Puerto Rico IT Sector Composition Report & IT Market and Growth Opportunity Analysis

DEPARTMENT OF ECONOMIC
DEVELOPMENT
AND COMMERCE

April 2023

accenture

Contents

Executive Summary: IT Sector Composition Report

Objective

This analysis aimed to provide a richer understanding of the size, layers and composition of Puerto Rico's IT sector. A consistent definition of the IT sector and clarity on its current state are critical to formulating strategy, support measures and KPIs for the sector, and for attracting prospective investors who seek to understand the supply and demand landscape.

Approach

This effort is a triangulation exercise of data and information from official statistical sources, third-party databases, and interviews with stakeholders in the IT sector. A custom dataset of representative IT companies was also constructed to glean novel insights into the scope and nature of core IT sector activities.

Key findings

1. **IT Sector scope:** The boundaries of the IT sector are not cleanly defined given the widespread use of IT throughout the economy. For sector sizing purposes, the important distinction is between (a) **the core IT sector** of companies who directly produce IT goods and services, and (b) the broader **IT-enabled economy**, which consists of companies who employ IT professionals and leverage IT inputs in their operations but are fundamentally in other non-IT sectors.

2. **Puerto Rico's Core IT Sector:** The Core IT sector consists of at least **260 companies** employing roughly **5,000 workers**. The majority **(~75%) of these companies are small** (<10 employees) and around **70% are located in the San Juan area**. Most are concentrated in the **IT services and Software subsectors** (<. Relative few have exposure to emerging technologies (e.g. AI, Robotics) and relatively few operate in the cross-over tech space, with the majority in Fintech.

3. **IT-Enabled Economy:** The broader IT-enabled economy is a major source of employment. Up to **14K Puerto Ricans work in IT occupations and 30K in IT-related sectors**. There is a **clustering of IT professionals in the Professional and Technical services, Government, and Education sectors.** Most work in IT Service roles such as Computer Support Specialists or IT Systems managers, pointing to **Puerto Rico's current specialization in lower value-added segments of the IT space**.

4. **IT Sector Ecosystem:** Puerto Rico has players in all key areas of the IT sector ecosystem, but their overall functioning and coordination could be improved. In particular, there is a **lack of quality data on the IT sector and metrics around its size and performance**. The lack of a primary convener and/or changemaker within and between each area of the ecosystem has created **fragmentation, duplication in efforts, weak relationships**, and a **lack of mobilization** of strategic plans.

Overall takeaway

Puerto's Rico IT sector appears to be in early stages of maturity, evidenced by the high number of micro or small companies, and the concentration of activity and employment in relatively lower valued added and outsourcing-oriented segments such as IT services. While there is some activity in the emerging and cross-over tech spaces of the sector, this is nascent and/or dominated by a few companies. The geographic clustering of IT companies in the San Juan metropolitan area also suggests limited geographic and socio-economically inclusivity, to date.

Executive Summary: IT Market and Growth Opportunity Analysis

Objective

To assess Puerto Rico's standing relative to key peers and competitors in the IT sector globally, understand its current market presence, and identify opportunities for future IT growth. A market assessment is an essential input into the formulation of a strategic vision for the IT sector's future development.

Approach

A benchmarking of Puerto Rico to US states and international jurisdictions on various dimensions of the enabling environment for IT sector growth. This is overlayed with data on Puerto Rico's IT market presence and demand trends in the IT sector to identify market gaps and areas of comparative advantage and potential growth.

Key findings

1. **Benchmarking:** Relative to international comparator groups (structural peers, emerging hubs and aspirational targets), Puerto Rico ranks in the bottom half of the pack. It outperforms growing hubs due to **its high salaries and high service sector productivity**, but lags behind other groups due to **challenges in infrastructure, the economic environment, and deficiencies in the scientific & innovation ecosystem.** Compared to US States, Puerto Rico's standing is even less favorable.

