2016 Top Markets Report
Cloud Computing

A Market Assessment Tool for U.S. Exporters

April 2016

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Executive Summary

This report provides market assessment information for U.S. companies interested in entering and/or expanding in international markets. To that extent, the report addresses issues specific to the cloud computing market place, as well as issues affecting the attractiveness of various global markets for U.S. cloud computing providers. It also provides a ranking of the top markets for cloud computing, focusing on enterprise adoption and market potential. This ranking is based on export data from the U.S. Bureau of Economic Analysis (BEA) and from a wide variety of reports and statistics on topics such as policy and regulatory environments, Internet infrastructure, business adoption and several other factors (see the methodology annex for further details).

This, in turn, has been analyzed by trade specialists at the U.S. Department of Commerce in light of their existing knowledge, expertise and extensive research into the markets profiled and, in some cases, feedback from U.S. Department of Commerce Global Markets staff located in the countries profiled on this report. The results are a subjective but well-reasoned ranking for top export markets, as well as nine country reports (Australia, Brazil, Canada, China, Germany, India, Japan, South Korea and the United Kingdom) that should be informative and instructive.

The nine markets chosen for the report were selected based on historic export data, market maturity and emerging market potential. According to data from the BEA, Europe and the Asia-Pacific region were the top two regional markets for U.S. exporters in 2014.

Figure 1: U.S. Computing Services Exports by Region (in USD Millions)
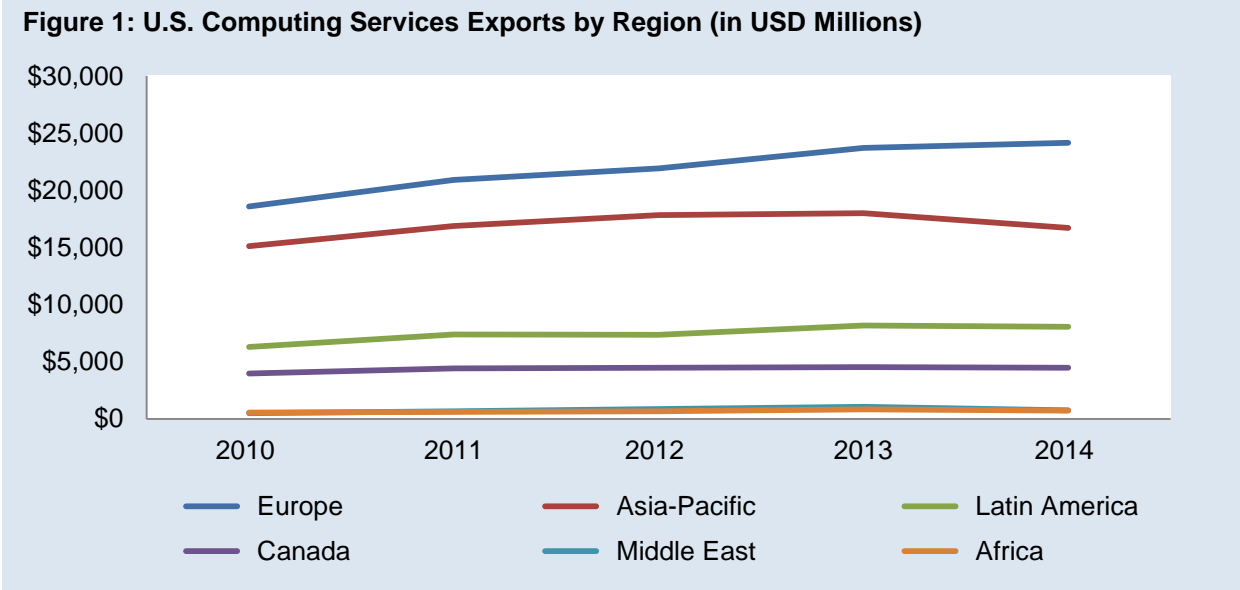
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Overview and Key Findings

Introduction

According to the U.S. Department of Commerce's National Institute of Standards and Technology, cloud computing is "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction".[1] Essentially, the cloud allows users to easily tap into applications, virtual environments, or more basic computing tools that may be supplied from technical and software infrastructures other than their own.

Three commonly used designations for deployment models are private, public, and hybrid cloud. In a private cloud environment, a client or its vendor manages a cloud infrastructure and makes a shared pool of technical resources available exclusively to the client's users. On the other end of the spectrum, a public cloud provider allows the general public to access and use services it offers from its own facilities, typically for a fee. A hybrid cloud environment is one which combines these elements.

Another way to categorize cloud computing is by the type of service provisioned. Note that the specific firms mentioned below may offer a range of services falling across multiple categories, and that many other cloud providers offer similar products.

Software-as-a-service (SaaS) enables a user to remotely access software applications from a cloud provider. The client may do so from different locations or devices, and the experience in this instance generally involves logging in and gaining access to some form of software interface. Prominent examples include Microsoft's Office 365 web-based e-mail and scheduling products, or Salesforce.com's customer relationship management offerings.

Users of platform-as-a-service (PaaS) solutions gain virtual access to programming resources and tools, provided and controlled by the cloud vendor that enables them to develop their own web applications. These applications are hosted through the vendor's cloud infrastructure. Google's App Engine and Red Hat's OpenShift are examples.

Finally, infrastructure-as-a-service (IaaS) enables users to virtually access more foundational computing resources to support their operations. Among other potential IaaS offerings, a vendor may provide file storage, processing power, or networking-related services. Some examples would be Amazon Web Services' Elastic Compute Cloud (EC2), VMware's vCloud Air, or IBM's SoftLayer.

As we did in the 2015 Cloud Computing report, this study provides a ranking for the top twenty cloud computing export markets for 2016. Issues including, but not limited to market environment, barriers, policies, regulations and competition are discussed in each country profile.

Key Findings: Top Markets and Methodology

From a general global industry standpoint, addressing concerns about data privacy while maintaining open, competitive and innovative digital markets continues to be a delicate matter. Government efforts to maintain national security and address data privacy issues for their citizens remain a central challenge for the industry. Technologically-speaking, the consolidation of SaaS continues to be successful, as do the increasing applications of IaaS and PaaS. Hybrid clouds also continue to do well with increasing market prevalence and utilization.

As a whole, the cloud computing industry continues to see healthy expansion as strong data reflects an increase in sales, adoption and business acceptance. Furthermore, according to Gartner, by 2020, a corporate "no-cloud" policy will be as rare as a "no-Internet" policy is today.[2]

Figure 2: Top Cloud Computing Export Markets (through 2016)

1. Canada
2. Japan
3. United Kingdom
4. Brazil
5. South Korea
6. Germany
7. Switzerland
8. India
9. Mexico
10. Australia
11. China
12. France
13. Netherlands
14. Italy
15. Sweden
16. Singapore
17. Spain
18. South Africa
19. Chile
20. Malaysia

Despite some potential market barriers encountered when entering international markets, U.S. companies are very well-positioned to continue being global market leaders and expand their market opportunities abroad.

According to the World Economic Forum's Global Information Technology Report (2015) (which includes a wide array of topics such as Internet penetration and cost, regulatory environment and laws relating to ICT, infrastructure and digital content and ICT use for business-to-business and business-to-consumer transactions), the top 20 countries in the Network Readiness Index are all high income advanced economies.[3] Even though some non-OECD countries are making significant advances regarding their ICT development efforts, most development, market opportunities and business needs are among the wealthiest and most technologically developed nations. However, some of the less advanced IT societies are increasing demand of cloud-based services, thus becoming significant markets for U.S. exporters.

The rankings in this Cloud Computing Top Markets Report were determined by analyzing the export data from the U.S. Bureau of Economic Analysis (BEA), various reports and statistics on factors deemed significant to cloud computing adoption, original research and input from the U.S. Department of Commerce staff stationed in the profiled countries.

The methodology followed in this report was the same as the one followed in the 2015 report. The predictions made in the 2015 report turned out to be quite accurate: Eighteen of the top markets predicted in the report remained in the top 20 ranking according to the latest 2014 BEA data.
For more information about the methodology followed for this report, please check the methodology appendix.

Industry Overview and Global Landscape

As in previous years, forecasts for global cloud adoption are bullish. For example, Forrester believes that businesses will spend about $191 billion on cloud services by 2020, compared to $72 billion in 2014.[4] This projection suggests that the future cloud market will be 20 percent larger than what had previously been forecasted by the firm, which reveals that the sector has entered a "hypergrowth" stage and is

displacing on-premise setups faster than expected. International Data Corporation (IDC) predicts the market in 2017 will be worth $107 billion, over twice as much as its 2013 estimate of $47.4 billion.[5]

A key trend shaping the cloud ecosystem over the next several years is the continued prominence and even quicker rise of SaaS, widely expected to show the strongest growth in both revenues and deployments. One prediction is that in 2016, worldwide SaaS revenues will total approximately $106 billion.[6] Other forecasts call on more than $132 billion in sales of SaaS by 2020, or a $50.8 billion revenue in 2018 from SaaS-based business applications alone.[7, 8] While dollar figures differ, usage projections are equally compelling.

In its "Predicts 2016: Cloud Computing to Drive Digital Business" report, Gartner provides several insightful, forward-looking key findings and strategic business assumptions: [9]

- The defensive stance that dominated the large software vendor strategies toward the cloud has been replaced in recent years with a cloud-first approach. By 2020, a corporate "no-cloud" policy will be as rare as a "no-Internet" policy is today.

- Hybrid will be the most common usage of the cloud, but it requires the public cloud to be part of the overall strategy.

- By 2020, more computing power will be sold and deployed by IaaS and PaaS cloud providers than by enterprise data centers.

- The IaaS computing market has been growing more than 40 percent in revenue per year since 2011 and is projected to continue to grow more than 25 percent per year through 2019.

- While some applications and data will remain locked on-premises in older technologies, more new solutions will be cloud-based, thus further increasing demand for integration infrastructure.

