

# 6

*Chapter*

*First Draft*

## ECONOMIC DEVELOPMENT FOR THE INFORMATION SECTOR

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## **I. INTRODUCTION**

The Puerto Rico Planning Board (PRPB) retained the services of H. Calero Consulting Group, Inc. (HCCG) to prepare a Strategic Plan for the Information sector in Puerto Rico. This initiative intends to curb the economic slowdown in Puerto Rico that started in 2006 and turned into an economic recession with negative real GNP growth since 2007 to the present. This ongoing recession also impacted employment negatively and increased unemployment. Confronting this reality, the PRPB, the agency responsible for planning the economic development of PR, focused its efforts on preparing a multi-sector strategic plan for Puerto Rico. It states that the Vision and Mission of this PRPB Plan are:

**Vision:** In the period of 2020 to 2050, Puerto Rico is entrepreneurial, prosperous and dynamic.

**Mission:** Develop and adopt an Industrial Development Plan that is realistic, pragmatic, executable, and which enables monitoring the path forward in Puerto Rico.

Predicting the coming years is a daunting task but a challenge we must meet.

### **A. Objective**

The objective of the Plan for the Information Sector in Puerto Rico is to evaluate the sector, identify key variables, which can be used as a benchmark, prepare an analysis of strengths, weaknesses, opportunities, and threats (SWOT); define a Vision, Mission, goals, and objectives for the information sector and for selected subsectors; and finally, suggest strategies to achieve the objectives for the Information Sector and main subsectors.

### **B. Sources of Information**

HCCG used several information sources, among them, official GNP statistics published by the PRPB, employment statistics from the PR Department of Labor and Human Resources (DLHR), Employment statistics from the County Business Patterns of the US Census Bureau, PR demographics from the US Census Bureau, and several industry analysis published by Deloitte LLC, World Bank, Forrester, Forbes, Connect Puerto Rico, and The Silicon Valley Bank, among others. In addition, HCCG prepared and sent a questionnaire to key analysts in the information sector. (Appendix 1) The opinions of those who replied are presented in aggregate so as not to disclose the identity of respondents.

### **C. Organization**

This report is organized into six chapters. After the Introduction in Chapter I, there is an overview and assessment of the global information sector in Chapter II. Chapter III analyzes the information sector in Puerto Rico. Chapter IV considers the Strengths, Weaknesses, Opportunities, and Threats (SWOT) of the Information Sector. Chapter V uses the SWOT analysis to introduce the vision, mission, and objectives for the Information Sector and main subsectors. Chapter VI proposes strategies to reach the objectives of the information plan introduced in Chapter V. Finally, Chapter VII contains a summary of findings.

## **II. THE INFORMATION SECTOR AND OVERALL TRENDS**

### **A. Definition of the Information Sector**

The Information sector, as classified in the North American Industrial Code System, NAICS 51, comprises establishments engaged in the following processes: (a) producing and distributing information and cultural products, (b) providing the means to transmit or distribute these products as well as data or communications, and (c) processing data.

The main components of this sector are:

1. Publishing Industries (except Internet)
2. Motion Picture and Sound Recording Industries
3. Broadcasting (except Internet)
4. Telecommunications
5. "Internet Service Providers, Web Search Portals,
6. Other Information Services

The expressions "information age" and "global information economy" are often used today. In fact, it is said that the twenty-first century is the Information Century. The general idea of an "information economy" includes both the notion of industries primarily producing, processing, and distributing information, as well as the idea that every industry is using available information and information technology to reorganize and make themselves more productive.

The unique characteristics of information and cultural products, and of the processes involved in their production and distribution, distinguish the Information sector from the goods-producing and service-producing sectors. Some of these characteristics are:

1. Unlike traditional goods, "an information or cultural product," such as a newspaper on-line or television program, does not necessarily have tangible qualities, nor is it necessarily associated with a particular form. A movie can be shown at a movie theater, broadcast on television, through video-on-demand or rented at a local video store. A sound recording can be aired on radio, embedded in multimedia products, or sold at a record store.
2. Unlike traditional services, the delivery of these products does not require direct contact between the supplier and the consumer.
3. The value of these products to the consumer lies in their informational, educational, cultural, or entertainment content, not in the format in which they are distributed. Most of these products are protected from unlawful reproduction by copyright laws.
4. The intangible property aspect of information and cultural products makes the processes involved in their production and distribution very different from goods and services. Only those possessing the rights to these works are authorized to reproduce, alter, improve, and distribute them. Acquiring and using these rights often involves significant costs. In addition, technology is revolutionizing the distribution of these products. They can be distributed in a physical form, via broadcast, or on-line.
5. Distributors of information and cultural products can easily add value to the products they distribute. For instance, broadcasters add advertising not contained in the original product. Hence, and unlike traditional distributors, these broadcasters receive revenues not from the sale of the distributed products to the final consumer, but from those who pay for the privilege of adding information to the original product. Similarly, a directory and mailing list publisher can acquire the rights to thousands of previously published newspaper and periodical articles and add new value by providing search and software and organizing the information in a way that facilitates research and retrieval. These products often command a much higher price than the original information.

## **B. Overall Market Trends**

The economic importance of the information sector has increased radically with the spread of new communication technologies, most notably the Internet, and the development of a 'knowledge economy' in which value is generated through innovation in information and services. There is now a considerable body of academic and other literature supporting the view that the greater availability and accessibility of public sector information can boost innovation and facilitate economic growth. Several analysts (Vickery, 2011) have concluded, "knowledge is a source of competitive advantage in the "information economy", and, for this reason, it is economically important to monitor these global trends.

1. **Emerging technologies:** Technological innovation and Information Communication Technologies (ICTs) represent a way for developing world nations to foster economic development, improve levels of education and training, as well as address gender issues within society. (Chetty, 2013)
2. **Fast growing sector:** The Internet related businesses are still disrupting industries with new and high growth markets. Software/Website development has been benefiting the most from all of these developments.
3. **A new competitive advantage:** In a globalized world, capabilities to remain competitive require efficiency, investment, understanding a rapidly changing technology landscape, and analyzing tons of information on consumers and businesses with analytics.
4. **Mobility is the new standard:** Smart phone technology has increased the potential market sizes for all of these industries.
5. **Millennials are on the Go:** A generation of employees who were pampered and scheduled by their Baby Boomer parents has taken the workplace by storm. Millennials bring special challenges – employers are dealing with helping three generations of workers happily co-exist to serve customers as a team.
6. **The big blur:** Online all the time, and availability via technology, has blurred the line between work and home. Employees work at home in the evening on collaborative reports and email.

These trends impact every sector of the economy but this is especially relevant in the information sector, because the main input for businesses in this sector and its subsectors is the information. There are also major trends on subsectors:

### **Trends in Publishing**

1. Online services are becoming more important.
2. Profits are decreasing significantly even with online subscription services.
3. Growing E-books market. By 2015, it is expected that 20% to 25% of the book sales in the US will be on digital formats compared with 3% in 2010. (Béhar et al, 2011)
4. Live journalism through social media such as twitter.
5. “Data Journalism”, presenting news and information through use of data. (Grey, et al, 2014)
6. All of these point to a significant increase in Internet infrastructure.
7. While print advertising is declining, online advertising is growing fast. (Pew Research Center, 2013)
8. Blogs are cheap to maintain but investigative journalism has been cut because employers have to spend many thousands of dollars fighting off, not just a defamation suit, but demands by the courts that reporters reveal their sources “in the interests of justice”; or by proliferating crime commissions, anti-corruption agencies and intelligence organizations that do so in the name of national security. (Holmes, 2014)

### **Trends in Film Industry**

1. Big movies are getting bigger with 15 of the 50 highest grossing films released between 2011-2013.
2. This has also led to massive flops with 10 of the 50 largest box office bombs being released between 2011 and 2013.
3. Ticket sales have been stable but have decreased from their peak.

### **Trends in Broadcasting**

1. Similar to newspaper, online has provided new opportunities for growth. Tune in and other apps let you listen to local radio stations from around the world. SiriusXM - satellite radio allowing the listener to receive many stations after paying a subscription fee.
2. They face stiff competition from other services, such as, music streaming services like Pandora and Spotify.
3. Having a worldwide audience, access to mobile market are best bets.
4. Advertising is the main form of revenue for most stations with some going international and cutting ads by using subscriptions.



5. In 2012, digital news in US surpasses newspapers and radio. (Pew Research Center, 2013)
6. Streaming is becoming a massive market with Netflix, Youtube, Hulu, and HBOGo. In 2013, Netflix and YouTube accounted for 51% of download traffic on the Internet. (Reed, 2013)
7. Cable Companies continue to bundle many channels that users are not interested in. According to a report by Nielsen, US cable subscribers in 2013 got a record average of 189 channels in prepackaged bundles but watched only 17 of those channels. (Kang, 2014)
8. Young people are watching less television and more online services. (Marketing charts, 2014)
9. Massive budget TV shows have appeared in basic cable, i.e. Breaking bad and Mad Men on the American cable network AMC.
10. Online services have begun to roll out their own shows, such as, House of Cards and Orange is the New Black by Netflix.

