELIVERABLE SERVICES TRADE AND SERVICES SUPPLIED THROUGH AFFILIATES* (BILLIONS OF DOLLARS)



**Trade data are for 2015. Affiliate data are for 2014, the latest available year.*
Sources: U.S. Bureau of Economic Analysis.

TABLE 6: INFORMATION SERVICES SUPPLIED ABROAD BY U.S. MULTINATIONAL CORPORATIONS THROUGH THEIR MOFAS (MILLIONS OF $)

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Canada	3,595	4,140	3,971	5,996	6,316	7,135	7,595	7,401	8,725
Europe	67,270	76,156	85,450	84,117	96,310	110,525	119,123	120,796	147,123
France	4,045	3,794	4,475	4,713	4,582	5,013	4,768	5,258	5,715
Germany	5,260	6,031	6,104	6,456	7,143	7,798	7,970	10,599	12,086
Netherlands	5,925	8,152	9,980	8,674	8,719	9,313	10,196	9,117	10,900
Switzerland	2,871	2,527	3,197	3,747	4,034	4,419	5,243	4,778	6,051
United Kingdom	28,073	30,500	31,479	29,906	24,941	26,446	25,996	23,876	29,326
Latin America and Other Western Hemisphere	7,255	10,845	13,165	13,798	17,578	20,943	21,887	21,751	21,083
Australia	5,722	6,365	6,369	5,961	6,852	6,960	5,531	7,735	8,380
Japan	3,447	(D)	6,224	7,856	4,575	4,828	5,204	5,807	7,505
Other Asia-Pacific and MENA Countries	5,217	(D)	(D)	8,875	10,215	11,947	13,244	15,882	17,500
TOTAL	**92,507**	**(D)**	**(D)**	**126,603**	**141,846**	**162,338**	**172,583**	**179,372**	**228,396**

MOFA: Majority-owned foreign affiliate
(D) indicates that the data in the cell have been suppressed to avoid disclosure of data of individual companies.
Source: Bureau of Economic Analysis

TABLE 7: TOP APP ECONOMY JOBS: EUROPEAN COUNTRIES AND U.S. STATES

		Share of European App Economy jobs	Jobs (thousands)			Share of U.S. App Economy jobs	Jobs (thousands)
1	UK	19.6%	321.2	1	California	22.7%	376.0
2	Germany	16.3%	267.9	2	New York	9.4%	156.2
3	France	14.0%	228.9	3	Texas	7.3%	121.1
4	Netherlands	7.6%	125.2	4	Illinois	5.1%	84.9
5	Italy	6.0%	97.5	5	Massachusetts	4.1%	67.2
6	Poland	5.1%	84.3	6	Florida	3.5%	58.7
7	Spain	4.8%	78.2	7	New Jersey	3.5%	58.7
8	Sweden	4.1%	67.1	8	Virginia	3.3%	55.5
9	Finland	2.9%	47.4	9	Michigan	3.2%	52.8
10	Norway	2.5%	41.6	10	Washington	3.0%	50.1
11	Denmark	2.0%	33.4	11	Ohio	3.0%	49.9
12	Switzerland	1.7%	28.5	12	Georgia	2.9%	48.6
13	Portugal	1.7%	27.4	13	Pennsylvania	2.9%	48.6
14	Belgium	1.4%	23.3	14	North Carolina	2.2%	37.0
15	Czechia	1.2%	19.7	15	Missouri	1.9%	32.1
16	Romania	1.2%	19.3	16	Indiana	1.6%	26.6
17	Hungary	0.9%	15.3	17	Arizona	1.6%	26.5
18	Ireland	0.8%	13.2	18	Maryland	1.6%	26.3
19	Austria	0.7%	11.9	19	Colorado	1.4%	22.4
	30-COUNTRY TOTAL		**1,642.0**		**UNITED STATES**		**1,670.0**

Source: Progressive Policy Institute, Indeed, ILO. Data for Europe January 2016; data for U.S. December 2015. See http://www.progressivepolicy.org/blog/app-economy-jobs-part-2/.

and affiliate sales increasingly drive transatlantic trade flows. The fact that digital services are following this same broad pattern of transatlantic commercial flows reinforces our point that intra-firm trade is critical to the transatlantic economy. Nearly 40% of data flows between the United States and Europe are over business and research networks.[13] Companies rely on cross-border, intra-firm data flows to manage their communications, finances, data centers, human resources and supply chains, access software, and build synergies in research, development and other tasks among affiliates across the transatlantic space. These activities spur innovation and create economic value and are important attributes of the transatlantic digital economy, but are not captured adequately by national statistics.

The Transatlantic App Economy

Digitally deliverable services have also been catalysts for the growth of the App Economy on both sides of the Atlantic.

The Progressive Policy Institute, a U.S. think tank, studied the App Economy in the U.S. and in 30 European countries, and concluded that as of January 2016 Europe and the United States had each generated similar numbers of App Economy jobs, 1.64 million versus 1.67 million, respectively. This corresponds to 0.7% of all jobs in Europe and 1.2% of all jobs in the United States, still small, but growing fast. The Institute noted that France's 229,000 App Economy jobs were only slightly less than the 289,000 net new jobs generated in the country between 2007 and 2015.[14]

By 2020, the app economy could double in size to $101 billion, according to market researcher App Annie.[15] The European Commission estimates that by 2018, the App Economy will employ 4.8 million people in Europe, contributing €63 billion to the EU economy. Within the ICT sector, the App Economy is becoming more important. The Institute calculates that roughly 9% of ICT jobs in Europe, and roughly 11% of ICT jobs in the United States, are associated with the App Economy.[16] The European Commission concludes that on balance, jobs in the App Economy are good ones.[17]

Although most app platforms are American, streaming music services are a notable but niche exception where

TABLE 8: MAJOR INTERCONNECTION HUBS, INTERNATIONAL INTERNET BANDWIDTH (TBPS)

	2016	2012
Frankfurt	48.5	15.7
London	43.1	15.1
Amsterdam	34.6	11.7
New York	14.6	6.1
Singapore	10.5	2.1
Hong Kong	9.2	2.0
Tokyo	7.3	2.3
San Francisco	7.0	2.8
Washington, DC	4.9	2.5

Tbps: Terabits per second.
Source: Jon Hjembo, TeleGeography, The Colocation Sector. Shifting Dynamics and Stable Fundamentals, presentation at Telegeography Workshop, PTC '17, Jan 15-18, 2017.