- By 2019, the majority of virtual machines will be delivered by IaaS providers. Revenue from computing IaaS and PaaS in 2016 will be only 13 percent less than the revenue for all servers worldwide. By 2020, the revenue for IaaS and PaaS will exceed $55 billion and likely surpass the

revenue for servers.

- By 2018, 50 percent of enterprises with more than 1,000 users will be using products provided by a cloud access security broker (CASB) to monitor and manage their use of SaaS and other forms of public cloud.

Although security concerns will probably continue pushing many towards hybrid cloud deployments, public cloud expenditure will still grow six times as quickly as overall IT spending over the 2013-18 timeline, more than double in value, reaching $127 billion by the end of this period.[10] Other estimates are even more optimistic, calling for $250 billion in public cloud spending by 2017, up from $158 billion in 2014.[11]

Possible explanations for this trend include the growing understanding that cloud vendors offer state-of-the-art security; the innovative security-related services actually being marketed by those vendors; a gathering boom in value-added offerings available through public clouds; the popularity of "cloud first" approaches in procurement ecosystems; and greater overall trust in public clouds.[12-14]

This does not preclude the continued popularity of hybrid approaches, which could be in use in 50 percent of businesses by 2017, especially given that security remains a paramount concern and the response is often to hold some data in-house.[15] It also does not mean that private clouds will become irrelevant in the next few years. There are at least two credible surveys pointing to their continued importance (although one case predicted a slight decline in usage and corresponding rise in public cloud utilization).[16, 17]

With time, maturity and familiarity, public cloud services are likely to become an even more important factor than they are today.[18] Indeed, public cloud is expected to constitute "more than half of worldwide software, server and storage spending growth," by 2018, according to IDC.[19] One prominent example of this trend is General Electric, a U.S.-based but global company that in 2014 rolled out over 90 percent of its applications in a public cloud environment.[20] In addition, greater public cloud adoption may spur wider SaaS usage, since SaaS will account for approximately 55 percent of all public cloud spending by 2018.[21]

Challenges, Barriers and Opportunities

U.S. companies are very well-positioned to continue in leadership positions within the cloud computing global market. Factors such as a very innovative and competitive domestic market, high levels of expertise and talent, name recognition and first-mover advantages provide a competitive advantage to U.S. companies expanding their operations abroad.

Leadership today, however, guarantees neither that U.S. cloud vendors will succeed in every global market they enter, nor that they will remain on top. Some foreign-based companies (e.g., Germany's SAP or Japan's Fujitsu) are strong global competitors, while others have solid or growing stakes in their home countries (e.g., Alibaba's Aliyun in China).

Competition is not the only challenge for U.S. companies. In some large markets, there has been discussion or enactment of regulatory measures that may impose disadvantages to foreign firms. In addition to general privacy considerations, many foreign buyers have expressed concerns about who might have access to their data. Following some surveillance disclosures in recent years, trust-related issues have increasingly caused hesitations amongst those considering purchasing of cloud services from U.S. vendors, especially those vendors who do not store data locally. Thus, some U.S. companies operating in foreign markets are storing data in-country due to strict data policies. Data localization requirements (i.e., requirements to store user data in domestic servers) increase costs and create servicing and technical inefficiencies, which adds complexity and financial stress for U.S. exporters.

The United States is in the process of negotiating and implementing several multi-national agreements that should alleviate some of the industry market barriers, as well as increase opportunities for U.S. companies.

The Trans-Pacific Partnership (TPP), a trade agreement signed among 12 countries within the Pacific Rim (including the United States and three countries profiled in this report – Australia, Canada and Japan), should provide a framework to further liberalize the digital economy moving forward.

The United States is also currently negotiating the Transatlantic Trade Investment and Partnership (TTIP) with the European Union and the Trade in Services

Agreement (TiSA) with 22 other parties from around the world. In both agreements, the United States seeks to further facilitate trade in the digital economy and promote global innovation and entrepreneurship.

In addition, the U.S. Department of Commerce reached agreement with the European Commission in February 2016 on the EU-U.S. Privacy Shield Framework, which will enable U.S.-based companies to meet EU data protection requirements when transferring personal information to the United States. The United States is working closely with European partners to help restore trust in transatlantic data transfers and provide needed certainty for U.S. companies.

Finally, the United States is promoting the expansion of the APEC Cross Border Privacy Rules (CBPR), a system that facilitates cross-border data flows by allowing companies to satisfy the requirements of multiple regulatory regimes under a single certification system. As the system continues to grow, it will reduce the administrative burden on cloud service providers that export to multiple APEC Economies.

Country Case Studies

The following pages include case studies that summarize export opportunities in selected markets. The overviews outline ITA's analysis of the U.S. export potential in each market. The markets represent a range of countries to illustrate a variety of points – and not the top markets overall.

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Australia

Australia presents attractive opportunities for cloud exporters, with an advanced and reliable ICT infrastructure, a free trade orientation and an affluent consumer base. Market surveys reveal that the Australian cloud services market has plenty of room to grow, since only a fraction of enterprises currently report paying for cloud services. U.S. companies may face some challenges doing business in Australia due to slower economic growth and a weakened currency. Yet Australia fundamentally remains a strong market for U.S. cloud services providers.

Overall Rank

10

Australia's trade friendly policy environment, developed infrastructure and affluent consumer base makes the country an attractive market for U.S. cloud exporters. Gartner estimates that cloud spending in Australia was $4.1 billion in 2015 and forecasts it will grow to $4.7 billion in 2016.[1] The country provides strong intellectual property protections, a solid legal framework for combatting cybercrime and a safe environment for data centers.[2,3] Current leaders in the Australian cloud services market include Equinix, Amazon Web Services, IBM and Microsoft.[4] Both the government and the private sector are potential cloud services buyers.

Australia's participation in trade agreements with digital trade components has helped ease access to the market for U.S. companies. While the Australia-United States Free Trade Agreement (AUSFTA) of 2005 does not directly address cloud computing services, it does guarantee nondiscriminatory treatment for digital products and electronic supply of services under the Electronic Commerce Chapter.[5] In June 2015, Australia announced its bid to join the World Trade Organization's Agreement on Government Procurement (GPA). If the government's bid is successful, Australia's accession will enshrine protections against policies that favor local cloud suppliers over foreign companies.[6] Australia is also a party to the Trans-Pacific Partnership (TPP), which concluded in October 2015. This agreement is the first of its kind to aggressively promote trade in the digital economy. The agreement will facilitate the free flow of data, protect copyrights and prohibit data localization.

Australia's developed ICT infrastructure is well-suited to cloud computing. Through the National

Broadband Network, the government is targeting 93 percent fiber broadband coverage in homes, schools and businesses by 2021. The remaining 7 percent are expected to be covered by next generation wireless and satellite.[7] Currently, fewer than 90 percent of the Australian population has Internet access.[8]

Despite the country's friendly policy environment and strong infrastructure, current economic conditions in Australia create challenges for U.S. exporters. Due to a drop in global commodity prices and to China's economic slowdown, Australian economic growth is expected to be slower over the next several years.[9] Between 2016 and 2019, the Australian economy is forecast to grow by 2.9 percent annually.[10] Australian unemployment is on the decline, at 5.8 percent as of November 2015, its lowest rate since May 2014, but still above its historical low of 4 percent in 2008.[11] For U.S. exporters, the weakening of the Australian dollar against the U.S. dollar has increased the price of U.S. goods and services relative to domestically-produced products, which may put American products and services at a disadvantage.[12]

Market surveys reveal that Australia offers extensive opportunities for growth in cloud services. An Australian Bureau of Statistics (ABS) study found that only 19 percent of Australian businesses use paid cloud services. Of the respondents who did not report paying for cloud services, 58 percent could not identify a specific reason that caused them to avoid using cloud services. Of those that did name a barrier, the top concerns were lack of information (23 percent), security concerns (16 percent), cost (11 percent) and uncertainty of the data's location (10 percent).[13] Of those respondents that reported using cloud services, 87 percent reported paying for

software and 57 percent reported paying for storage capacity. When asked to identify the benefits of cloud computing for their companies, 47 percent mentioned simplicity of deployment and 46 percent mentioned increased productivity, followed by reduction of IT costs (34 percent) and flexibility to upsize or downsize more easily (33 percent).[14]

To support Australia's burgeoning cloud services sector and promote the use of cloud services across public, private, and nonprofit organizations, the Australian Department of Communications and the Arts released a multisector cloud computing strategy in 2013.[15] One component of the strategy is a government wide "cloud first" policy. It was introduced to promote efficiency, save costs and improve customer service. Under the new policy, government entities must use cloud services when possible, unless they are unsuitable for the purpose, provide inadequate data protection, or are more costly than alternatives.[16] This push creates new opportunities for cloud exporters, since the Australian government's ICT budget for cloud services increased to $6 billion.[17]

On the whole, Australia's hospitable policy environment, mature infrastructure and affluence, along with its relatively low cloud services market saturation makes the market a prime export opportunity for U.S. cloud services providers. As the country's domestic and international broadband connectivity continues to improve and international agreements like the TPP and WTO Agreement on Government Procurement (GPA) come into effect, the Australian market is to become an even more attractive to exporters.

Guidance and Resources for Exporters

The following information is intended to provide guidance and resources for U.S. exporters looking to sell their services in Australia. The information was provided by U.S. Department of Commerce staff located in-country as well as by input from U.S. Department of Commerce industry specialists. As mentioned, the information is only intended to provide guidance and does not guarantee sales or success in the market.

- Usual buyers of cloud computing services in Australia might include: State and federal government, small and medium sized private companies and large private companies.

- Preferred business strategies to enter/expand in the market might include: Agreeing on distribution and setting up an office in country with local data centers.

- Common trade barriers to enter/expand in the market might include: Most multinational cloud vendors have set up their own data centers in Australia. It is a cost of doing business in the local market as many potential clients, especially federal government agencies, insist on their data remaining in Australia. Companies should expect some significant competition from local vendors that have already built a considerable market by having their own local data centers from the start.

- Recommendations to bid and navigate government procurement processes: In many cases, it is easier to bid with a local partner because they usually understand the bidding process.