### **Trends in Telecommunication**

1. Telecoms have been consolidating with mergers in both the US and Puerto Rico. Hence, there are few massive companies competing. As of 2013, AT&T and Verizon had 65% of the US mobile market. (Metzler, 2013)
2. Services include TV, Telephony, Internet, and mobile.
3. Mobile has been experiencing global growth. By 2013, 56% of the world population owned a smartphone compared with 35% in 2011. (Digitalbuzz, 2013)
4. Fixed line has remained faster and cheaper (charged monthly rather than by data) (Communications Authority, 2013)
5. Hot topic issue “Net Neutrality” is the principle that all Internet traffic should be treated equally. The idea is that a maximally useful public information network aspires to treat all content, sites, and platforms equally”. (Wu, 2008)
6. Netflix, Amazon, and Google use up large amounts through VOIP, Streaming, and other services.
7. Advanced markets in Asia and Europe are cheaper and faster than US.
8. There are worries regarding lack of competitive edge affecting other information technology sectors in US. There are cheaper broadband costs available in certain cities, at lower to mid download speeds, for example, San Francisco (\$99), New York (\$70) and Washington DC (\$68) dwarf London (\$38), Paris (\$35) and Seoul (\$15). (Geoghegan, 2013)

### **Software publishing / Data processing**

1. Huge area of growth in tech hubs in US, San Francisco, Boston, New York, Austin. Start-up activity increases 31% in 2013, reaches highest level since 2009. (Pedderson, 2014)
2. Mobile Apps and Internet sites are huge potential markets.
3. Increasing demand services provided through their smartphone or Internet browser.
4. Apps: The proliferation of smartphones has led to the creation of mobile software known as “apps”. Apps often take advantage of the many capabilities of smartphones such as: advanced computing power, camera, gyroscope, GPS sensors, and even other apps to provide some sort of service to the user. Apps have become extremely profitable and widespread with over 102 billion downloads in 2013 for global revenue of \$26 billion. By 2017, the number of downloads is forecasted to reach 76 billion. One of the reasons for the high value and growth in this market is the rapid global adoption rate of smartphones making it easier than ever for developers to gain customers. Pricing has also made downloading apps very easy with over 90% of apps being free to download relying on ads. Developing apps can also be very easy thanks to a wide array of developer tools, free resources, and even private app consultants that are available. Competition in this market is fierce. However, with so many free apps available, it is quite difficult to become successful in this market if one is a new entrant. Smaller entrants should focus on local markets.
5. Data processing has become a necessity for larger companies with massive amounts of data.

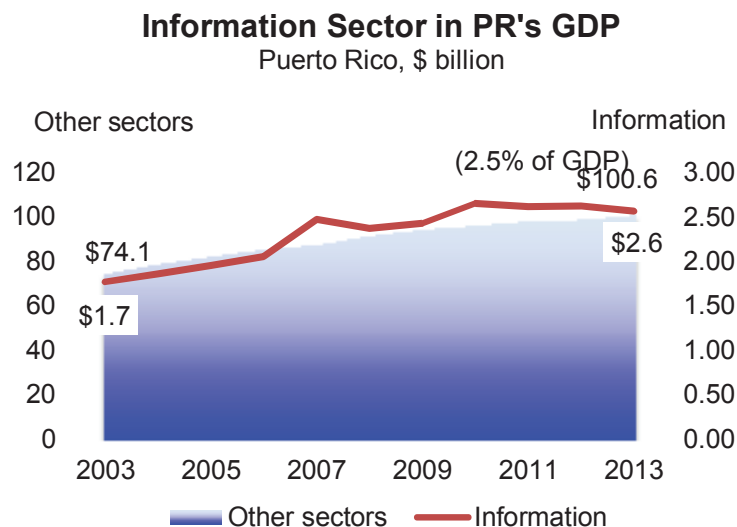
6. **Big Data:** Thanks to the proliferation of services across the Internet and the consolidation of the infrastructure utilized to house and process all these services, we have seen the rise of a new type of information service that relies on handling and processing massive amounts of data to create novel solutions. Although installing the infrastructure necessary to analyze these data sets is expensive, there are now many companies that will house and analyze the data once it is collected. Hence, small teams can work with large data for a lower price. Big data can revolutionize a wide range of industries including: Healthcare services, Retail, Agriculture, Transportation, Education, and Crime Prevention, among others. Retail firms that utilize big data rely on consumer information to make better decisions on how to better sell and present their products. By collecting genetic data, farms can predict which cows will produce more milk and which crops will have greater yields making it useful for breeding. For schools big data can help create better courses and tests by observing student performance over time and change programs to better suit their needs. The Panama Canal benefited from use of big data, collecting information from oil wells and shipbuilding to forecast traffic along the canal. Finally, in the area of Crime Prevention there are correctional facilities that rely on big data to guide on which prisoners to grant parole by comparing several indicators such as: level of education, severity of crime, and social circle within the facility. These are just some of the ways Big Data can be harnessed to improve the performance of these businesses or institutions. In order to develop and properly use this software one needs to be educated and trained in a wide variety of disciplines such as statistics, mathematics, and computer science. For Puerto Rico to be competitive on a global scale, it needs to start incorporating these systems alongside well-trained personnel or risk lagging behind early adopters.

We summarized the most critical trends affecting the information sector. Any effort or strategy recommended for this sector has to take into account its overall and specific trends. Analyzing the most important trends enables us to make well-informed predictions of what the future holds and to gauge which subsectors Puerto Rico should prioritize.

### III. PUERTO RICO'S INFORMATION SECTOR

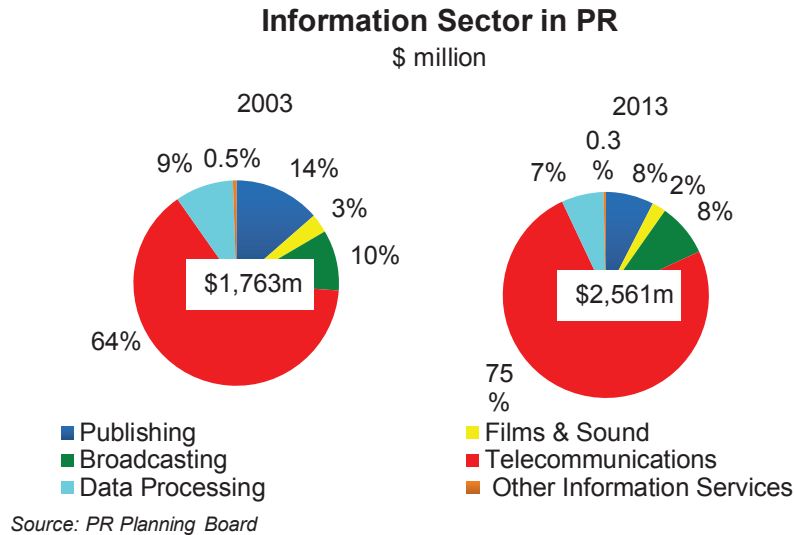
#### A. Overview of the Information Sector in PR's Economy

In 2013, the Information Sector in Puerto Rico amounted to \$2.6 billion or 2.5% of PR's Gross Domestic Product (GDP). The Telecommunications subsector is by far the largest within the Information Sector with \$1.8 billion or 70% of PR's information sector. In the past 10 years, the Information sector grew at an annual rate of 3.8%.

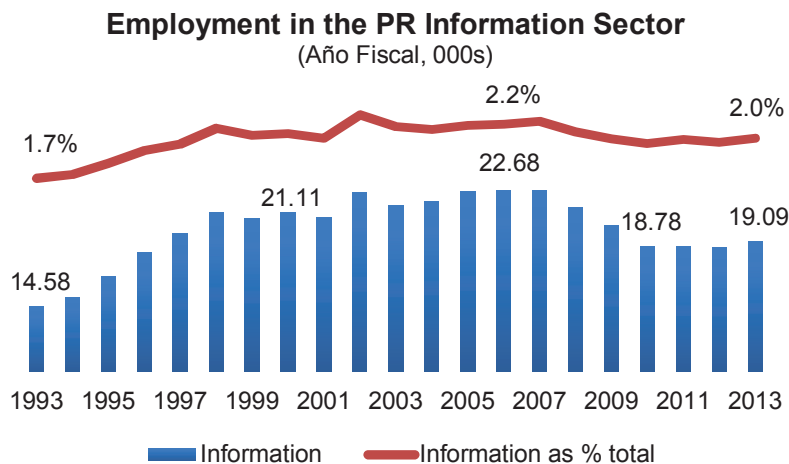


Source: PR Planning Board

Between 2003 and 2013, Telecom gained market share with 75% in 2013 compared to 64% in 2003. The remaining subsectors lost market share. Subsectors of Publishing dropped from 14% in 2003 to 8% in 2013 of the total information sector and Film & Sound declined to 2% in 2013, down from 3% in 2003. Radio, TV & Cable also fell, from 10% in 2003 to 8% in 2013. The subsectors Data Processing and Other services plunged from 9% to 7% and from 0.5% to 0.3%, respectively.



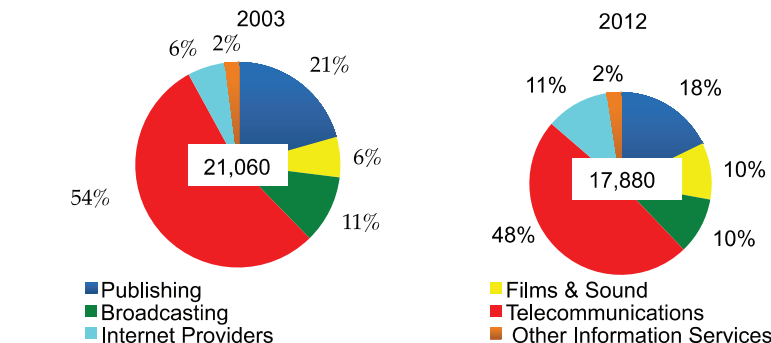
According to the Employment Establishment Survey from the DLHR, in the past 20 years, employment in the PR information sector exhibited two distinct periods. The expansion period took place from fiscal year 1993 thru 2006. During this period, employment in the information sector grew from 14,600 jobs or 1.7% of total employment in 1993 to 22,700 jobs or 2.2% of total jobs in 2006. The contraction period started in 2007 and has continued to the present, in tandem with the ongoing recession. Information jobs fell to 18,739 in 2011 and to 19,100 jobs or 2% of total employment in fiscal 2013.