European companies are holding their own. EU and U.S. app companies each account for 42% of app revenue across the U.S. and EU. Many EU developers are on contract work, or pay app platform fees, to U.S. companies — another indication of the depth of transatlantic linkages in the App Economy.[18]

When it comes to overall App Economy jobs, Europe's app economy remains more concentrated than that of the United States. California still leads other states in terms of App Economy jobs, but its lead is diminishing. The Golden State, which accounts for 12% of the U.S. population, accounted for 22.7% of U.S. App Economy jobs in 2015, down from 29% in 2012, whereas states such as New York, Texas, and Illinois quadrupled their App Economy jobs.

When it comes to "app intensity," however, the picture changes. The Progressive Policy Institute compared "app intensity" — i.e. App Economy jobs as a percentage of all jobs — in both European economies and U.S. states. According to their analysis, the United States has an average app intensity of 1.2% and Europe an average app intensity of 0.7%. California, the District of Colombia and Massachusetts rank as the most "app intensive" overall in the transatlantic space. Finland ranks 4th, and tops in Europe, underscoring its role as a small country with a big presence in mobile apps. Norway ranks as the second most "app intensive" European country, just behind the state of New York, followed by the Netherlands and the U.S. state of Washington. New Jersey, Virginia and Sweden round out the top spots. Germany ranks highly on total App Economy jobs but is only average when judged by app intensity. Italy, which is fifth in total App Economy jobs, falls to the bottom of the app intensity listings with 0.4%.

TABLE 9: ICT DEVELOPMENT INDEX - TOP 20 COUNTRIES

Economy	Rank 2015	IDI 2015
Korea (Rep.)	1	8.93
Denmark	2	8.88
Iceland	3	8.86
United Kingdom	4	8.75
Sweden	5	8.67
Luxembourg	6	8.59
Switzerland	7	8.56
Netherlands	8	8.53
Hong Kong	9	8.52
Norway	10	8.49
Japan	11	8.47
Finland	12	8.36
Australia	13	8.29
Germany	14	8.22
United States	15	8.19
New Zealand	16	8.14
France	17	8.12
Monaco	18	8.10
Singapore	19	8.08
Estonia	20	8.05

Source: International Telecommunications Union.

The Hardware of the Transatlantic Digital Economy

The digital economy evokes images of electrons speeding through the ether, but the reality is that undersea cables bring the internet to life. The virtual economy relies on a network of telecommunications cables under the oceans. They transmit 99% of all intercontinental telecommunication traffic — data, phone calls, texts, emails.[19] They can serve as an additional proxy for the ties that bind continents.

Here again, the transatlantic economy is central. Not only do transatlantic cable connections already represent the densest and highest capacity cable routes, with the highest traffic, in the world, commercial and consumer demand is rapidly outpacing supply.[20] Telegeography projects that 2 new transatlantic cables will be needed every year between now and 2025 just to keep up with demand.[21] If all planned systems for just the next 2 years become operational, they will double existing total transatlantic capacity.[22] If current transatlantic demand trends, continue, Telegeography estimates a compound annual growth rate of 38% in capacity until 2025.[23]

In addition, the United States and Europe are central hubs in the global submarine cable system. For instance, 30% of all internet capacity in 2015 was connected to the United States.[24] While emerging economies are becoming more integrated into the submarine cable network, South Americans rely almost exclusively on international interconnections routed through the United States, and Africans and people living in the Middle East are highly dependent on international interconnections routed through Europe.

Europe is the global leader when it comes to major interconnection hubs, with tremendous connected international capacity. Frankfurt, London and Amsterdam substantially outpace North American and Asian cities. Frankfurt's connected capacity, for instance, is over 3 times greater than that of New York and almost 5 times greater than that of Singapore, the Asian leader. Europe has increased its position, while leading Asian cities have surpassed U.S. cities.[25]

The ICT Sector

Although the digital economy is more than the information and communications technology (ICT) sector, ICT is at the heart of the digital economy.

The ICT Development Index (IDI), a composite index produced by the International Telecommunications Union, compares ICT developments among countries. The Republic of Korea is ranked highest, while 18 of the Top 25 Economies are from Europe or North America, and 8 of the top 10 economies are from Europe (See Table 9).

A Boon to Stakeholders

Taken together, these metrics underscore the importance of the digital economy to healthy transatlantic commerce and to the globally competitive position of the United States and the European Union. The digital economy is opening significant opportunities to key stakeholders across the Atlantic and around the world. Individuals tap global networks to learn, work, play, create, or build personal and business connections. Consumers benefit by easier, faster and cheaper access to products and services. Small and medium-sized businesses and entrepreneurs stand to be major beneficiaries from increased productivity and efficiency, better market intelligence, and greater reach at lower cost.[26] While a number of issues have arisen regarding appropriate rules of engagement when it comes to the internet and cross-border flows of massive amounts of data, avoiding a transatlantic digital divide is highly important to the transatlantic partnership.

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