- U.S. Department of Commerce Country Commercial Guide http://export.gov/ccg/australia090720.asp

- Australian Information Industry Association https://www.aiia.com.au/

- American Chamber of Commerce in Australia http://www.amcham.com.au/

- Government Procurement Information http://www.finance.gov.au/policy-guides-procurement/data-centres/data-centre-strategy/%E2%80%8B/

- Australian Department of the Communications and the Arts https://www.communications.gov.au/

- Trade Show http://connectexpo.com.au/index.html

Brazil

Brazilian has the largest computing services market in Latin America followed by Mexico, Chile and Argentina. As such, it has attracted the attention of vendors from across the world and become a very competitive environment. In seizing opportunities, vendors must contend with security concerns, connectivity shortfalls, high costs and a recessive economy throughout 2016. These make the Brazilian market a challenging, yet potentially rewarding one for companies with the resources and commitment to manage these issues.

Overall Rank

4

According to the consulting firm Frost and Sullivan, Brazil's cloud computing market revenue was $217 million in 2012 and it is expected to reach $1.1 billion by 2017.[1] This represents a five-year compounding annual growth rate of almost 40 percent. By 2017, the firm expects the SaaS market to lead at $584.3 million in spending, while IaaS and PaaS will be worth $489.9 million and $39 million, respectively.[2]

A survey conducted in 2014 by Capgemini found that nearly three out of four Brazilian IT decision-makers use a SaaS application for enterprise resource planning or customer relationship management.[3] Smaller but still-substantial numbers reported adopting IaaS (55 percent, largely for data backup purposes) and PaaS (39 percent); and the uptake rates of both (but especially IaaS) are expected to pick up in the next few years. Some of the key motivators cited by respondents include the desire to achieve cost savings, enable innovation and raise productivity.

The same Capgemini survey found that no single type of cloud computing deployment is significantly more popular. One in four respondents stated that they use public cloud services, one in six private, one in six hybrid and one in four indicated no preference. However, security-related concerns are expected to drive much greater adoption of private and hybrid cloud setups in the years to come, with a corresponding decrease in public cloud usage.[4]

Small and medium-sized enterprises (SMEs) will continue to command a large portion of cloud expenditures driving nearly half of Brazil's total, purchasing mostly SaaS, enterprise resource planning (ERP), customer relationship management (CRM) and supply chain solutions, among others.[5] Cloud provider SAP sees unlimited opportunities to conduct business with over one million existing Brazilian SMEs.[6] In fact,

SAP already attributed 68 percent of its Brazilian revenues to SMEs in 2014.[7]

According to IDC, in 2014 almost half of Latin America's IT investments were in Brazil.[8] Major U.S. providers such as Amazon, IBM, Microsoft, Oracle and Verizon maintain or have plans to introduce Brazil-based data centers to support their local cloud operations, while others like Dell, Google, Rackspace and Salesforce at least market their services in the country.[9-17] Other foreign providers like German cloud heavyweight SAP, the UK's BT Global Services and Japan's Fujitsu are also present.[18-20] Prominent domestic players include major firms Locaweb, Mandic, Totvs and UOLDIVEO.[21-24] A variety of telecommunications operators, such as Embratel and Telefonica's Vivo, offer cloud services too.[25] While it may be more difficult for these more recent entrants to wrestle IT spending from cloud-centric players, they have managed to craft credible offerings, according to Frost and Sullivan and likely have the financial resources to establish themselves in the sector.[26, 27]

Although prominent players do not always directly compete in the same segments or offer interchangeable services, they do have a significant market share and contribute to a very competitive environment that demands a serious commitment of time and resources.

The Brazilian market presents further significant challenges that should be taken into account. Chief among these, according to numerous industry watchers and market participants, may be concerns about the reliability and security of data stored in the cloud.[28-31] One major survey found that the possibility of a data breach and a more general lack of trust were barriers to cloud adoption (especially among those in the financial industry).[32] Though Capgemini, the

consultancy behind the survey, points out the situation may actually benefit U.S. cloud providers, who often bring to the table stronger security-related expertise and credentials. Other major factors cited by respondents included data sovereignty and cost.

A host of additional issues weigh on the overall development of the industry. The cost of energy, along with high equipment prices and taxes, make running a Brazilian data center relatively expensive.[33-35] The country's leading ICT trade group found that, at $61 million, setting up a local data center is about 42 percent more costly than in the United States.[36] Maintaining this operation requires approximately $100 million annually, more than double the amount in the U.S.[37] Given the competitive value of offering lower latencies and addressing data sovereignty concerns through a domestic data center, many well-resourced firms are likely to simply absorb these high costs.

Brazil also suffers from significant connectivity challenges. The cost of bandwidth is much higher than that in other countries with competitive cloud sectors and there are clear shortfalls in the reliable provision of service and in infrastructure, especially regarding the critical last-mile of delivery.[38, 39] Such factors sow doubt in the availability of data stored in the cloud, which requires a steady broadband connection to be fully fuctional.[40]

On a macroeconomic level, a potential contracting economy throughout 2016 and unfavorable exchange rates for U.S. exporters might contribute to the list of challenges posed by the Brazilian cloud computing market.

From a policy and regulatory standpoint, it is important to mention that in April 2014, Brazil's President, Dilma Rousseff, signed "Marco Civil Da Internet," a civil rights-based framework for the Internet. Dubbed the "Internet Constitution", the law seeks to reinforce the protection of fundamental freedoms in the digital age.[41] This law has been followed by two legislative projects that are being developed in a collaborative process that has invited public participation: a decree law to further implement the Marco Civil through regulations and a data protection law. Both legislative projects attempt to strike a balance between protecting individual freedoms and creating a stable and open commercial environment.[42]

In a highly publicized case in 2015, a judge invoked the Marco Civil to order ISPs to block access to the Internet application WhatsApp throughout Brazil in an effort to compel WhatsApp to cooperate with local police in an investigation. While the decision was reversed by an appellate court, it cast doubt on whether the Marco Civil will offer reliable protection to service providers and companies doing business in Brazil.[43]

Despite its challenges, Brazil's IT market, the seventh largest in the world, with a population of 200 million, and sustained increasing purchases of U.S. computing services, can be quite a lucrative one for U.S. companies ready to compete in the market.[44]

Guidance and Resources for Exporters

The following information is intended to provide guidance and resources for U.S. exporters looking to sell their services in Brazil. The information was provided by U.S. Department of Commerce staff located in-country as well as by input from U.S. Department of Commerce industry specialists. As mentioned, the information is only intended to serve as guidance and does not guarantee sales or success in the market.

- Usual buyers of cloud computing services in Brazil might include: SMEs and large companies.

- Preferred business strategies to enter/expand in the market might include: Distribution agreement.

- Common trade barriers to enter/expand in the market might include: There is still a cultural barrier when it comes to trusting the cloud. Due to the current economic crisis, Brazilian companies may decide to hold off investments on cloud computing. On the other hand, companies may decide to outsource cloud services to reduce costs and additional investments in infrastructure.

- Recommendations to bid and navigate government procurement processes: U.S. companies should work with a local partner to sell to government entities.

- American Chamber of Commerce in Brazil http://www.amcham.com.br/en

- The Brazilian-American Chamber of Commerce
  http://www.brazilcham.com/

- Brazilian Association of Software Companies
  http://www.abessoftware.com.br/

- U.S. Department of Commerce Country Commercial Guide

  http://www.export.gov/brazil/build/groups/public/@eg_br/documents/webcontent/eg_br_034878.pdf

- Trade Shows
  http://en.futurecom.com.br/
  http://www.the-eshow.com.br

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Canada

Canada, ranked number one in this report, presents a wide opportunity for various cloud-related services. A relatively easy market to enter makes Canada a good new-to-export destination, as well as one to further expand internationally. However, competition is quite fierce as multiple U.S. companies and other international leaders are already in operation there. U.S. companies venturing into the Canadian marketplace should have a good business strategy that differentiates them from the competition and targets a niche market.

Overall Rank

1

Canada was the top export market for U.S. computing services exports in 2014. According to the U.S. Bureau of Economic Analysis, U.S. companies exported $4.4 billion worth of cloud computing services to Canada in 2014.

According to IDC, public cloud infrastructure will increase by 45 percent in 2016.[1] Gartner estimates that Canadian public cloud services expenditures will grow from $5.4 billion in 2015 to $10 billion by 2019.[2]

Canada has one of the highest Internet penetration rates in the world with 93 percent of its population having access to the Internet.[3] In 2014, the average peak connection speed in Canada was 43 megabits per second, almost as fast as the U.S.' speed, 45 megabits per second.[4] However, Canada faces a challenge when it comes to getting fiber to some of the more remote locations within the country. Data centers in Canada tend to be located in urban centers, where fiber is more readily available.[5]

As the Canadian cloud computing market matures, some interesting phenomena are occurring. The market is quickly shifting from isolated infrastructure-based solutions for developing applications and content delivery, to platforms that integrate onsite, public and private IaaS.[6]

As a result of companies not wanting to directly manage their IT systems, there seems to be an increasing market for managed hybrid services. Over the past two years, market leaders have quickly extended beyond a singular public IaaS environment to a hybrid combination of an on-premise, third-party server support and private and public IaaS, PaaS and SaaS technologies.[7]

Despite its business attractiveness, one of Canada's most difficult market challenges to overcome is its competition. Companies such as IBM, Microsoft, AWS, Bell Canada, Long View, Telus, Cogeco, Internap, SherWeb, Rackforce and CenturyLink, among others, have already established operations in Canada.[8, 9]

Due to data security concerns and the preference from government and, allegedly, from consumers to keep data within Canadian territory, some U.S. companies have established data centers in-country. Microsoft recently announced plans to establish two data centers in Toronto and Quebec to provide cloud services to its customers. The data centers in Toronto and Quebec City will be the first Microsoft cloud locations in Canada.[10] Besides Microsoft, other market leaders such as IBM, SAP, Salesforce and Fujitsu also have data centers in Canada.[11, 12, 13]