The DLHR does not provide employment statistics by subsector (NAICS codes with three or more digits) for Puerto Rico. Instead, we used the statistics of the County Business Patterns published by the US Census Bureau. These statistics are available for Puerto Rico from 2003 to 2012. However, since 2007 and due to confidentiality policies, the PR County Business Patterns does not provide employment statistics for the subsectors of Films & Sound (NAICS 512) and Data Processing (NAICS 518). HCCG estimated employment for these sectors using proportions and trends.

**Employment Composition - Information Sector in PR**

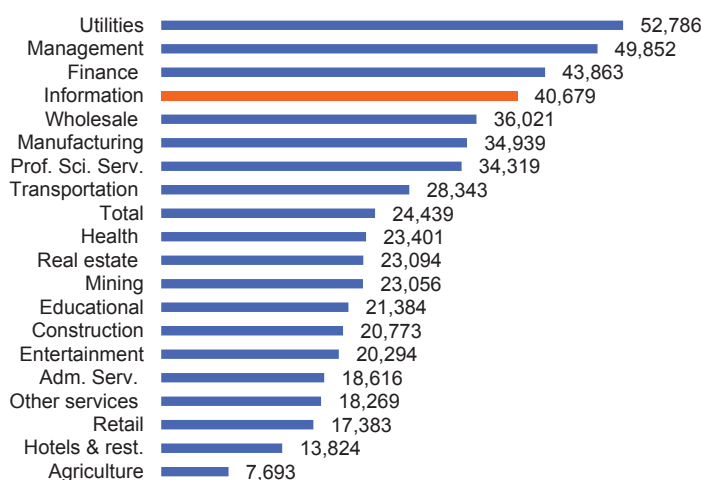
As of March



Fuente: US Census Bureau, County Business Patterns

Between 2003 and 2012, the following subsectors within the information sector reduced their share within the sector: Editorials plunged from 21% in 2003 to 18% in 2012, Radio, TV & Cable fell from 11% to 10%, and Telecommunications dropped from 54% to 48%. The subsectors of Films & Sound and Data Processing increased their share within the information sector jobs from 6% in 2003 to 10% in 2012 and from 6% to 11%, respectively. Other services remained unchanged.

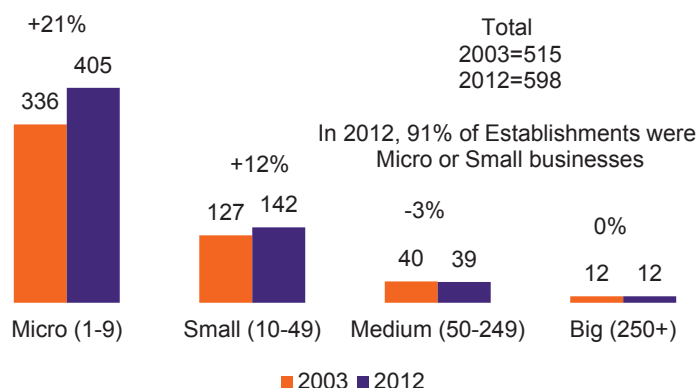
In 2012, the average salary for employees in the information sector was \$40,679 compared with \$38,026 in 2011. In 2012, wages in the information industry occupied the fourth position compared to other industries. Wages in the information industry were below wages in utilities, management and finance but above wholesale, manufacturing, professional and scientific services, healthcare, transportation, real estate, education, entertainment, construction, administrative services, retail trade, hotels & restaurants, and agriculture.

**Average Wage by Industry - Puerto Rico 2012**

Source: US Census Bureau, County Business Patterns

Between 2003 and 2012, only micro and small enterprises posted growth within the information sector. Other types of companies by size remained relatively unchanged or had losses. In 2012, there were 405 micro-enterprises in this sector compared to 336 companies in 2003 for an absolute increase of 69 companies or 21%. The number of small enterprises (10-49 employees) grew 12% or 15 companies. On the other hand, the number of medium-sized companies (50-249 employees) declined by one company and large companies (over 250 employees) remained unchanged.

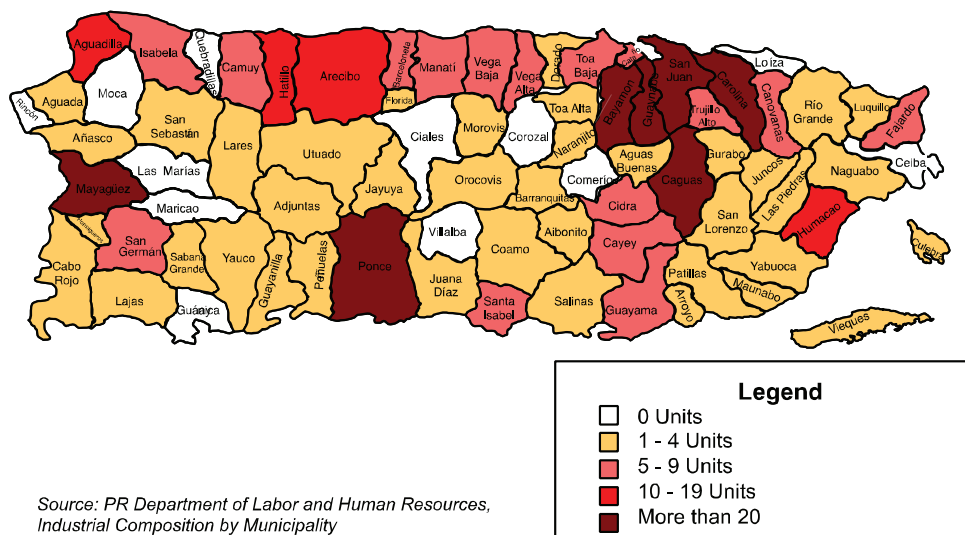
### Number of Establishments by Size - Information Sector - Puerto Rico



Fuente: US Census Bureau, County Business Patterns

Companies by location or municipality in the information sector are highly concentrated in the metropolitan area, Ponce, and Mayaguez. In the 2nd quarter of 2013 (end of fiscal year 2013), the PR Department of Labor indicated there were 612 establishments in the information sector in Puerto Rico, of which 364 or 60% were located in the most populated municipalities in dark red in the following map. San Juan only had 167 establishments or 27% of the total establishments. Since many information services can be provided using Internet services, we recognize this industry has a high potential for de-concentration.

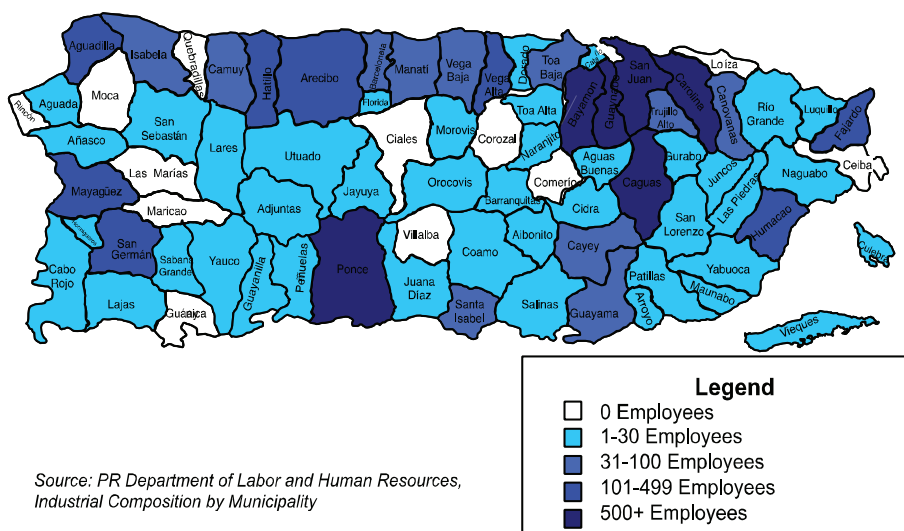
### Distribution of Information Sector Establishments in PR Second Quarter 2013



The PR Planning Board performed a spatial analysis for the 6 information subsectors using information of the 2011 County Business Patterns (Appendix 2). All subsectors depict the same trend of establishment concentration in the Metropolitan area, Mayaguez and Ponce.

Employment in this sector is also highly concentrated in six municipalities: San Juan, Bayamón, Guaynabo, Caguas, Carolina, and Ponce. Each of these municipalities has more than 500 employees in the information industry. This group of municipalities accounts for 77% of total employment in this sector. This confirms the information sector is a highly geographically concentrated industry.

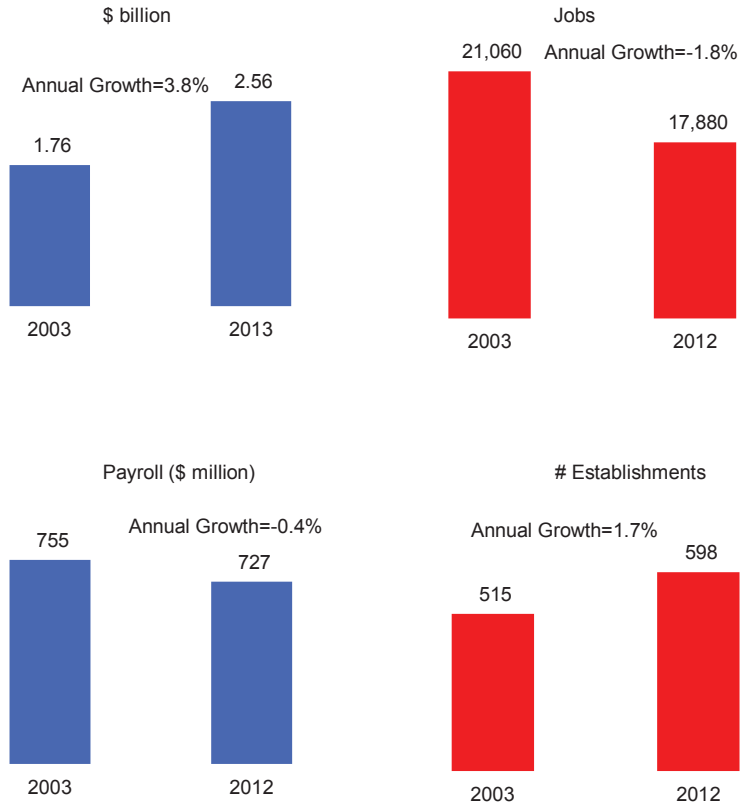
### Distribution of Employment - Information Sector in PR Second Quarter 2013



In summary, between 2003 and 2013, the information sector in Puerto Rico showed a significant annual growth of 3.8% in the value of production and between 2003 and 2012, the number of jobs in this sector fell by -1.8% per year. Total payroll fell -0.4% annually, but the number of establishments grew from 515 in 2003 to 598 in 2012. The increase in production and the loss of jobs are both linked to productivity increases in this sector.