2. **Current IT market presence:** Puerto Rico is most active in the **IT services, software, and cybersecurity subsectors**, and has limited presence in telecom services and hardware & infrastructure. Geographically, the primary export market for Puerto Rican IT companies is the **mainland United States (85-90% of the total),** while the major non-US markets are Latin America and the Caribbean. As a whole, Puerto Rico's IT export market is **less diversified than most of its comparators.**

3. **Growth opportunities:**
   a. In the near term, **deepening market penetration in the mainland US** for IT services and cybersecurity appears to be the most promising and frictionless opportunity. Target demand segments include mainland US companies in **Financial Services, Comms and Media and Healthcare**, where IT spend is set to remain strong, as well as the **US federal government for cybersecurity.**
   b. In the medium-term, expansion into new geographic markets could become more feasible, **particularly Latin America**, as Puerto Rico benchmarks favorably to other regional peers servicing this market and offers companies direct access to the US market.

Overall takeaway

Puerto Rico's IT sector has promising growth potential, stemming from the island's strategic intercontinental location, favorable tax incentives, and special access to the US market. Realizing this potential is unlikely to be straightforward, however, in light of Puerto's relatively weaker overall enabling environment for IT compared to regional and structural competitors. Until these competitiveness gaps are narrowed, growth opportunities are likely to be limited to consolidation of market share in existing IT subsectors in the mainland US.

1
Introduction

Purpose – "The Why"

State and local governments are positioning to grow sector strategies **with a focus on the Information Technology Sector**.

As IT growth has moved outside of the west and east coasts, governments are looking to tap into the unique value propositions that they offer to develop thriving technology ecosystems.

The Department of Economic Development and Commerce seeks to understand and grow an already developing IT Sector on the island. To do so, DDEC would like to position the island **to be best known for "something" in the IT Sector**.

The Case for IT Sector Growth

Puerto Rico has strengths such as its strategic location, bilingual workforce, and tax incentives for IT companies, which can be leveraged to promote growth in the IT sector. Addressing these opportunities and building a supportive ecosystem can help Puerto Rico realize its potential and foster the growth of its IT sector.

Known Foundational Challenges

PRE-PANDEMIC CHARACTERISTICS	PANDEMIC CHARACTERISTICS	THE NEW NORMAL

Workforce Challenges:

- Skills Gap
- Brain drain
- Lack of available workers

Ecosystem Challenges:

- Fragmented
- Lack of Leadership
- Not concentrated

The New Normal

IT Sector Growth

Ecosystem Collaboration

Infrastructure Support

Increased value in scalability & adaptability

Overall public receptiveness & trust in economic growth

Growth of Sector

Pandemic

Incentive Structure Changes

Programs evolve rapidly in response to pandemic – Remote workers move to Puerto Rico