Amazon Web Services recently announced that it will open a data center in Montreal in 2016 to store data within Canada.[14] This seems to be in response to concerns raised by Canadian consumers, especially from the health, finance and government sectors, who are asking the company to establish data centers in Canada. They believe this will allow easier compliance with some data localization aspects of Canada's data privacy law, the Personal Information Protection and Electronic Documents Act, or PIPEDA.[15]

PIPEDA sets out the ground rules for how private sector organizations collect, use or disclose personal information in the course of commercial activities across Canada. It also applies to personal information of employees of federally-regulated works, undertakings, or businesses (organizations

that are federally-regulated, such as banks, airlines and telecommunications companies).[16]

Some provinces have privacy legislation that has been deemed substantially similar to PIPEDA, which means that, in some cases, it is applied instead of PIPEDA. Alberta, British Columbia and Québec all have legislation that has been declared to be substantially similar to PIPEDA and will apply to private sector businesses that collect, use and disclose personal information while conducting business within those provinces. Ontario, New Brunswick and Newfoundland and Labrador each have privacy legislation that has been declared substantially similar to PIPEDA with respect to health information custodians.[17]

In 2015, the Canadian government passed the Digital Privacy Act, which resulted in a number of significant amendments to PIPEDA. Among these amendments is the allowance to disclose personal information without consent when the disclosure is in connection with business transactions. Another important amendment impedes PIPEDA from restricting the sharing of business contact information, including email addresses, which an organization collects, uses, or discloses solely for the purpose of communicating with a person in relation to their employment, business or profession.[18]

As a result of various terrorist acts taking place in Canada in 2013 and 2014, the Canadian Parliament passed the Anti-Terrorism Act in June 2015, also known as Bill C-51.[19] The bill has received some criticism from some Canadian ICT businesses due to its potential to alter business transactions and exchanges.[20] However, the recently elected government of Prime Minister Trudeau is currently in the process of amending the bill with potential impacts to business transactions; however, the outcome will not be clear until the bill gets amended.[21]

U.S. companies should understand the potential impacts of PIPEDA and Bill C-51 in regards to data localization and subsequent preferences for cloud services being hosted and managed within Canadian borders.

Notwithstanding competition and data privacy and security laws, the Canadian market presents a great opportunity for U.S. companies seeking to export for the first time or expand their operations into a

multibillion-dollar market. Furthermore, the Trans-Pacific Partnership (TPP) a trade agreement signed among 12 countries within the Pacific Rim (including the United States and Canada) should serve as a catalyzer to increase cloud computing business exchanges between the United States and Canada.

Guidance and Resources for Exporters

The following information is intended to provide guidance and resources for U.S. exporters looking to sell their services in Canada. The information was provided by U.S. Department of Commerce staff located in-country as well as by input from U.S. Department of Commerce industry specialists. As mentioned, the information is only intended to serve as guidance and does not guarantee sales or success in the market.

- Usual buyers of cloud computing services in Canada might include: SMEs and large private companies.

- Preferred business strategies to enter/expand in the market might include: Business partners and local representatives.

- Common trade barriers to enter/expand in the market might include: Many Canadian organizations are on the fence when it comes to adopting U.S. cloud technology due to fears that they could run into legal and data privacy issues when transferring data across borders.

- Recommendations to bid and navigate government procurement processes: Local representation is important when trying to attain government contracts. U.S. companies wishing to sell to the federal government will also have to be listed on a procurement vehicle in order to sell to the Government of Canada.

- American Chamber of Commerce in Canada http://www.amchamcanada.ca/

- The Canadian Chamber of Commerce http://www.chamber.ca/

- Government Procurement Information https://buyandsell.gc.ca/for-businesses/selling-to-the-government-of-canada

- Trade Show: http://www.itechconference.ca/

- U.S. Department of Commerce Country Commercial Guide http://apps.export.gov/article?id=Canada-

Information-and-Communications-Technology

- Conference and Exhibition: http://www.gtec.ca/

- Information Technology Association of Canada http://itac.ca/

China

A complex and difficult regulatory environment and local competition makes China a challenging market. Entering or expanding into the Chinese market requires the capacity to navigate regulatory barriers and effectively manage an array of additional administrative, technical and operational costs. The Chinese market can be a lucrative one for U.S. companies with the in-country expertise, resources and commitment to tackle the market.

Overall Rank

11

The cloud computing market is still relatively nascent in China. According to Bain & Company, China's cloud computing market was worth $1.5 billion in 2013. However, that figure is expected to go up to $20 billion by 2020, a compound annual growth rate of approximately 40 percent.[1]

China's state-owned telecom companies plan to invest about $180 billion from 2015 to 2017 in fixed-line and wireless connectivity. The government views cloud computing as a strategic priority and included it in the nation's 12th Five-Year Plan. The Ministry of Industry and Information Technology and the National Development and Reform Commission (NDRC) subsequently launched pilot cloud schemes in five cities: Beijing, Shanghai, Shenzhen, Hangzhou and Wuxi. China's development blueprint for the next five years, the 13th Five-Year Plan (2016 – 2020), will likely reaffirm the strategic priority of cloud computing, with the NDRC planning continued investment through 2020.[2]

According to IDC estimates, nearly 500 million smartphones were projected to sell in China in 2015, three times the sales in the United States and about one third of global sales. More than 680 million people in China will be online, or 2.5 times the number in the United States. These numbers are expected to grow further, helped by its national initiative, The Broadband China Project, intended to give 95 percent of the country's urban population access to high-speed broadband networks.[3] Furthermore, China's State Council has unveiled plans to invest $22 billion in expanding broadband network infrastructure in underserved areas of the country by 2020. Through this investment, 30 million households will have improved Internet access, including some 50,000 villages currently without broadband access.[4] In total, China's expenses on

information and communication technologies will be more than $465 billion in 2015.[5]

Tencent, a Chinese Internet company, announced in 2015 that it will invest $1.5 billion over the next five years in its cloud computing business, including the construction and operation of data centers in China and Hong Kong.[6, 7] The Alibaba Group announced a $1 billion investment into Aliyun, its cloud computing unit, which has data centers in China and Hong Kong.[8]

Despite the positive industry events mentioned above, U.S. firms face some considerable challenges when entering the Chinese market, with China's regulatory environment being perhaps the biggest obstacle. For example, foreign cloud providers are required to partner with local companies to serve customers, which raises questions about how much control foreign providers will ultimately have over their partnerships and joint ventures given that their Chinese partners may fully manage daily operations.[9] Moreover, certain regulatory requirements impact the hardware and software that may be used in offering cloud services, necessitate that extra care be taken to avoid hosting certain content and create uncertainty about some industries' ability to contract with foreign cloud providers.[10]

A 2015 policy document written by the American Chamber of Commerce in China highlighted a series of information security policy initiatives that could potentially restrict the flow of foreign goods and services in the ICT sector.[11] Some examples include a law preventing data from being removed from China if it is deemed to contain state secrets, a standard that prohibits the overseas transfer of data to an entity without express user consent or government permission and an antiterrorism law that requires

that companies hand over technical information and help with decryption efforts.[12-14] Another example includes a law that prohibits financial institutions from analyzing, processing, or storing offshore personal financial information of Chinese citizens. While China recently suspended rules that would have forced banks to turn over proprietary source code and encryption keys to the China Banking Regulatory Commission (CBRC), the CBRC has reached out to western technology companies to get opinions on a new version of the rules.[15, 16] Further restrictive policies include a law and standard that requires any credit information collected within the territory of China to be organized, stored and processed within China.[17]

Another significant regulatory issue includes a planned security rating system to be used in assessing the "trustworthiness" of cloud providers vying for public contracts.[18] Foreign firms are expected to be able to participate in the review process, though in doing so they may be required to turn over proprietary source code.[19] By 2020, the Chinese government may be aiming to remove foreign-made software and hardware from major segments of the economy, such as the military, banks, some government bureaus and the country's massive state-owned enterprises. Instead, the Chinese government prefers to have domestic suppliers provide software and hardware for these sectors.[20]

Mainland China's Internet download speeds also present challenges. The penetration of broadband access, which is critical to the meaningful use of cloud services, is only about 14 percent.[21, 22] In 2014, average peak connection speed in China was 16 megabits per second whereas in the United States the speed was 45 megabits per second, almost three times faster.[23] Chinese Internet-filtering systems contribute to this slowness and latency tests have confirmed the importance of having in-country technical infrastructure, although concerns also exist about China's electricity infrastructure and ability to dependably supply power to large data center operations.[24, 25] Fortunately, the deployment of LTE networks and other infrastructural upgrades should help ameliorate the barriers to cloud computing created by slow or unreliable networks.[26] Analysts predict that 4G LTE mobile networks will reach over half the Chinese population by 2016.[27]

Despite the challenges presented by the Chinese market, several large, well-resourced U.S. cloud providers have established operations in the market through joint partnerships with local companies. For example, Microsoft has partnered with 21Vianet, a Chinese data services firm, to roll out public cloud services.[28]

Other U.S. companies are also operating in China. Amazon is partnering with ChinaNetCenter to offer cloud services; IBM is teaming with 21Vianet to offer its hybrid cloud platform; and Oracle recently announced that it will add 260 employees in China.[29-31]

Local competition is another significant factor to take into consideration. Several Chinese companies are well-positioned in their domestic market. E-commerce giant Alibaba's Aliyun is already a notable competitor, servicing 1.4 million customers directly and indirectly.[32] China Mobile, China Unicom, China Telecom, Baidu, Tencent and ZTE among others, are also well-positioned in the market.[33, 34]

Although some point out that local players currently lack some of the larger U.S. firms' key advantages (e.g., scale, technical skill, name recognition, innovative services), there is no doubt that these gaps will close to varying degrees over the next several years.

Guidance and Resources for Exporters

The following information is intended to provide guidance and resources for U.S. exporters looking to sell their services in China. The information was provided by U.S. Department of Commerce staff located in-country as well as by input from U.S. Department of Commerce industry specialists. As mentioned, the information is only intended to serve as guidance and does not guarantee sales or success in the market.