In terms of exports, the PR information sector accounted for \$268,206 or less than 1% of total exports in CY2013. These exports were mainly software exports. US information sector exports account for \$33.4b or 1.5% of total exports in CY2013. With the new digital trends in publishing, PR has the potential to increase its exports of eBooks oriented to bilingual markets. Software publishing is also another great opportunity, especially in the apps market. PR has unique locations for movie and TV productions. PR telecom infrastructure is good and is improving, which suggests a potential for exports of telecommunication services.

Information Sector (NAICS 51) - Puerto Rico

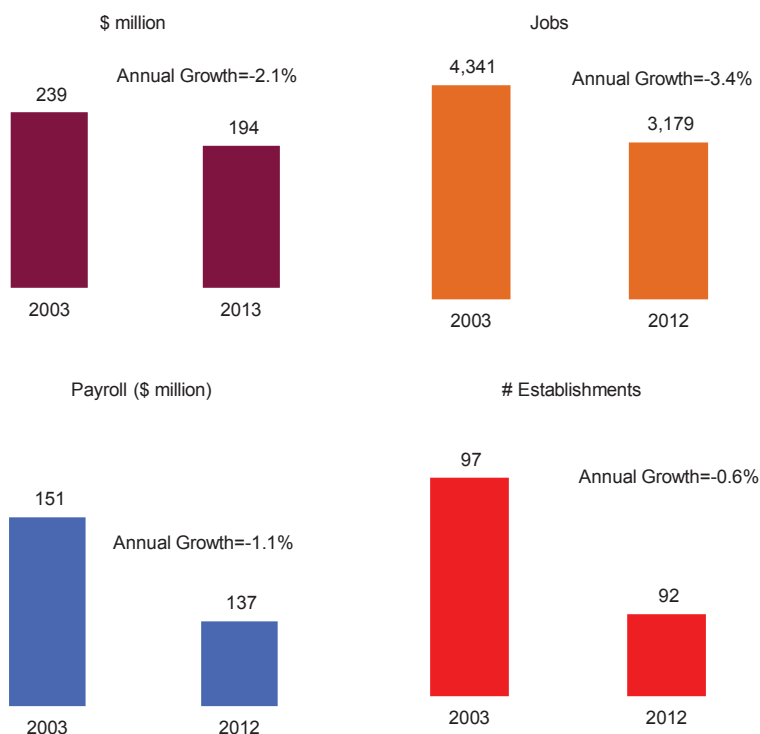


Source: PR Planning Board & US Census Bureau,, County Business Patterns

A.1. Overview of the Information Subsectors

1) Publishing (NAICS 511)

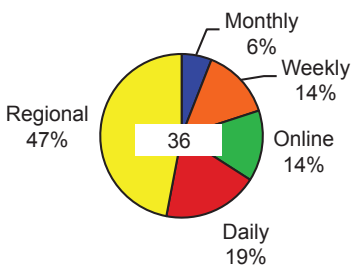
The publishing industry (except Internet) includes establishments engaged in the publishing of newspapers, magazines, other periodicals and books, as well as directory and mailing list and software publishing. In general, these establishments, which are known as publishers, issue copies of works for which they usually have copyrights. Entries may be in one or more formats including traditional print form, CD-ROM, or electronic networks.

**Publishing (NAICS 511) - Puerto Rico**

Source: PR Planning Board & US Census Bureau, County Business Patterns

Between 2003 and 2013, this subsector showed a -2.1% annual decline in the value of production and between 2003 and 2012, employment in the publishers subsector fell -3.4% per year. Payroll and number of establishments also fell at -1.1% and -0.6% annual growth.

Regional newspapers are the most common format across the Island, with 47% of all newspapers being regional. Hence, the market is very much geared towards smaller, more local areas. Daily newspapers make up the second largest sector with 19% and both online and weekly tied for third with 14%.

**Frequency of Newspapers by Type**

Source: [onlinenewspapers.com](http://onlinenewspapers.com)

The leading printed newspapers in Puerto Rico are El Nuevo Día, Primera Hora, and El Vocero. The last one is distributed free of charge. However, in the last 2 to 3 years new and free printed newspapers, such as Metro and Indice, as well as the specialized Blogs Sincomillas.com, Newsismybusiness.com, and Miprv.com, among others, have appeared. As part of these innovations, NotiCel, an exclusively digital newspaper, emerged. Given this trend towards Internet, traditional newspapers face many challenges in a more digital world.



**Puerto Rico's Daily Newspapers\***

(Listed According to Circulation Average as of December 2011)

Ranking	Name	Municipality	Total circulation (week days)	Rates**	Year Established in PR
1	El Nuevo Día	Guaynabo	239,173	\$320/\$58	1970
2	Primera Hora	Guaynabo	140,000	\$88/\$22	1997
3	El Vocero de PR	San Juan	131,793	\$70/\$17	1974

\* According to Metro newspaper on April 26th, 2013, the new free printed newspapers, like Metro and Indice had a daily circulation of 112,814 and 106,166, respectively. Other specialized Blogs such as Miprv.com, Sincomillas.com, Newsismybusiness.com, and the only digital newspaper NotiCel are the most recent important innovations in this industry in PR.

\*\* Rates per Column inch (per Col. Inch), includes R.O.P & classified.

Source: *Caribbean Business, The Book of Lists, 2013.*

The largest weekly newspapers in Puerto Rico are: Caribbean Business, La Perla del Sur, La Semana, The San Juan Daily Star y La Estrella de PR.

**Puerto Rico's Largest Weekly Newspapers**

(Listed According to Number of Full-Time Employees as of November 2012)

Ranking	Name	Municipality	No. of Full-time Employees	Rates*	Year Established in PR
1	Caribbean Business	San Juan	80	\$117/\$72	1973
2	La Perla del Sur	Ponce	33	\$28/\$32	1982
3	La Semana	Caguas	24	\$25/\$14	1963
4	The San Juan Star	Caguas	20	\$19/-	2009
5	La Estrella de PR	San Juan	19	\$45/\$21	1983

\* Rates per Column inch (per Col. Inch), includes R.O.P & classified.

Source: *Caribbean Business, The Book of Lists, 2013.*

**2) Films and Sound Recording (NAICS 512)**

This subsector comprises establishments engaged in the production and distribution of motion pictures and sound recordings. The production is a complex process involving several types of establishments engaged in activities such as hiring the artists, creating the film or sound content, and providing post-production services.

Between 2003 and 2013, this subsector showed an annual growth of 0.4% in the value of production and between 2003 and 2012, the Film & Sound subsector increased 3.3% per year in the number of jobs. However, Payroll and number of establishments plunged in the same period with -2% and -2.6% annual growths, respectively. Luna Films, Muvi Films, GW Cinco Studio, and La Plaza Films are among the companies engaged in production and filmmaking. Some sound recording companies operating in Puerto Rico are BM Studio, Johnny Blackmusic Records, Justice Recording Studios, San Francisco Lounge Recording Studios, Immsomnio Recording Studio, and Millennium Recording Studio.

#### Films & Sound (NAICS 512) - Puerto Rico



Source: PR Planning Board & US Census Bureau, County Business Patterns

### 3) Radio, Television & Cable (NAICS 515)

Broadcasting Industries (except Internet) include establishments that create content or acquire the right to distribute content and subsequently broadcast this content. The industry groups (Radio and Television Broadcasting and Cable and Other Subscription Programming) rely on various methods of communication and the nature of the services provided. The group of radio and television industry includes establishments that operate broadcasting studios and facilities for the performance of radio, television, entertainment, news, interviews, and the like. These establishments are usually related to the production and purchase of programs and generate revenue by selling airtime to advertisers.

### Radio, TV & Cable (NAICS 515) - Puerto Rico

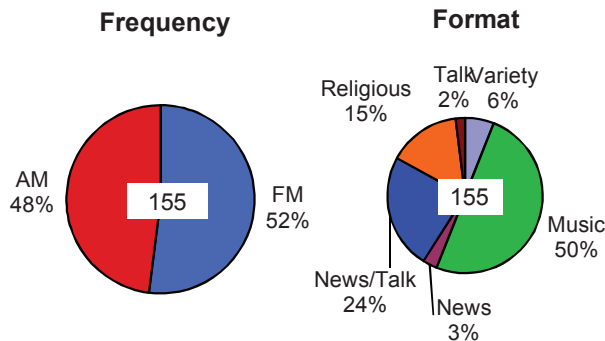


Source: PR Planning Board & US Census Bureau, County Business Patterns

Between 2003 and 2013, Radio, TV & Cable showed a significant annual revenue growth of 5.3% and between 2003 and 2012, the number of jobs in this subsector decreased -2.9% per year. Increasing productivity in this subsector accounts for increased production and decline in employment.