Growing awareness of Puerto Rico Value Add

IT Sector Evolution

Mergers and Acquisitions

Pre-Pandemic

Growing Ecosystem and Energy

FOUNDATIONAL STRENGTHS & KNOWLEDGEABLE ECOSYSTEM PARTNERS + WORKFORCE

Project Approach – Where We Are

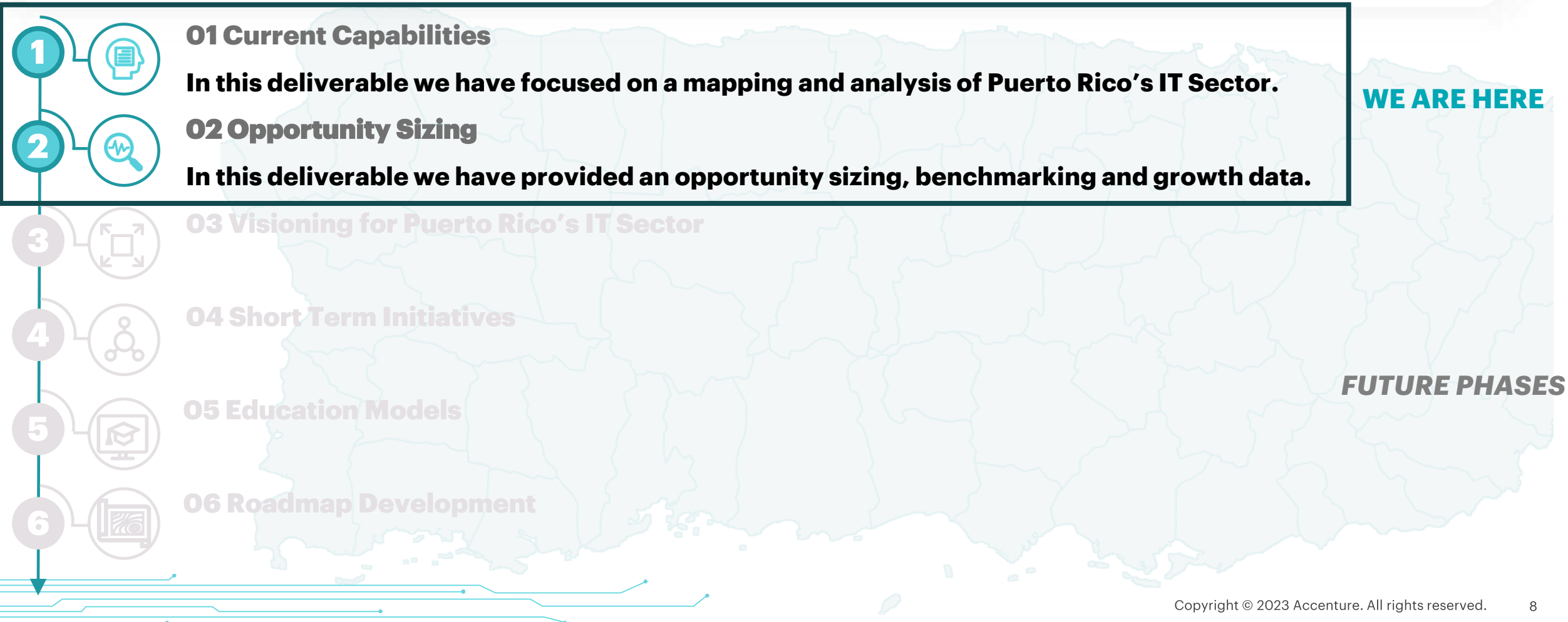This project is focused on developing a clear understanding of Puerto Rico's current IT sector landscape, its vision for growth, and a plan for its development. The content in this report covers findings from the first phase of the project.

1

01 Current Capabilities

In this deliverable we have focused on a mapping and analysis of Puerto Rico's IT Sector.

WE ARE HERE

2

02 Opportunity Sizing

In this deliverable we have provided an opportunity sizing, benchmarking and growth data.

3 03 Visioning for Puerto Rico's IT Sector

4 04 Short Term Initiatives

FUTURE PHASES

5 05 Education Models

6 06 Roadmap Development

Growing the **IT Sector** in Puerto Rico

DDEC Goals

The Puerto Rico Department of Economic Development and Commerce seeks to develop strategies and roadmaps that will enable the Commonwealth to attract more business from the information technology sector. Puerto Rico's economy is undergoing a transformation driven in large part by a large increase in federal funds to the island, a commitment from the government and DDEC to grow Puerto Rico's economy in key areas, and an increasingly digital global economy that can enable IT Sector work to be exported from Puerto Rico. Expediting this transformation requires a plan that integrates Puerto Rico's strengths, such as an educated and motivated workforce and a robust small business environment, with broader market dynamics including the advantages of being a U.S. territory.

Talent

Attracting and retaining IT talent is essential to drive innovation and growth in the IT sector.

Ecosystem

Establishing strategic partnerships between the public and private sectors, including universities, research institutions, and private companies, will promote IT sector collaboration and innovation in the IT sector.

Governance

Puerto Rico needs to reduce fragmentation across the sector and create an island wide yet global strategy to bring together the talent and ecosystem while generating growth.