- Usual buyers of cloud computing services in China might include: SMEs and large companies.

- Preferred business strategies to enter/expand in the market might include: Distribution agreements, joint ventures and establishing a subsidiary company in China.

- Common trade barriers to enter/expand in the market and suggested troubleshooting strategies

might include: Lack of effective IP protection can prove challenging. Chinese language skills are essential. Working with a Chinese distributor/reseller or setting up an office in China are good ways to enter and expand in the market.

- Recommendations to bid and navigate government procurement processes: Foreign suppliers usually work with Chinese system integrators (SI) or resellers to obtain government contracts.

- American Chamber of Commerce in China
  http://www.amchamchina.org/

- U.S. Department of Commerce Country Commercial Guide (page 76)
  http://export.gov/china/build/groups/public/@eg_cn/documents/webcontent/eg_cn_078667.pdf

- The American Chamber of Commerce in Shanghai
  http://www.amcham-shanghai.org/AmchamPortal/

- Trade Shows
  http://www.chinaexhibition.com/trade_events/list-0-212-0-ICT-%28Information_and_Communications%2C_Technology%29.html

  http://www.cloudchinaexpo.com/

  http://www.cloudconnectevent.cn/en/about-us/cloud-connect/

- U.S. Information Technology Office / Trade Association
  http://www.usito.org/about-us

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Germany

Although Germany is the 6th ranked market for cloud services, it has serious limitations for U.S. cloud providers. Aside from the established Internet and economic infrastructure, consumer and business demand for cloud services help make Germany a top 10 market for cloud services. While Germany offers great potential, there are limitations to market access, particularly among SMEs, for U.S. providers. Large U.S. vendors who are heavily involved in Germany have considered responding with EU or German only data centers, but that may not be an option for all interested players. Therefore, Germany will remain a challenging market until consumer confidence in U.S. providers improves.

Overall Rank

6

Research and Markets predicts a compound annual growth rate of Germany's cloud computing market of 32 percent between 2013 and 2018.[1] This places the German market among the global leaders in terms of growth potential for cloud services. The projected expansion is supported by a 2013 Experton Group study predicting an increase in cloud computing spending of nearly $17 billion between 2012 and 2017 – a rise from current levels of roughly $3 billion to nearly $20 billion in projected revenue.[2,3] Cloud services are expected to grow from almost $2 billion to nearly $12 billion and cloud integration and consulting from $550 million to almost $3 billion and cloud infrastructure technology from $1 billion to more than $5 billion by 2017.[4]

With a sophisticated economy, Germany's demand for cloud services is tied to advancing digitalization in all areas of personal life and business. Moreover, Germany's existing infrastructure and consumer base are driving demand for cloud services. A study in 2014 revealed that only 26 percent of German companies do not currently use or plan to use cloud services in their operations, which highlights the enormous market potential that Germany's private sector offers for cloud adoption and an expanding need for diverse cloud services.[5]

Germany's cloud computing market is attractive to domestic, regional and international cloud service providers. Furthermore, the country's status as a mature market means that domestic and foreign cloud providers alike benefit from a refined existing infrastructure.

Competition for IT budgets is particularly difficult among cloud vendors marketing to the German

Mittelstand (a term used to describe German SMEs), who usually prefer domestic providers.

Another challenge in the German market is the potential necessity to open a local office to conduct business. This is due to possible consumer concerns regarding cross border data transfers and security outside of Germany. Those without the ability to establish a local office should considering expansion in other Western European markets, such as the United Kingdom.

Further, Germany's government has encouraged and, arguably, effectively implemented an EU or German domestic data infrastructure – without the necessity of legislating it – by relying on pressure from German companies and consumers to store information on cloud servers located domestically. Further, Germany's "no spy decree" mandates that suppliers involved in public procurement must sign a declaration that no confidential information related to "security contracts" will be given to foreign authorities, despite any conflicting legal obligations.

A 2015 poll found that 57% of German companies preferred their data to be processed only in Germany.[6] The industry and public pressures that led to an increase in localized data creates challenges for cloud providers without the willingness or ability to store information within Germany, which is a particular concern for smaller vendors.

Consumer concerns over compliance by foreign vendors with EU and German laws and regulations are barriers to foreign cloud providers. As early as 2011, a senior Deutsche Telekom official argued on behalf of creating a German or EU cloud (i.e.,

Schengen cloud) to block access to local data by U.S. authorities. In October 2015, the European Court of Justice ruled that the European Commission made the wrong decision when it granted adequacy to the EU-U.S. Safe Harbor Framework, which had until then enabled and facilitated data flows between the United States and EU members like Germany.

In February 2016, the European Commission and the United States agreed on a new Framework for transatlantic data flows called the EU-U.S. Privacy Shield Framework. This new framework will re-enable digital flows between the United States and EU members, as well as improve commercial oversight and privacy protection.

While large U.S. providers have considered establishing or have established data centers in Germany to process EU or German data, it is not a viable option for all U.S. service providers and should not be encouraged as an alternative to the free flow of cross border data.[7]

A key challenge in reestablishing consumer confidence in the German market is ensuring a successful implementation of the EU-U.S. Privacy Shield Framework that assures German and U.S. businesses and consumers that the Framework provides an effective mechanism for digital transatlantic flows.

Guidance and Resources for Exporters

The following information is intended to provide guidance and resources for U.S. exporters looking to sell their services in Germany. The information was provided by U.S. Department of Commerce staff located in-country as well as by input from U.S. Department of Commerce industry specialists. As mentioned, the information is only intended to serve as guidance and does not guarantee sales or success in the market.

- Usual buyers of cloud computing services in Germany might include: SMEs and large companies and multinationals or subsidiaries of U.S. firms.

- Preferred business strategies to enter/expand in the market might include: Distribution agreements and opening an office in Germany.

- Common trade barriers to enter/expand in the market and suggested troubleshooting strategies might include: Opening an office is almost a requirement and in country personnel are needed to market services, support sales and establish relationships within the country. The service should be localized legally, linguistically, technically and through processes adaptations.

- Recommendations to bid and navigate government procurement processes: Win commercial contracts first. Build up trust and start with local government entities before moving to doing business with the federal government.

- Trade Show
  http://www.cebit.de/home#

- Conferences and Events
  http://www.world-of-cloud.de/
  http://lanyrd.com/topics/cloud/in/germany/

- Government Procurement Information
  http://ted.europa.eu/TED/main/HomePage.do

- American Chamber of Commerce in Germany
  http://www.amcham.de/

- U.S. Department of Commerce Country Commercial Guide
  http://www.export.gov/germany/MarketResearchonGermany/CountryCommercialGuide/LeadingSectorsforU.S.ExportandInvestment/eg_de_034863.asp#P336_21223

India

The cloud services market continues to rapidly grow in India, as cloud spending is anticipated to reach almost $2 billion by the end of the decade. In spite of infrastructure and security challenges, U.S. cloud services companies continue to see opportunities for growth in India, especially as the government invests in improved infrastructure and as internet access expands to more consumers through smartphones.

Overall Rank

8

Despite challenges with infrastructure, security and trade policy, India remains a top market for U.S. cloud services exporters due to its large number of consumers with Internet access. India boasts 250 million people with web connected devices, which generally rely on cloud services for applications and other functionality.[1] Both businesses and the government are buying and using cloud services. According to the research firm Gartner, public cloud services spending in 2015 was $731 million.[2] As Internet access, e-commerce, mobile device and application usage and business adoption continue to expand, the growth in cloud related spending in India should outpace that in the rest of the world and possibly reach $1.9 billion by 2019.[3, 4] Growth in 2015 was led by cloud management and security spending, SaaS and Iaas spending, which increased 37 percent, 33 percent and 25 percent over 2014, respectively.[5]

Besides deeper Internet penetration and smartphone adoption, a key component of these optimistic forecasts is widespread interest among business customers across several industries in all types of cloud-related services.[6] In a survey from 2015, sixty-one percent of Indian respondents reported using cloud services and 31 percent said they were not currently users but planned to be by the year's end.[7] Cloud vendors attempting to win a share of this spending have the opportunity to develop provisions that cater to the needs of a wide variety of industry segments, such as pharmaceuticals, healthcare, consumer goods and financial services.

U.S. cloud providers are clearly enthusiastic about the opportunities in India. Firms like IBM and Microsoft have committed to having or already have launched local data centers. Amazon recently

announced that it will build data centers in India by the end of 2016, saying that it expects India to grow to become a top market for Amazon Web Services.[8] These efforts are a way to improve technical performance and increase appeal to customers who are limited by regulatory restrictions on data location.[9-12]

Whether they have a physical presence or not, various cloud suppliers are today actively competing with each other for India's inflated cloud spending. The companies' strengths and areas of focus differ slightly, with Amazon Web Services' (AWS) adoption driven by business demand for public cloud services, Microsoft's growth propelled by SaaS offerings and IBM focusing on private cloud.[13, 14]

As seen in other markets, elements of cloud vendor competition exist, such as heavy advertising and aggressive price cuts by Amazon[15, 16] Google, Microsoft and IBM are also aggressively competing to attract startups through "cloud credit" programs.[17] As of 2015, Amazon had "tens of thousands" of customers in India, while Microsoft has said it is adding 2,000 new cloud customers per month.[18, 19] Other foreign companies with a presence in this fast growing and competitive market include HP, Red Hat, SAP and Oracle.[20]

Despite optimistic predictions and clear interest from global players, a variety of challenges have shown that India's cloud potential continues to persist. These have contributed to a situation in which, regardless of significant awareness, most large Indian enterprises host less than 15 percent of their ICT processes in the cloud.[21] For example, while analysts have long predicted a boom in the country's cloud market, in 2013, growth slowed likely due to a flagging currency (which effectively shrank budgets

for foreign ICT services) and pre-general election reluctance among government departments to make new ICT-related investments.[22]

A lingering problem is the country's insufficient Internet infrastructure (e.g., bandwidth constraints and fiber optic weaknesses) and the inconsistency of its power supply in some areas.[23] According to the United Nations, India meets the minimum Internet infrastructure standards necessary for only basic cloud services, with bottlenecks impacting download speeds, upload speeds and network latency.[24] Further, the World Economic Forum ranked India a dismal 113 out of 142 countries with the availability of international Internet bandwidth, a measure of the amount of Internet traffic that can be exchanged between countries.[25] Various other rankings and indicators focused on Internet penetration, cloud readiness and other factors confirm a sub optimal state of affairs. When combined with ongoing shortfalls in the steady electricity supply needed for data center operations, it is likely to continue to limit cloud growth.