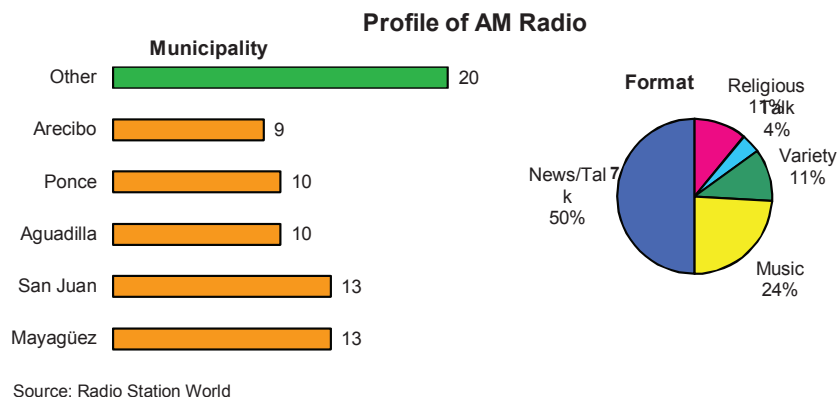
If we breakdown the 155 radio broadcast stations in Puerto Rico by frequency, we observe that there are as many AM as FM radio stations. If we divide them by format, over 50% focuses on playing music. The second and third most common formats are News/Talk and Religious, respectively.

### Radio Overview in Puerto Rico

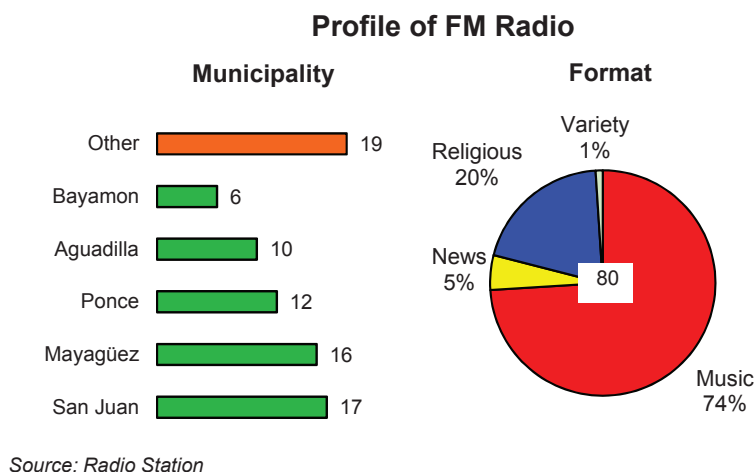


Source: Radio Station World

There are over 55 AM radio stations across the Island concentrated in five municipalities while the rest of the island has 20 AM radio stations. News/Talk format prevails in AM with 50% and Music with 24%.



FM radio follows a similar concentration trend with five municipalities having 61 radio stations while the rest of the island has 19. Unlike AM stations, these radio frequencies are dominated with music radio stations making up 74% of total stations. Religious is the second most common format with 20%. These profiles highlight the main difference between the two frequencies, that is, AM is geared towards news while FM is geared towards Music.



The market for AM Radio in Puerto Rico is very competitive. The Top 5 AM Radio Networks had only 19.5% of the audience. These networks are Univision Radio, Radio One Group, Power Media Group, Inc., WAPA Radio, and WPAB 550 in Ponce.

### Puerto Rico's Leading AM Radio Networks

(Listed According to Average % Audience Share in Spring 2012)

Ranking	Name	Municipality	Audience Share	Year FCC License Obtained
1	WKAQ 580, Univisión Radio	Guaynabo	8.4	2004
2	Noti-Uno, Uno Radio Group	San Juan	4.8	1998
3	Radio Isla 1320, Media power Group, Inc.	San Juan	3.7	2003
4	Cadena WAPA Radio	San Juan	1.3	1991
5	WPAB 550	Ponce	0.9	1940

Source: Caribbean Business, The Book of Lists, 2013.

The FM Radio market is more concentrated than the AM. The top 5 FM radio stations have 31% of the market. These radio stations are Univision Radio, Zeta 93, Salsoul, La Mega, and La Nueva 94.

### Puerto Rico's Leading FM Radio Stations

(Listed According to Average % Audience Share in Spring 2012)

Ranking	Name	Municipality	Audience Share	Year FCC License Obtained
1	KQ-105, Univisión Radio	Guaynabo	8.8	1958
2	Zeta 93, Spanish Broadcasting System of PR	Guaynabo	7.4	1959
3	Salsoul, Uno Radio Group	Caguas	5.6	1972
4	La Mega, Spanish Broadcasting System of PR	Guaynabo	5.2	1965
5	La Nueva 94, Spanish Broad. System of PR	Guaynabo	3.9	1999

Source: Caribbean Business, The Book of Lists, 2013.

The leading TV stations in Puerto Rico are Televiscentro, Univisión de Puerto Rico, Telemundo, Puerto Rico TV, and Kids TV de Puerto Rico.

### Puerto Rico's Leading TV Stations

(Listed According to Average % Audience Share from Jan to Nov 2012)

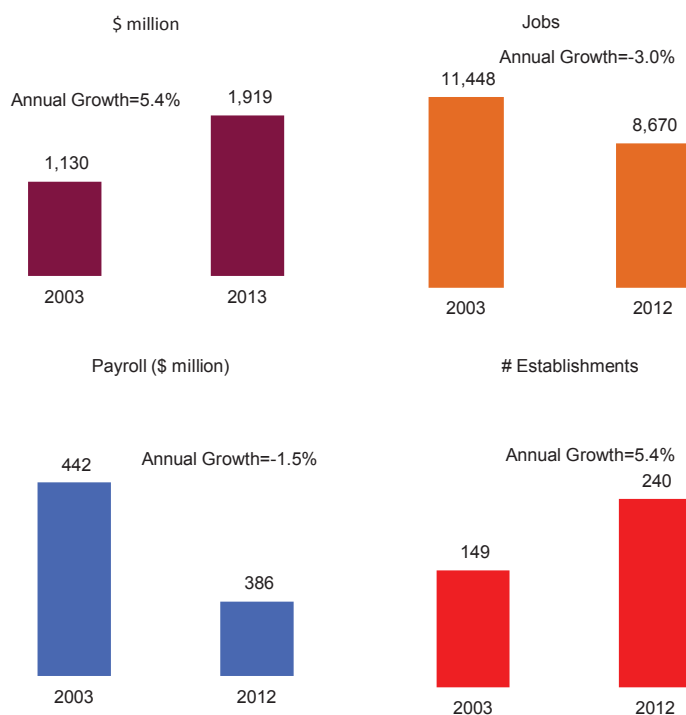
Ranking	Name	Municipality	Audience Share
1	Televiscentro of Puerto Rico LLC	Guaynabo	23.9
2	Univisión Puerto Rico	Guaynabo	21.3
3	Telemundo de Puerto Rico	San Juan	14.7
4	Puerto Rico TV	San Juan	2.6
5	Kids TV Puerto Rico	San Juan	2.3

Source: Caribbean Business, The Book of Lists, 2013.

## 4) Telecommunications (NAICS 517)

Industries in the Telecommunications subsector consist of establishments providing telecommunications and other services related to this activity. The Telecommunications subsector is primarily engaged in the operation, maintenance, and access to facilities for the transmission of voice, data, text, sound, and video. A transmission facility may be based on a single technology or a combination of technologies. According to the Telecommunications Board, there are 50 certified companies in PR and 3 broadband fiber optic cables.

Between 2003 and 2013, the Telecommunications subsector showed a significant annual growth of 5.4% in the value of production and between 2003 and 2012, the number of jobs and payroll in this subsector decreased -3.0% and -1.5% per year, respectively. However, the number of establishments increased 5.4% per year. Increases in production and job losses are again associated with increased productivity resulting from use of new technologies in this subsector.

**Telecommunications (NAICS 517) - Puerto Rico**

Source: PR Planning Board & US Census Bureau, County Business Patterns

The PR leading cellular telephone communications carriers are Claro, AT&T, Open Mobile, T-Mobile, and Sprint.

**Puerto Rico's Cellular Telephone Communications Carriers**

(Listed According to Number of Full-Time Employees as of June 2012)

Ranking	Name	Municipality	No. Full-Time Employees	No. of stores in PR	Year Established in PR
1	Claro	Guaynabo	4,000	41	1914
2	AT&T Mobility Puerto Rico Inc.	Guaynabo	1,600	34	1990
3	Open Mobile	Guaynabo	571	18	2007
4	T-Mobile Puerto Rico LLC	San Juan	468	22	2000
5	Sprint	San Juan	350	11	1990

Source: Caribbean Business, The Book of Lists, 2013.

**5) Data Processing (NAICS 518)**

This sector covers industries in the Data Processing, Web Search Portals, and Data Processing Services subsector group establishments that provide: (1) search facilities for the Internet; and (2) data processing, hosting, and related services.

**Data Processing (NAICS 518) - Puerto Rico**

Source: PR Planning Board & US Census Bureau, County Business Patterns

Between 2003 and 2013, the subsector of Data Processing showed a significant annual growth of 0.4% in the value of production and between 2003 and 2012, the number of jobs and payroll in this subsector increased 5.4% and 8.9% per year, respectively. The big increase in jobs is associated with a global trend of businesses relying more on Internet services and consumers spending more time on the Internet. The decline of -3.1% per year in the number of establishments signals a consolidation process. Executives of the industry have indicated the PR market is relatively small.

Puerto Rico's largest Data Processing companies are Coqui.Net Corp, Choice Cable TV, Liberty Cablevision, AT&T Business Solutions, and Open Mobile.