Growth

Puerto Rico can create a favorable environment for the growth of its IT sector, leading to economic development, job creation, and increased opportunities for its people.

What We've Learned – Discovery of Data and Interviews

Puerto Rico has the potential to grow its IT sector and become a leader in the sector by strategically investing in key areas and fostering a conducive environment for IT innovation and entrepreneurship. To achieve this, Puerto Rico should focus on developing its IT infrastructure, building a skilled workforce, attracting and retaining IT talent, fostering innovation and entrepreneurship, establishing strategic partnerships, and leveraging emerging technologies.

Interviews & Discussions

- 27 interviews with 23 stakeholders
- Executive, departmental, and employers
- Focus on key organizations within the "broad" ecosystem
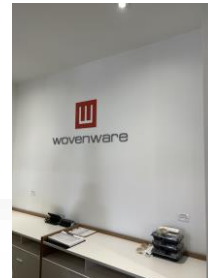
Existing Reports & Data Review

- Existing report, databases, third party research
- DDEC level strategies and reports
- BLS, Census, OECD
- Financial data

Data + Discovery: Challenges DDEC Should Pay Attention To

Key challenges impacting Market Analysis, Opportunity Sizing, and Benchmarking

Government Data Availability

Due to Puerto Rico being a U.S. Territory, Government statistical agencies due not track key datasets for benchmarking and market analysis that is available to U.S. states.

Third Party Data Availability

Third party providers of key global publications for industry and government do not track key metrics that would greatly inform Puerto Rico but also allow Puerto Rico to tell it's story to a global audience.
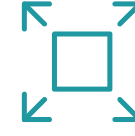
Stakeholder Engagement

DDEC is currently undertaking numerous projects that have significant overlap with this engagement. This led to "stakeholder burnout" of participation to support our efforts.
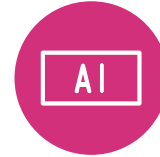
What We've Learned

Most of Puerto Rico's IT companies are **young** (established <7 years ago), **small** and of **local origin**.

Puerto Rico's current IT ecosystem design **does not enable agility** to address rapid market developments and **emerging technology** like **generative AI**.

Puerto Rico has **260+ companies** developing core IT goods and services, most of which are **concentrated in IT Services**.

Puerto Rico's core IT sector ecosystem can be strengthened by **designating champion organizations** to preside over **specific areas of the overarching vision** and strategy.

The **core IT sector** employs around **5K** Puerto Ricans. **~14K** work in **IT occupations** and **~30K** work in **IT-related sectors**.

Puerto Rico faces challenges in a competitive global IT market, as it ranks **ranks less favorably to US states and international comparators** on various IT-relevant benchmarking dimensions, particularly human capital.

The **lack of a convening body and standard definition for the IT sector** have made it **difficult to enact meaningful large-scale change**.

In the near term, Puerto Rico's highest-potential IT growth opportunity is likely in **IT Services and Cybersecurity for the mainland US market**.

2

IT Sector Definition & Scope

Key takeaways and highlights

1 There is an important distinction between the "core" IT sector and the broader IT-enabled economy—this calls for multiple layers of analysis to understand the full scope of the sector.

2 It is difficult to measure overall IT employment due to extensive overlap between IT subsectors, occupations, and tasks, and the blurred lines between traditional IT skills and broader "digital" skills.