Fortunately, the government is acutely aware of these challenges. India's ambitious Digital India program aims to address some of the weaknesses in its infrastructure, though it remains to be seen if this will lead to significant improvements.[26] Moreover, the interest expressed by major cloud providers in establishing Indian data centers suggests that their electrical infrastructure is either improving or they are becoming better at managing it. For example, some firms have implemented redundant power equipment setups and even rooftop solar panels to ensure an adequate supply of electricity.[27, 28] Another possible step to curb the challenges is placing data centers in areas with more consistent power capacity and better Internet infrastructure.[29]

Another key issue is concerned with security, especially around the use of foreign providers. While there is great interest in cloud based solutions, apprehensions remain about whether cloud services (and particularly public cloud) can ensure adequate protection of sensitive information.[30] Industry participants report that current adoption focuses on noncritical business workloads and SaaS applications, which are unlikely to host particularly sensitive data, although "people are not as hesitant as they used to be" when it comes to cloud deployments overall, according to one industry expert.[31] In some sectors with traditionally large IT

budgets (e.g., financial services and telecommunications), an especially strong emphasis on data security or regulations mandating domestic storage of customer data limits interest in cloud usage, especially with a foreign provider.[32]

India also presents an ambiguous policy setting for cloud services. Some elements of the environment remain undefined (e.g., India lacks a formal data breach notification rule), while others are clearly positive (e.g., there do not appear to be tariffs on software downloads) and some negative (e.g., government procurement, which though a major source of IT spending is reportedly a complex, multifarious process).[33, 34]

Citing the need to monitor domestic Internet traffic for national security reasons, concerns over foreign surveillance and a desire to ensure that data is subject to local laws, the Indian government has for years supported the idea of foreign firms storing data within the country.[35]

One clear example of the push for data localization is in the Department of Telecommunications' study from January 2015, "National Telecom M2M Roadmap" (referring to machine to machine data transmission of the sort expected to increase substantially as Internet-connected devices become more common).[36] The guidelines call for "all M2M gateways and application servers" used in providing services to individuals in India to be physically located within the country. Although, cloud vendors would not be the main focus of this provision, its inclusion points to the acceptance of data localization policies among some in the Indian government.

Leading up to general elections in 2014, Bharatiya Janata Party (BJP) members spoke out about the possible need to enact measures like these to ensure that Internet companies adhere to Indian laws and cultural expectations.[37] Further, Indian ISPs have cited privacy concerns in lobbying the government to require data localization.[38] With BJP's electoral victory, it seems likely that additional rules may be introduced. These measures would address policies on domestic data routing proposed by India in other forums and with the Modi government's recent moves to exert greater control over online content.[39, 40, 41]

Resources for Exporters

U.S. Department of commerce Country Commercial
Guide: http://export.gov/ccg/india090814.asp

Government Procurement Information
https://eprocure.gov.in/cppp/

Department of Electronics and Information
Technology: http://deity.gov.in//

Department of Telecommunications
http://www.dot.gov.in/

American Chamber of Commerce in India
http://amchamindia.com/

National Association of Software and Services
Companies: http://www.nasscom.in/

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Japan

Japan is ranked 2nd among the top markets for global cloud services. The country boasts one of the most consistent and developed markets for cloud services, while still maintaining substantial growth potential for U.S. cloud providers. Despite an established market of local competitors, Japan has no current trade barriers that offer preference to domestic cloud providers. Furthermore, Japan's commitment to universal broadband access for all households presents a uniquely connected market with almost complete participation in ICT service needs. However, future privacy and data protection laws in the country should be observed with caution and attention.

Overall Rank

2

Japan has consistently been one of the top markets for growth in ICT and cloud services. Gartner predicts that by 2018, the Asia Pacific and Japan (APJ) region will account for $11.5 billion in total cloud services spending. As the leading cloud market in the APJ region, Japan is poised for continued growth through 2018.[1] The Asia Cloud Computing Association (ACCA) selected Japan as the top cloud market for the third consecutive year in their Cloud Readiness Index.[2] In addition, the ACCA ranked Japan as the best country for SME cloud investment.[3] Japan ranks among the top Asian markets for almost all categories used in the rankings, including broadband quality and intellectual property protections.[4]

Analysts project that from 2013 to 2018, the cloud computing market will grow at a 9.7 percent annual rate.[5] The increasing adoption of cloud services by Japanese small and medium-sized enterprises drives up this estimate.[6] Expansion in Japan's cloud services market is the product of direct private and public investment in ICT infrastructure and a commitment to cloud services by the government. To date, Japan has developed a regulatory environment that preserves free flow of data while protecting privacy. As well as joining the APEC Cross-Border Privacy Rules (CBPR) framework, Japan has existing comprehensive intellectual property (IP) and cybercrime laws, which protect IP stored on clouds from theft and offers recourse in case of breaches.[7] The implementation of the Trans-Pacific Partnership (TPP) and its requirements for open data flows will further lower trade barriers in Japan and among signatories throughout the region.

Government regulations are just one of the means by which authorities have stimulated cloud services

growth. Since 2009, Japan's government has strengthened cloud infrastructure through the "Digital Japan Creation Project" with annual rollouts of new government-led cloud services in 2015.[8] The project, "Kasumigaseki Cloud," supports all government ICT systems and has played a prominent role in growing Japan's cloud market. This cloud has enabled public and private sector collaboration on processing government documents and included increased online applications to encourage public use of mobile devices to access government functions.[9] Moreover, Japan's government has committed to ensuring all households have "very high speed" fiber broadband connections, bringing the potential benefits of cloud services to every household in the country.[10] While the "Kasumigaseki Cloud" program and nationwide broadband initiative continue, Japan can safely expect to find new ways to use government investments to introduce cloud adoption to the general public.

Corporate investors from the United States have been helpful in stimulating Japan's cloud related infrastructure. For example, in August 2014, Google announced a partnership with five Asian ICT companies to construct a new fiber optic cable system connecting the United States with two Japanese cities, Chikura and Shima.[11] Google's investment is meant to spur user growth for the Google Cloud Platform. The project is expected to be completed by the second quarter of 2016.

As identified by industry watchers, five out of six key vendors of cloud services in Japan are U.S. companies – Amazon Web Services, Google, IBM, Microsoft and Salesforce.[12] American companies have had strong historic success in the Japanese ICT market, particularly with recent cloud investments. There are

no significant trade barriers that favor domestic cloud providers over foreign ones, making Japan a strong market for foreign involvement. In addition, in 2016, Japanese regulators will require the electronic submission of any data from any scientific or health care clinical trials. This is a key market for U.S. cloud providers like Medidata and could offer opportunities for other vendors as well.[13]

However, it should be noted that competition in Japan's cloud computing market is intense. Japan has strong domestic cloud firms and the country has seen increased participation by Chinese ICT companies. Therefore, U.S. companies should expect to enter a market with high competition from foreign and local players. In 2015, leading Japanese ICT company Fujitsu announced expansion plans for its existing data centers to meet an increased demand related to Internet of Things services.[14] This announcement was an extension of the company's plan to invest $2 billion between 2014 and 2017 to capture an increased market share in cloud computing.[15]

Intense competition is not the only challenge in Japan for cloud providers. In late 2015, Japan's Diet passed amendments to the nation's privacy law restricting the cross-border transfer of personal data in the name of increased privacy and data protection. Hopefully, Japan's participation in the APEC Cross Border Privacy Rules (CBPR) system will help address these restrictions because implementing regulations will recognize CBPRs as a valid mechanism for cross-border data transfers.

In addition to the changes in Japan's regulatory framework, there are economic concerns of which cloud vendors should remain mindful. In 2015, Microsoft announced a drop in profits due to earning shortfalls in Japan and China.[16] Also, new projections show corporate revenues declining in Japan due to faltering economic conditions attributable to decreased consumer spending. In turn, the spending decline in Japan is due to an increased local sales tax. This chain of events has, in the Microsoft example, already impacted earnings and could potentially limit the market for U.S. cloud providers.[17]

Ultimately, Japan offers substantial opportunities for cloud services providers in 2016 and beyond. In spite of the proposed data privacy legislation and the economic climate that represent potential barriers, Japan is expected to remain one of the top markets for foreign cloud investment.

Guidance and Resources for Exporters

The following information is intended to provide guidance and resources for U.S. exporters looking to sell their services in Japan. The information was provided by U.S. Department of Commerce staff located in-country as well as by input from U.S. Department of Commerce industry specialists. As mentioned, the information is only intended to serve as guidance and does not guarantee sales or success in the market.

- Usual buyers of cloud computing services in Japan might include: Municipal, state and federal government, small, medium and large private companies.

- Preferred business strategies to enter/expand in the market might include: Distribution agreements, joint ventures and establishing a subsidiary company in Japan.

- Common trade barriers to enter/expand in the market and suggested troubleshooting strategies might include: Language barrier, working with a Japanese distributor or reseller is a good way to enter the market, setting up a sales office in Japan is a good expansion strategy.

- Recommendations to bid and navigate government procurement processes: Foreign suppliers usually work with Japanese system integrators (SI) or resellers. Government procurement opportunities are usually led by a Japanese partner that acts as the prime contractor to submit bids.