**Puerto Rico's Largest Internet Service Providers**

(Listed According to Number of Subscribers as of November 2012)

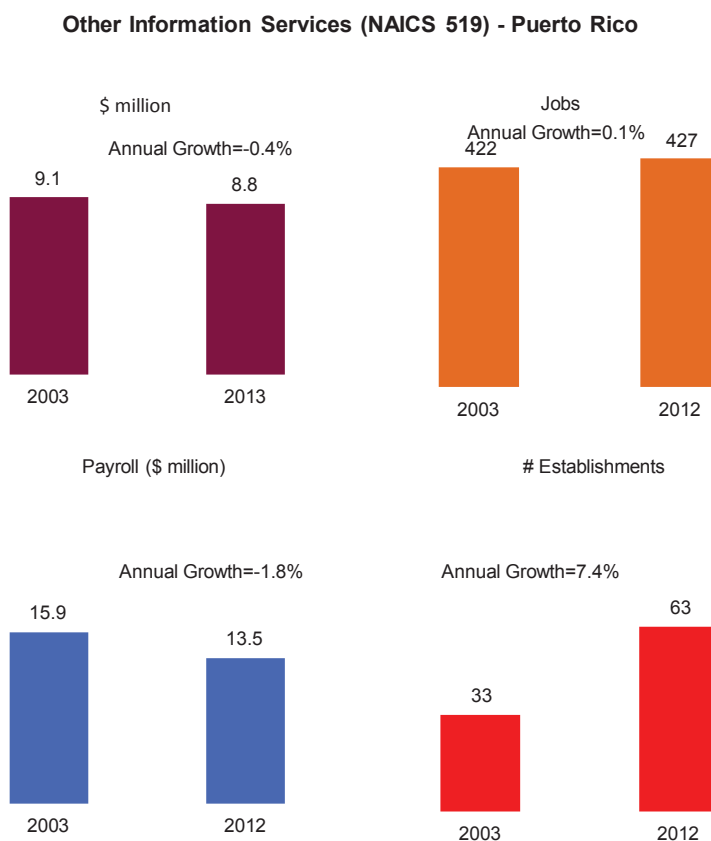
Ranking	Name	Municipality	No. of subscribers	No. of Full-Time Employees	Year Established in PR
1	Coqui.Net Corp.	San Juan	290,000	165	1995
2	Choice Cable TV	Ponce	87,000	315	2001
3	Liberty Cablevision	Luquillo	85,000	N/P	2002
4	AT&T Business Solutions	San Juan	75,000	310	1996
5	Open Mobile	Guaynabo	35,000	450	2010

Source: Caribbean Business, The Book of Lists, 2013.

## 6) Other Information Services (NAICS 519)

Industries in the Other Information Services subsector group involve establishments supplying information, storing, and providing access to information, searching and retrieving information, operating Web sites that use search engines to allow for searching information on the Internet, or publishing and/or broadcasting content exclusively on the Internet. The main components of the subsector are news syndicates, libraries, archives, exclusive Internet publishing and/or broadcasting, and Web Search Portals.

Between 2003 and 2013, Other Information Services showed an annual decline of -0.4% in the value of production and between 2003 and 2012, the number of jobs and payroll in this subsector grew 0.1% and -1.8% per year, respectively.



Source: PR Planning Board & US Census Bureau, County Business Patterns

In short, during the past 10 years the information sector experienced moderate growth in terms of its contribution to GDP and experienced significant job losses, mostly associated with increased technology that led to higher productivity.

Subsectors showed mixed results with broadcasting and telecommunications growing fast in terms of GDP but losing jobs. In terms of employment, Data Processing and Other Information Services were the only two subsectors with positive dynamic growth.



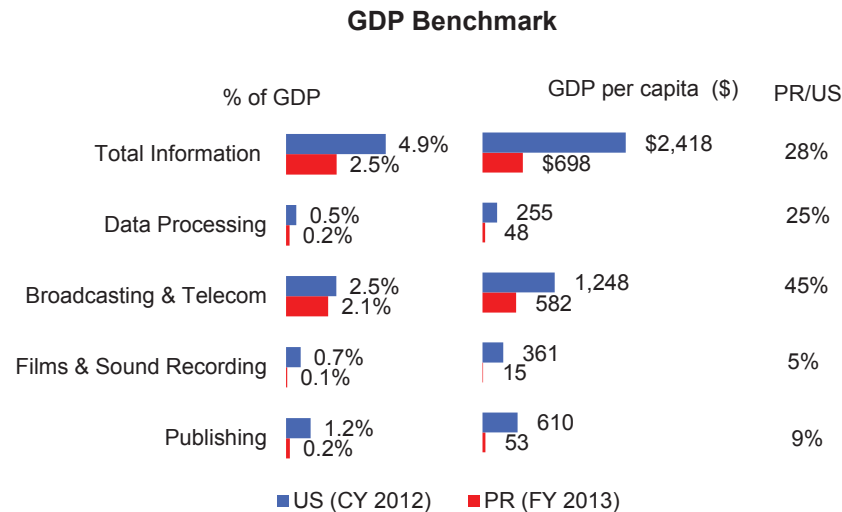
## B. Comparative Analysis

### B.1. Benchmarking with the United States

The PR economy is a regional economy of the US economy. According to the PR Institute of Statistics, the US accounts for 72% of PR exports and 45% of PR imports in FY 2013. Given this close economic relationship, HCCG chose the US GDP and employment as Benchmarks for the information sector.

The most recent statistics for the information sector and its subsectors in PR refer to fiscal year 2013 while for the US, it refers to calendar year 2012<sup>1</sup>. The information sector in the US accounted for 4.9% of total GDP and PR accounted for 2.5% of its GDP. The GDP per capita in the Information Sector in PR was \$698 compared with \$2,418 in the US. PR had only 28% of the US GDP per capita in this sector. Narrowing this gap is one of the strategies later defined in this report.

Among the subsectors, the Bureau of Economic Analysis (BEA) only provides GDP statistics for 4 subsectors, including Broadcasting and telecommunications merged. To maintain comparability with the US, HCCG aggregated the subsectors, which appear merged in the US.

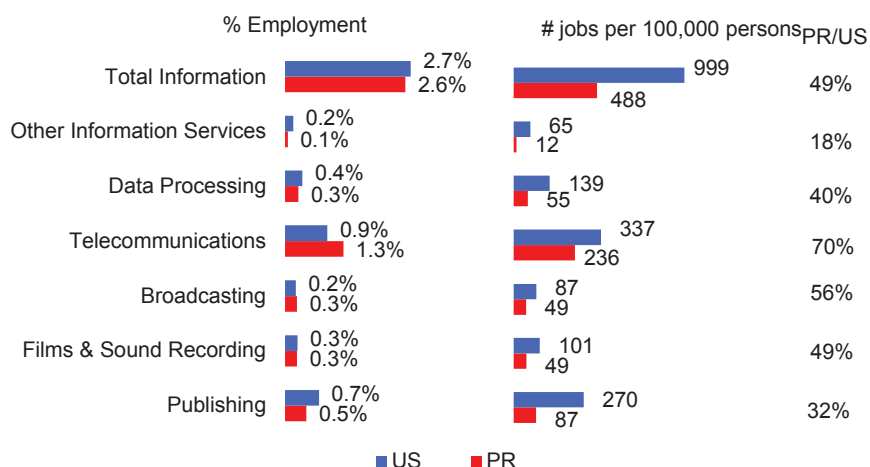


Source: Bureau of Economic Advisors, PR Planning Board, and US Census Bureau.

Employment is also a key variable to benchmark. According to the County Business Patterns, total information employment in both, PR and US, represented 2.6% and 2.7%, respectively of total employment in 2012. It is useless to try to catch-up with the US in terms of share of total employment but benchmarking in terms of number of jobs per 100,000 persons makes more sense. The number of jobs per 100,000 persons in the PR information sector represents only 49% of the US employment in that sector.

Other information services in PR accounted for 18% of employment in the US. Telecommunications has the smallest gap because Telecom jobs in PR represent 70% of jobs per 100,000 persons in the US.

<sup>1</sup> According to the Bureau of Economics Analysis, the US GDP for calendar year 2013 by NAICS at 3 digit level will not be available until November 2014.

**Employment Benchmark (2012\*)**

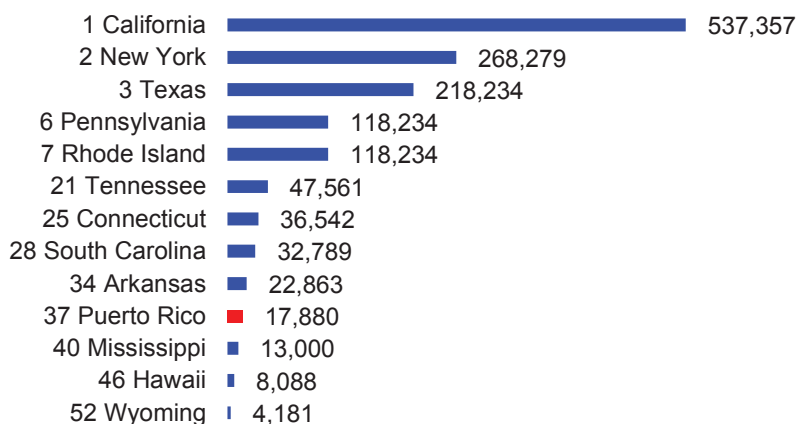
\* As of March 2012.

Source: US Census Bureau. County Business Patterns.

**B.2. Benchmark with Selected States**

This section compares Puerto Rico with the states and the US average in terms of employment, payroll and number of establishments. (Appendix 3)

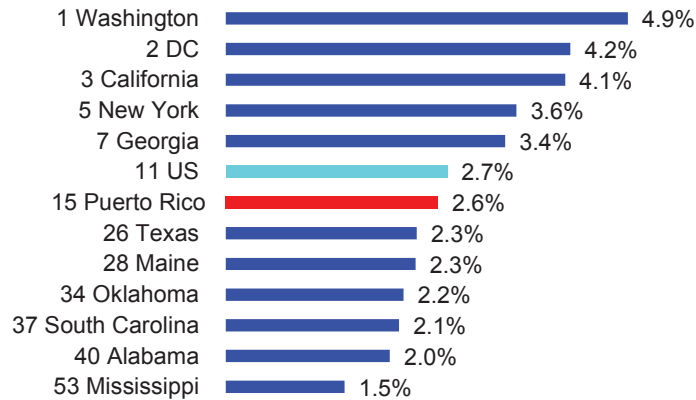
According to the County Business Patterns of 2012, total employment in the information sector was highest in California, New York, and Texas with 537,357; 268,279; and 218,234 employees, respectively. Puerto Rico ranked 37th with 17,880 employees.