- Trade Shows
  http://www.ceatec.com/en/
  http://expo.nikkeibp.co.jp/cloud/kyushu/exhibition/

- U.S Department of Commerce Country Commercial Guide
  http://apps.export.gov/article?id=Japan-Cloud-Computing

- American Chamber of Commerce in Japan
  http://www.accj.or.jp/

- Japan Electronics and IT Industries Association
  http://www.accj.or.jp/

- Government Procurement Information https://www.jetro.go.jp/en/database/procurement/ https://www.jetro.go.jp/en/database/procurement/procurement.html

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South Korea

South Korea, ranking 5th in this report's analysis, is one of the most stable markets for cloud computing due to existing infrastructure and government financing for of ICT and cloud expansion. Foreign and U.S. providers have ample experience in the market and are still finding opportunities for growth, particularly in the private cloud sector. Operating in South Korea comes with certain regulatory challenges, particularly when dealing with public institutions. In addition, large U.S. and foreign providers already exist in the market and many Korean SMEs have established cloud enterprises. That said, the market is primed for ample growth and presents a strong and stable environment with a high demand for cloud services.

Overall Rank

5

South Korea has an advanced existing telecommunications infrastructure that has supported substantial growth in the ICT sector for years. The country has been a regional leader in both ICT and cloud computing and has the distinction of being one out of five mature markets in the Asia-Pacific and Japan (APJ) region, which includes Australia, Japan, New Zealand and Singapore. Even with an advanced ICT and cloud infrastructure, South Korea represents a top market for significant future growth. Research and Market analysts predict the South Korean cloud computing market will grow at a compound annual growth rate of 22 percent over the years 2013-2018.[1] One key motivator of the projected growth is expected substantial government investment in private cloud computing for government agencies.[2]

The South Korean government has or is expected to enter numerous public and private partnerships to expand cloud services regionally through data center development. Additionally, South Korea has existing universal broadband access, driving demand for investments that utilize the universal broadband to expand access to cloud services. South Korea is the global leader in broadband penetration, at 97 percent, and the leader in average peak connection speed, 20.5 megabits per second, according to Akamai Technologies in Q3 2015.[3, 4]

In its 2014 report on regional "Cloud Readiness," the Asia Cloud Computing Association indicated that South Korea has the sixth highest level of readiness among the 14 countries examined in the region. It ranks among the highest in broadband expansion, which is a key component of the cloud infrastructure. While South Korea tied India for the largest fall in the ranking (down four spots from second), the faults did not lay

in South Korea's cloud readiness. Rather, it was due more to gains in other countries.[5]

Along with the other mature markets in the APJ region, South Korea offers strong growth prospects for cloud services. Cloud management and security services, for example, were projected to grow nearly 30 percent in 2015 to $264.5 million in the APJ as a whole.[6] Gartner predicts that by 2018, total public cloud services spending in the APJ region will be $11.5 billion.[7] South Korea's commitment to investing in cloud services for government agencies sets the country as a leader in the APJ region for public cloud services spending.

Gartner offered an interesting sector outlook on the APJ cloud market, providing guidance for cloud sector investment through 2018.[8] The firm predicts that at 21.5 percent, SaaS will make up the largest sector share of the overall market, next PaaS will account for 3 percent, then cloud management/security services 4 percent, and IaaS 9.8 percent, with the remaining 52.5 percent attributed to the cloud advertising market.[9]

While overall the South Korean market is strong, there are issues for U.S. companies looking to enter the market. The most important challenge concerns security within the South Korea government and among the general population, which has been exacerbated by recent global breaches of information stored on clouds in numerous countries, including South Korea.[10] This psychological barrier to storing data in the cloud will be an ongoing issue for U.S. providers in South Korea. In addition, concerns over the hacking of information on public clouds have driven the South Korean market towards adopting

private clouds, which are considered to be more secure.

Also, in the wake of disclosures about surveillance activities, many South Koreans remain concerned about U.S. Government access to data stored by U.S. companies. Combined with consumer concerns over cloud security, psychological barriers appear to be the biggest inhibitor of access for cloud providers.

Another challenge is the potential for slower growth in the South Korean economy. While the ICT market is predicted to perform well, some sources project that the Korean economy will face a significant downturn in 2016.[11, 12]

U.S. companies are not alone in recognizing the market opportunities in South Korea. The country's SME market contains a substantial number of domestic cloud providers who benefit from government investments and incentives for local companies. The implicit challenges of entering a somewhat saturated market should not overshadow the growth potential. While South Korea's slip in the "cloud readiness" ratings referenced a potential weakening in cloud infrastructure compared to its Asian competitors, the government recently invested in an executive structure within the official bureaucracy to support ICT development. Specifically, in 2013, the Ministry of Science, ICT and Future Planning was created.[13] The budget increased more than $12 billion for this new ministry saw in 2014 and the aforementioned drop in regional competitiveness will probably spur greater investments in years to come. This is a development that should be carefully tracked.[14] Therefore, South Korea seems well adjusted to sustain its position as a cloud and technology leader in the Asia-Pacific region.

South Korea's historic strength in ICT infrastructure and cloud development in the Asia-Pacific region is leading to strong participation by U.S. companies, including numerous plans for the future. In 2015, for example, Microsoft released a predictive cloud service based on its Azure learning machine released in the United States in 2014.[15] The service differs from existing data mining, analysis and artificial intelligence as it is capable of making predictions based on data trends, which could increase the demand for cloud services in a number of fields.

Along with this release, Microsoft plans to invest $450 million over five years on a South Korean data center, as part of a predicted $5.2 billion investment in the country through expanded infrastructure projects and jobs.[16] In addition, Cisco committed to expanding its Intercloud business to support the development of South Korea's Internet of Things (IoT) market. Cisco invested $2 billion in the Intercloud (the so-called "cloud of clouds") in 2014 and is expected to make further expansion a priority. The Intercloud system involves a global interconnection of public, private and hybrid clouds for processing and contributing to the growth of the IoT industry. Lastly, Google is expected to set up a campus in Seoul, South Korea, to expand the company's presence in the country.[17] While impressive, these are only a few of the major cloud investments U.S. companies are making in South Korea.

South Korea represents a historically strong market for cloud services, despite existing market competition and the presence of established providers. Demand, which derives from local and national infrastructure investments, is still projected to remain strong for capable U.S. vendors. South Korea should be a top market considering the growth potential for cloud services in 2016.

Guidance and Resources for Exporters

The following information is intended to provide guidance and resources for U.S. exporters looking to sell their services in South Korea. The information was provided by U.S. Department of Commerce staff located in-country as well as by input from U.S. Department of Commerce industry specialists. As mentioned, the information is only intended to serve as guidance and does not guarantee sales or success in the market.

- Preferred business strategies to enter/expand in the market might include: Joint venture.

- Common trade barriers to enter/expand in the market might include: There are certain business sectors that U.S. service providers have difficulty entering (due to data privacy issues) such as finance, education and health care.

- Recommendations to bid and navigate government procurement processes: To obtain contracts or navigate procurement processes U.S. firms should partner with Korean companies.

- American Chamber of Commerce in South Korea: http://www.amchamkorea.org/

- U.S. Department of Commerce Country Commercial Guide http://www.export.gov/ccg/korea090824.asp

- Industry Association https://eng.sw.or.kr/main/index.html

- Trade Shows http://worlditshow.co.kr/wp2/eng/ http://www.kitas.kr/new2/eng/info/info1.php

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United Kingdom

The United Kingdom is an important market for U.S. cloud vendors because of its developed economy, established base of business customers who understand the cloud value proposition and the lack of infrastructural hurdles present in other countries. However, UK-based users harbor some deep security concerns and this has a clear impact on how cloud services are adopted and deployed.

Overall Rank

3

With an advanced economy and mature IT market, the United Kingdom has been a notable destination for cloud services. National, regional and local governments, as well as private companies are major buyers of cloud services. While there are few estimates of the overall size of the UK cloud sector, credible research indicates that its 2014 value may have been around $9.5 billion.[1] Separate sources posit that SMEs contributed $3.2 billion in cloud related spending in 2014.[2]

Most market intelligence about enterprise cloud adoption in the United Kingdom comes from industry surveys. In one survey, eighty-four percent of UK firms said they use at least one cloud-based service in 2015, which is up six percent from 2014.[3] The cloud trade association, who created the poll, found that overall cloud adoption had increased by six percent between 2014 and 2015 and jumped an impressive 75 percent since 2010.[4] Large companies are adopting cloud technology more quickly than smaller firms (those with less than 200 employees), with uptake rates around 96 percent and 76 percent, respectively. IaaS has generated particular interest among IT decision makers, particularly in SMEs, which have reportedly helped drive the value of this cloud segment to at least $1.2 billion.[5, 6]

Government cloud spending is expected to grow quickly as the public sector is seeking to catch up with private sector cloud adoption. The UK government's G-Cloud frameworks allow the government to buy directly from suppliers after reaching an agreement on basic terms of use. This saves government officials and companies the cost of individual procurement contracts, although a "call-off contract" is still required for every procurement deal and the government ensures the value of each sale is publically available.[7]

It is clear from the above statistics and by at least two major U.S. cloud vendors' recent commitments to local data centers that the United Kingdom is an important destination for cloud providers.[8, 9] Most major U.S. providers offer services in this competitive market and are well represented in key UK industry groups.[10, 11] However, as is true elsewhere, concerns about data protection and security, as well as regulatory compliance make UK clients wary of handing over control of their data. When asked about these two issues, five out of six business decision makers believed that these issues are at least partially slowing cloud uptake .[12] Additional polls have found the related data sovereignty and privacy worries paramount.[13]

Such results have extremely significant implications for cloud uptake. "Data location, security and privacy risks" were the concerns most prominently cited by UK-based respondents to a recent KPMG survey, with legal compliance and doubts about integration with existing technology infrastructure emerging as secondary challenges.[14] According to KPMG, the result is that seven out of 10 UK firms allocate no more than one tenth of their technology budgets to cloud solutions. This figure offers a sober assessment of the impact of these misgivings on adoption.

Due to concerns about the viability of transatlantic data transfers, some U.S. companies have built or are considering establishing data centers in the United Kingdom and other European countries.[15] However, this alternative is not viable for many U.S. companies, especially SMEs. The U.S. Government is working with its counterparts in the European Commission to successfully implement the EU-U.S. Privacy Shield Framework for transatlantic data transfers in order to provide certainty for U.S. cloud service companies conducting business in the United Kingdom.