**Total Information Sector Jobs by State**

Source: County Business Patterns

We also analyzed the total information sector jobs as percent of total employment. With this metric, PR ranked much better in the position 15th with 2.6%, slightly below the US average of 2.7%. However, this also reflects the high unemployment rate and low participation rate in PR compared with the States. Using this indicator, Washington State, District of Columbia, and California ranked in the first three positions with 4.9%, 4.2%, and 4.1%, respectively. New York ranked 5th with 3.6% of total workers in the information sector.

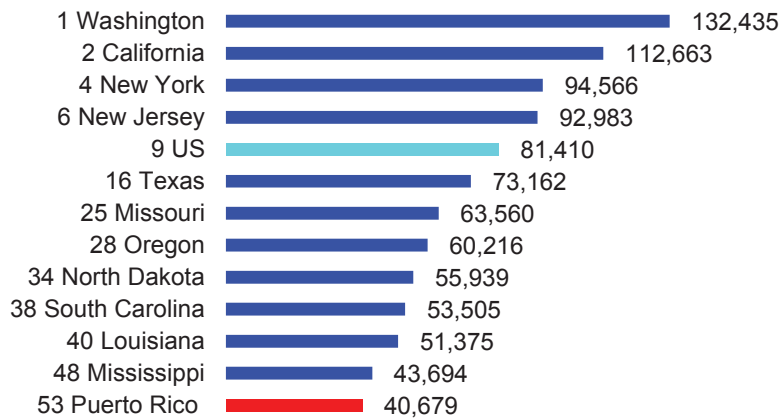
### Information Sector Jobs as % of Total Jobs by State



Source: County Business Patterns

The PR average wage in the information sector (\$40,679) ranked last compared with wages in the States and the US average. The top four States in terms of wages were Washington with \$132,435, California with \$112,663, and New York with \$94,466. In terms of salary perspectives, PR is the last State where highly qualified information professionals would like to work. These low wages respond to forces of supply and demand locally. However, it is important to watch closely this indicator as a measure of industry's growth and performance. It is important to recognize that geeks and nerds are not cheap, but they are necessary to create value in the PR information sector.

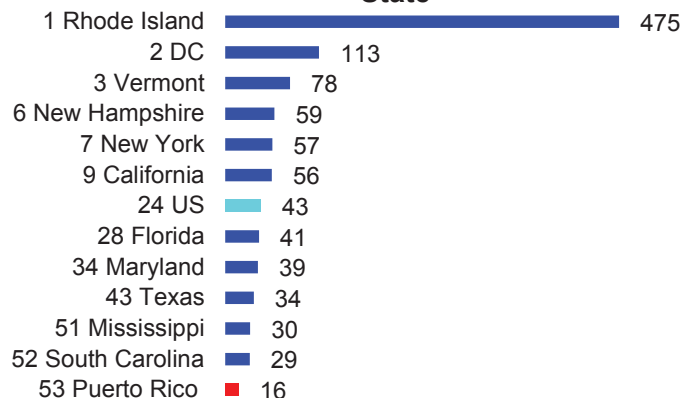
### Information Sector Average Wage by State



Source: County Business Patterns

In terms of the number of information establishments, Rhode Island, District of Columbia, and Vermont were the top three states with 475, 113, and 78 establishments per 100,000 persons. Puerto Rico ranked last again with only 16 establishments per 100,000 persons. This indicator reflects a culture of low entrepreneurship in the island.

**Information Sector Number of  
Establishments per 100,000 personas by  
State**



*Source: County Business Patterns*

California, New York, and Texas are the top three information intensive states. California and Texas are also the states with the most number of patents in the US. California is a worldwide leader in technology and film. This state has a well-established infrastructure and a highly dynamic market with many players.

New York has a strong Television and is a booming startup center. This state has a wide variety of successful industries. As an international hub, the city of New York serves as headquarters for many of the top 500 companies. Its population is highly concentrated in one city.

Texas has a strong technology sector in both service and manufacturing. The states have a wide array of incentives, fewer regulations, and relatively low costs of living.

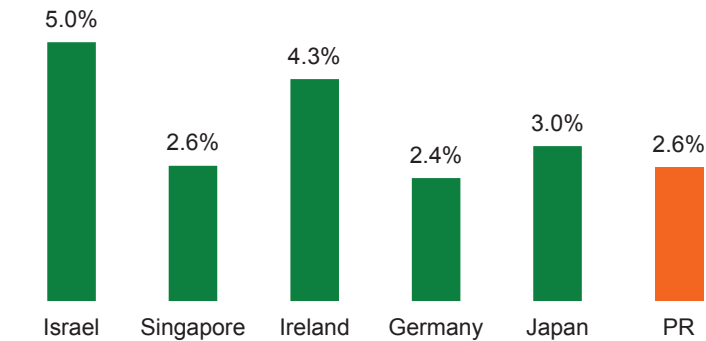
South Carolina and Mississippi are two states with a population similar in size to that of Puerto Rico. South Carolina has strong ties to global economy, is a more globalized economy with foreign investment and immigration, and its exports focus on manufacturing and services.

Mississippi has a strong entrepreneurial spirit and its population is willing to open businesses despite economic downturns.

Appendix 4 includes a comparison of the information sector, PR, US, and selected states using the County Business Patterns of 2011.

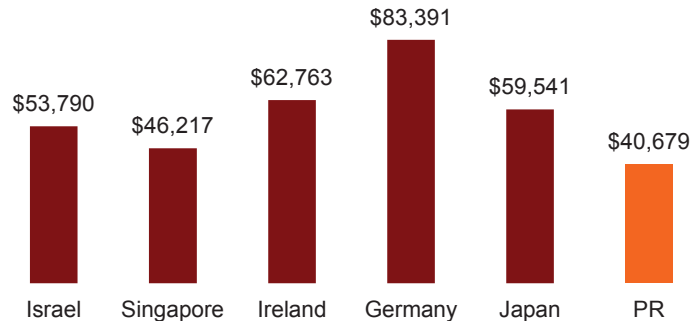
### **B.3. Benchmark with Selected Countries**

Compared with other countries, Israel and Ireland exhibit a higher proportion of information jobs as percent of total jobs with 5.0% and 4.3%, respectively. Japan had 3.0% share and Singapore and Germany had a share similar to PR.

**Information Sector Jobs as % total (2012)**

Source: WorldBank and Countries' Statistics Agencies..

Information sector wages in PR again are the lowest, \$40,679, compared with selected countries. Germany had the highest wages with \$83,391, followed by Ireland and Japan with \$62,763 and \$59,541, respectively.

**Average Information Sector Wage by Country (2012)**

Source: WorldBank and Countries' Statistics Agencies..

The above benchmarking exercise highlights that PR needs to undertake huge efforts to develop the full potential of its information sector. Production, employment, wages, and establishments in the information sector in PR lag behind most states, the US average, and other countries. In the following chapters, HCCG presents strategies that have worked in states, such as, California, New York, Texas, Mississippi, and South Carolina, as well as other successful strategies adopted in other countries.

**C. Relevance of the Information Sector**

With the spread of new communication technologies, including the Internet, and the development of a 'knowledge economy', the information sector is more important than ever. In this information era, economic growth is spurred through innovation and correct use of information services in all other industries. Knowledge has become a source of competitive advantage in the "information economy".

Global trends, such as, emerging technologies, connectivity, rapid growth in the information sector, advances in information technology, mobility, relevance of Millennials in the workforce, and new ways of work using Internet and the cloud, make the information sector a key sector to shape the economic future of many countries. The information sector has driven economic growth thru the formation of startups, technology clusters, and a multiplier effect that impacts the whole economy.

PR is at the crossroads with 8 years of recession, high unemployment and low participation rate. The development of the information sector can contribute to restoring growth and creating new jobs.

Mr. Alberto Bacó, Secretary of Economic Development and Commerce has said, “What we are trying to achieve here is a second transformation with the Puerto Rico economy, based on services”. The information sector plays a key role in achieving this goal. The following chapter presents a SWOT analysis of this sector.

## IV. SWOT ANALYSIS OF THE INFORMATION SECTOR IN PR

### A. Methodology

A SWOT analysis is a structured planning method used to evaluate the strengths, weaknesses, opportunities, and threats (SWOT) involved in a project or in a business venture. A SWOT analysis applies to a product, place, industry, or person. It involves specifying the objective of the business venture or project and identifying the internal and external factors that are favorable and unfavorable to achieving that objective. The concept of strategic fit refers to the degree to which the internal environment of the business matches the external environment. (University of Washington, 2011) Setting the objective should follow the SWOT analysis. This sequence allows the organization to set achievable objectives.

- **Strengths:** characteristics of the business or project that give it an advantage over others.
- **Weaknesses:** characteristics that place the business or project at a disadvantage relative to others
- **Opportunities:** elements that the project could exploit to its advantage
- **Threats:** elements in the environment that could cause trouble for the business or project Identification of SWOTs provides insight into later steps in planning needed to achieve the objective. The SWOT analysis enables decision makers to consider whether the objective is attainable. If the objective is not attainable, a different objective must be selected and the process repeated.

Users of SWOT analysis need to ask and answer questions that generate meaningful information for each category (strengths, weaknesses, opportunities, and threats). The process itself is useful and the findings provide users with a competitive advantage.

### B. SWOT Analysis of the Information Sector in PR

#### a. Strengths (Internal)

1. **Integration to the US market:** Puerto Rico’s economy is highly integrated with the US, both in terms of exports and imports. So far, this trend continues with the US as the main trading partner with 71% of exports and 47% of imports in fiscal 2014. As a US territory, Puerto Rico has the US legal protections, US currency, US customs, US postal system, and banking system. According to the Puerto Rico IT Cluster, the island meets the regulations of “International Traffic in Arms Regulation (ITAR)” that requires the military and defense technology to be handled only by US citizens and the Berry Amendment & Buy American Act compliance.