In other instances, firms of all sizes cited budgetary constraints (which have a greater impact on public sector and smaller organizations), investments in legacy IT and integration between existing and new cloud systems as stumbling blocks.[16]

Additional challenges holding back adoption include supplier reliability questions, fears (particularly among smaller companies) of vendor lock-in and reluctance to depend on an Internet connection for access to company data.[17-19] There is also a general preference for this data to be physically stored in the United Kingdom or at least in Europe, especially among public sector and smaller clients.[20] This confluence of factors has led many British business decision makers, approximately 30 percent according to one survey, to assert that they will never shift their data to the cloud, even if plurality still indicates plans to do so.[21]

Such fears are especially low in highly regulated sectors such as financial services and healthcare, two industries where UK cloud growth has been slower.[22] Sluggish cloud adoption in these sectors has been seen across Western Europe for similar reasons.[23] At least for British accounting firms, recent polls suggest that uptake may be slowly, but surely expanding.[24]

Given these concerns, it is understandable that the hybrid approach, in which both public and private cloud services are utilized by the same company, is the preferred method of deployment for as much as 89 percent of UK IT decision makers.[25] Across a wide range of cloud based solutions, including e-mail, payroll and sales management, the industry group Cloud Industry Forum (CIF) found that strong pluralities prefer on-premise options due to security, data protection and various other considerations.[26] This preference seems especially strong for accounting related applications, data storage and backup and online commerce-related functions, among several others.

Although the hybrid approach is well entrenched and unlikely to be supplanted anytime soon, nearly half of the respondents to CIF's annual survey indicated that they are open to eventually shifting to rely on off site cloud services. Furthermore, hybrid deployments may increase familiarity and comfort within cloud technologies, driving greater adoption in the future.

Guidance and Resources for Exporters

The following information is intended to provide guidance and resources for U.S. exporters looking to sell their services in the UK. The information was provided by U.S. Department of Commerce staff located in-country as well as by input from U.S. Department of Commerce industry specialists. As mentioned, the information is only intended to serve as guidance and does not guarantee sales or success in the market.

- Usual buyers of cloud computing services in the United Kingdom might include: Municipal, state and federal government and large private companies.

- Preferred business strategies to enter/expand in the market might include: Check the government's G-Cloud procurement initiative (more information below).

- Common trade barriers to enter/expand in the market might include: Small companies are slow to move to the cloud.

- Recommendations to bid and navigate government procurement processes: The British Government has set up G-Cloud frameworks, which are agreements between the government and suppliers. The basic terms of use are agreed by both parties following a formal Official Journal of the European Union (OJEU) procurement process. This saves public sector organizations and suppliers the time and cost traditionally associated with individual procurement contracts, as they can buy directly from companies approved onto the frameworks.

- U.S. Department of Commerce Country Commercial Guide
  http://export.gov/ccg/unitedkingdom090963.asp

- Government Procurement Information
  https://www.digitalmarketplace.service.gov.uk/g-cloud/framework

- Trade Show: http://www.itshowcase.co.uk/

- Cloud Industry Forum
  https://www.cloudindustryforum.org/

- American Chamber Commerce in the EU
  http://www.amchameu.eu/

- Industry Associations
  http://www.ukita.co.uk/cloud

- http://www.eurocloud.org.uk/

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Addendum: Resources for U.S. Exporters

The U.S. Government has numerous resources available to help U.S. exporters: from additional market research, to guides to export financing, to overseas trade missions, to staff around the country and the world. A few key resources are highlighted below. For additional information about services from the International Trade Administration (ITA), please visit www.export.gov.

Country Commercial Guides
http://export.gov/ccg/
Written by U.S. Embassy trade experts worldwide, the *Country Commercial Guides* provide an excellent starting point for what you need to know about exporting and doing business in a foreign market. The reports include sections addressing: market overview, challenges, opportunities, and entry strategies; political environment; selling U.S. products and services; trade regulations, customs, and standards; and much more.

Basic Guide to Exporting
http://export.gov/basicguide/
A Basic Guide to Exporting addresses virtually every issue a company looking to export might face. Numerous sections, charts, lists and definitions throughout the book's 19 chapters provide in-depth information and solid advice about the key activities and issues relevant to any prospective exporter.

Trade Finance Guide: A Quick Reference for U.S. Exporters
http://www.export.gov/tradefinanceguide/index.asp
Trade Finance Guide: A Quick Reference for U.S. Exporters is designed to help U.S. companies, especially small and medium-sized enterprises, learn the basics of trade finance so that they can turn their export opportunities into actual sales and achieve the ultimate goal of getting paid on time for those sales. Concise, two-page chapters offer the basics of numerous financing techniques, from open accounts to forfaiting and government assisted foreign-buyer financing.

Trade Missions
http://www.export.gov/trademissions/
Department of Commerce trade missions are overseas programs for U.S. firms that wish to explore and pursue export opportunities by meeting directly with potential clients in local markets.

Trade missions include, among other activities, one-on-one meetings with foreign industry executives and government officials that are pre-screened to match specific business objectives.

Certified Trade Fairs
http://www.export.gov/eac/show_short_trade_events.asp?CountryName=null&StateName=null&IndustryName=null&TypeName=International%20Trade%20Fair&StartDate=null&EndDate=null
The Department of Commerce's trade fair certification program endorses overseas trade shows that are reliable venues and good markets for U.S. firms to sell their products and services abroad. These shows serve as vital access vehicles for U.S. firms to enter and expand into foreign markets. The certified show/U.S. pavilion ensures a high-quality, multi-faceted opportunity for American companies to successfully market overseas. Among other benefits, certified trade fairs provide U.S. exhibitors with help facilitating contacts, market information, counseling and other services to enhance their marketing efforts.

International Buyer Program
http://export.gov/ibp/
The International Buyer Program (IBP) brings thousands of international buyers to the United States for business-to-business matchmaking with U.S. firms exhibiting at major industry trade shows. Every year, the International Buyer Program results in millions of dollars in new business for U.S. companies by bringing pre-screened international buyers, representatives and distributors to selected shows. U.S. country and industry experts are on site at IBP shows to provide hands-on export counseling, market analysis, and matchmaking services. Each IBP show also has an International Business Center where U.S. companies can meet privately with prospective international buyers, prospective sales representatives, and business partners and obtain assistance from experienced ITA staff.

The Advocacy Center

The Advocacy Center coordinates U.S. government interagency advocacy efforts on behalf of U.S. exporters that are bidding on public-sector contracts with overseas governments and government agencies. The Advocacy Center helps to ensure that sales of U.S. products and services have the best possible chance competing abroad. Advocacy assistance is wide and varied but often involves companies that want the U.S. Government to communicate a message to foreign governments or government-owned corporations on behalf of their commercial interest, typically in a competitive bid contest.

U.S. Commercial Service

http://www.export.gov/usoffices/index.asp

With offices throughout the United States and in U.S. Embassies and consulates in nearly 80 countries, the U.S. Commercial Service utilizes its global network of trade professionals to connect U.S. companies with international buyers worldwide. Whether looking to make their first export sale or expand to additional international markets, companies will find the expertise they need to tap into lucrative opportunities and increase their bottom line. This includes trade counseling, actionable market intelligence, business matchmaking, and commercial diplomacy.

Appendix 1: Methodology

The rankings in this report were determined by reviewing export data from the U.S. Bureau of Economic Analysis (BEA), various reports, statistics on factors deemed significant to cloud computing adoption, original research and in some cases input from U.S. Department of Commerce staff stationed in the relevant countries.

Consultation with a BEA staff member clarified that two of the three categories of export data likely to include cloud computing transactions were "telecommunications, computer and information services" and "charges for the use of intellectual property". To account for sales by foreign affiliates of U.S. companies, the "services supplied to foreign persons by U.S. multinational enterprises (MNEs) through their majority-owned foreign affiliates (MOFAs) by industry of affiliate and by country of affiliate" table was also considered.

The BEA data is credible and thorough but does not cover every potential market for U.S. cloud computing exports. It includes only 35 countries (13 in Asia-Pacific, 12 in Europe, one in North America, six in Latin America and other Western Hemisphere, two in the Middle East and one in Africa). While many major markets are represented, this is nevertheless a limiting factor. Further, although all of the profiled markets had complete data sets available for the first two categories mentioned above, foreign affiliate data was only available for 11 countries.

Another major input into the rankings was the existing body of reports relevant to cloud computing adoption in various countries. These covered a wide array of topics, such as digital international trade environment, e-trade and e-payments readiness, Internet penetration and traffic, regulatory environment and laws relating to ICT, Internet business ICT usage and its use for business-to-business transactions, cloud spending figures and overall network readiness. Some specific resources consulted were:

- The 2015 Global Information Technology Report from the World Economic Forum.
- The 2014 G20 E-Trade Readiness Index, from the Economist Intelligence Unit
- The 2014 Global Flows in a Digital Age Report from the McKinsey Global Institute
- The 2013 BSA Global Cloud Computing Scorecard: A Clear Path to Progress, from BSA | The Software Alliance
- Gartner's Public Cloud Services Spending Data by Country (2013-2019)

The two final inputs into the rankings were the original research conducted into the featured markets and comments submitted by in-country U.S. Department of Commerce specialists from several international markets.

Findings from these sources were analyzed and compared, which led to the creation of the ranking. As cloud computing is a fast-changing sector often characterized by a lack of publicly accessible market data and for which no single metric or even group of them can pinpoint future adoption with certainty, the ranking is a subjective one. However, it is based on extensive review of what data is available, numerous highly credible reports, information from commercial specialists on the ground and the subject matter expertise of the U.S. Department of Commerce's Office of Digital Services Industries. Therefore, while the rankings are unlikely to perfectly capture every facet of global markets, they should still be a useful reference tool for cloud computing professionals, industry watchers and researchers alike.

Appendix 2: Citations

Executive Summary and Overview and Key Findings
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