Despite dismal numbers of proficiency in public schools, Puerto Rico just as the US has done, can make advances in the information sector by obtaining brain talent from abroad thru H1B visas. “If you can show that you have special talents, resources, or scientific knowledge, you can jump ahead of the line and get an H1B visa. Silicon Valley, for example, is roughly 50% foreign born, many coming from Taiwan and India.”<sup>2</sup> Why not Puerto Rico?

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<sup>2</sup> Kaku, M., *Physics of the Future*, First Anchor Books Edition, February 2012, pp. 372-373.

2. **Strong position in knowledge-based growth industries:** PR has extensive experience in high-tech industries, such as pharmaceutical, medical devices and instruments, high technology, and financial services.
3. **Bilingual Population:** According to the Community Survey 2008-2012, 19% of the population speaks English “very well”. Previous studies reported about 24% of the population speak English with difficulty for a total of approximately 40% who understand and speak English. Despite this, there are more Puerto Ricans who speak fluent English than Hispanics living in the Continental US. PR has better English proficiency than Latin American countries where most of them have a very low English level. (Education First, 2013)

**English Proficiency in Latin America 2013**

Ranking	Country	EF EPI	Level
19	Argentina	54.43	Medium
29	Uruguay	51.49	Low
37	Costa Rica	50.23	Low
38	Brazil	50.07	Low
39	Peru	49.96	Low
40	Mexico	49.91	Low
44	Chile	48.20	Very low
46	Colombia	47.07	Very low
48	Ecuador	46.90	Very low
49	Venezuela	46.44	Very low
52	Guatemala	45.72	Very low
53	El Salvador	45.29	Very low
56	Panama	43.61	Very low

Source: Education First, EF EPI EF English Proficiency Index 2013.

4. **Physical Infrastructure, among the best in the region:** Puerto Rico has adequate infrastructure of ports, airports, roads, utilities, and telecommunications. According to the National Broadband Map (NBM), 97% of the population in PR has access to 2 or more wireless Data Processing.
5. **Highly competitive Internet market:** There are several companies providing Internet services and according to NBM, 98.4% of the population has access to at least one wireless Internet provider.
6. **Human Capital:** According to the 2008-2012 Puerto Rico Community Survey, 22.5% of the population 25 years old or more in Puerto Rico has a college degree and 44% of this population has tertiary education. According to the PR Council of Higher Education, there were 4,533 students who graduated from programs in engineering, technology, computers, mathematics, and related sciences in the academic year 2011-2012. Of this total, 67% were from private institutions and 33% from public institutions. On the other hand, 92% of the students graduated from undergraduate programs and 8% from graduate programs.
7. **PREPA Networks infrastructure:** Following the acquisition of Telecomunicaciones Ultramarinas de Puerto Rico, the PR Electric Power Authority (PREPA) Networks became the largest and most robust provider of fiber optic infrastructure Puerto Rico. However, Claro and AT&T also provide strong competitive broadband fiber optic services.

8. **Government willing to promote growth:** The Strategic Plan “Ideas in Production” calls for criteria to be followed for efficient Information Management and Technology to carry out current public policy.

#### **b. Weaknesses (Internal)**

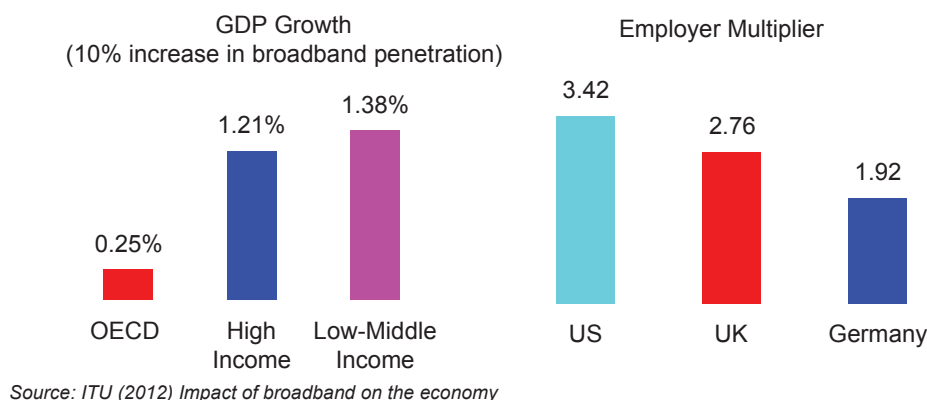
1. **Lack of entrepreneurship:** According to Global Entrepreneurship Monitor, only 18% of the population in Puerto Rico, between 15 and 64 years old, considers entrepreneurship as a desirable career, compared with 79% in the Netherlands, 69% in Chile, and 65% in the US.
2. **Small scale, micro and small companies:** According to County Business Patterns for PR in 2012, 91% of companies in the information sector were small.
3. **Incumbents’ strong opposition to competition:** Unanimous opposition of mobile operators, cable & satellite companies and Data Processing to Senate Bill 882, which introduces amendments to Law No. 213 of September 12, 1996 known as the “Telecommunications Act”. Among the proposals, PrepaNet, a subsidiary of PREPA, would provide Internet services to all government agencies. Currently, government spends \$400 million on Internet services. (García, 2014)
4. **Limited connectivity of seniors:** According to the Census Population of 2010, the population 65 years old or more represent 15% of the total population and only 26% in this group had a computer. (Connect Puerto Rico, 2012)
5. **Low Income and poverty:** Income inequality implies limited access to computers and the Internet in low-income sectors. According to the 2010 Census, 42% of households had an income less than \$15,000. According to Connect Puerto Rico 2012, only 45% of households with incomes below \$15,000 have a computer.
6. **Slow permitting process:** Puerto Rico still has room to simplify the permitting process. According to Doing Business 2014, it takes 189 days to obtain a building permit, compared to 91 days in US. It takes 193.5 days to register a property in PR, compared to 12 days in the US. Business devotes 218 hours per year on tax matters in PR compared to 175 hours in the US. (World Bank, 2013)

#### **c. Opportunities (External)**

1. **Connectivity and New Technology:** According to Forbes magazine, consumers and employees in 2014 have continuous connectivity and a vast array of applications. This reality raises several trends such as digital convergence, digital experience, and “unlimited” data storage, among others.
2. **Addiction to connectivity and speed:** According to Deloitte, consumers in 2014 have strong need to stay connected and required increasing speed Internet connection. The expansion of mobile network along with the demand for high-bandwidth applications and services such as video and gaming exerts pressure on the industry to provide quantity and quality of broadband connectivity. (Sandvine, 2013) There is a positive correlation between increases in broadband penetration and economic and employment growth. (Katz, 2012)



### Broadband impact on GDP and Jobs



3. **Potential senior market:** According to the 2010 Census of Population, 15% of the population in PR was 65 years or more. This group continues growing fast and a small percentage or 26% had a computer in 2012. If PR takes advantage of technology, competitive marketing, affordable prices, and the correct focus, then these new information services can grow fast.
4. **Unique bridge between Latin America and the US:** According to the Strategic Plan PR 2025, conducted by AT Kearney, Puerto Rico has the opportunity to become a “hub” for transportation and logistics; it has great location and attractive assets for knowledge-based services; and it has a cultural and linguistic mix that facilitates making the island the bridge between US and Latin America.
5. **New techniques of big data processing:** These processes seek to discover patterns in large volumes of data. Its applications range from determining supermarket-buying habits, patterns of clientele lost by banks, or telecommunications, and enables tracking customer behavior online. All of these processes can be performed online.

#### d. Threats (External)

1. **Brain drain:** According to the Migrant Profile, published by the PR Institute of Statistics, there were 2,224 engineers, architects and computer professionals who emigrated to the US between 2010 and 2012.
2. **Economic recession:** According to the PR Planning Board, the island’s real Gross Product (GNP) grew 0.3% in fiscal 2013 and is expected to decelerate its growth to 0.1% in 2014 and 0.2% in 2015. The lowering of the PR General Obligation bonds in February 2014 to below investment grade (junk) and the restrictive fiscal policy that the government is implementing to reduce deficits will reinforce a continuation of the current economic recession and hence, making it more difficult to attract new investment and business to the island.
3. **Competition from emerging markets:** In 2013, while Latin American economies like Panama, Peru, and Chile grew 8.1%, 5.7% and 4.2%, respectively, the PR Planning Board estimated real growth of 0.3% in GNP.
4. **Foreign investment with low value added:** The arrival of large foreign companies in the telecommunications sector and publishing business depict little added value since most of their operations use outsourcing and this creates negative pressures for the information sector in PR.

In summary, Puerto Rico depicts favorable factors to develop its information industry. The island has access to the huge US market and it is subject to many of the federal regulations in various sectors. PR has experience in high technology industries. Although in need of improvement, the island still has a fairly adequate infrastructure, a qualified and bilingual human capital, and the government is committed to promoting economic activity. Trends in connectivity, new technologies, demographics, our strategic location, and changing paradigms create great opportunities to leverage our strengths in order to overcome or minimize our weaknesses and external threats.

In his book, “Physics of the Future”, Michio Kaku predicts how science will shape human destiny and our daily lives by year 2100. One of the forces behind this trend is Moore’s law that “...simply says that computer power doubles about every eighteen months.”<sup>3</sup> Telecommunications technology unleashes new opportunities if only we are ready to seize them. But, there will be winners and losers in terms of jobs, both in the information sector as well as other sectors in the economy. Technology changes the way we work. The strategies to be delineated in the following chapters will define the best route to advance the information sector in Puerto Rico.

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<sup>3</sup> Kaku, M., *Physics of the Future*, First Anchor Books Edition, February 2012, p. 22.