3 Any estimates of the size and breadth of the IT sector are thus approximate and difficult to compare over time due the rapidly-evolving nature of IT.
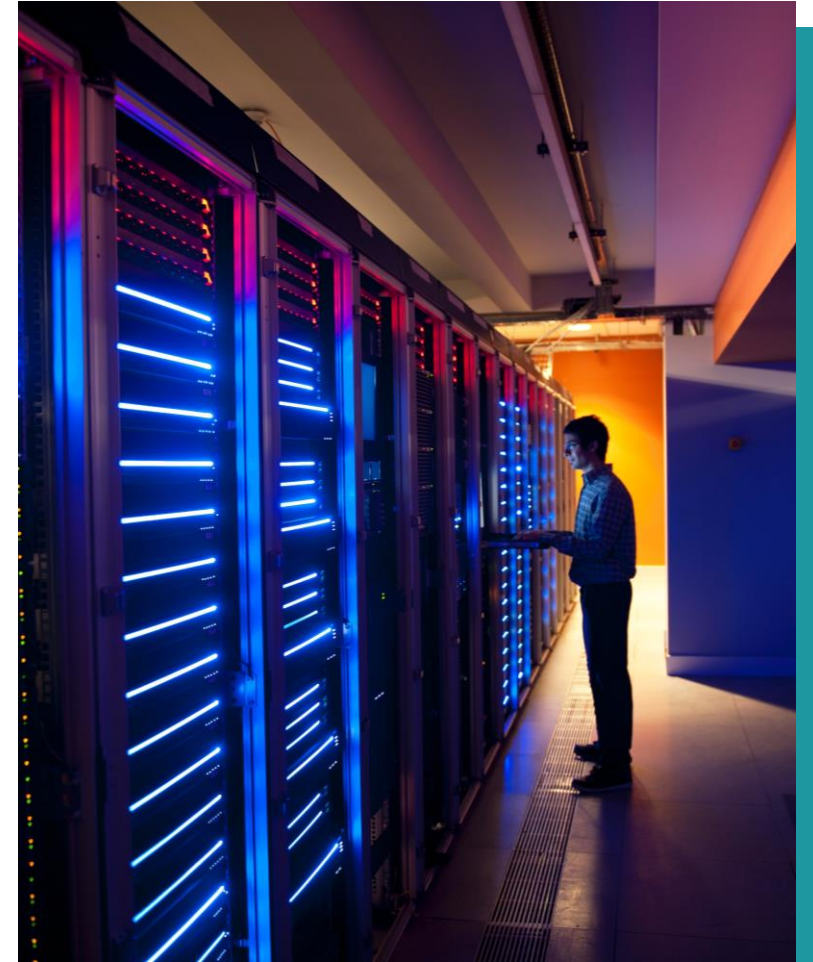
The Core IT-producing sector is the focus of this analysis but IT outputs and IT professionals are demanded throughout the economy

Core IT Sector vs. IT-Enabled economy

Inputs   Company   Outputs

Core IT Sector

Production of the IT infrastructure, goods, and services used by broader economy happens within the "Core IT sector."

IT Goods & Services

Labor (Including IT professionals)

Materials

e.g. Wovenware

IT Goods & Services

IT-Enabled Economy

Today's economy features IT professionals in every economic sector. Modern companies integrate IT workers and utilize IT goods and services to run their operations.

IT Goods & Services

Labor (Including IT professionals)

Materials

Raytheon

Non-IT goods & services

A range of traditional IT goods and services and new/emerging technologies comprise the core IT sector

Scope of Core IT sector

Legend:
- Major subsectors
- Subsector segments
- Emerging technologies

Subsectors and segments shown:

IT Services: Business Process Services, IT Consulting, Information Management, Data Management & Analytics, Platform Services, Infrastructure Services

Software: Software Development, Software Distribution, Software Sales, AI

Cybersecurity: Application Security, Education & Training, IT Disaster Recovery & Business Continuity

Telecom Services: Internet Service Providers, Data Service Providers, Broadcasting

Hardware & Infrastructure: Consumer Device Production, Network Equipment Production, Data Center Systems, Electronic Equipment, Machinery, & Parts

Emerging technologies: AI, Blockchain, Robotics, AR & VR, IoT

Within the broader IT-enabled economy, Government, Professional Services and Finance sectors tend to be largest end users of IT

Demand for IT goods and services in United States, by sector (2021 Billions USD)

Sector	Value
Professional & business services	153.5
Government	112.2
Finance, insurance, & real estate	64.0 — **Fintech**
Education, health, & social services	44.6 — **Healthtech, Edtech**
Retail trade	34.2
Wholesale trade	27.4
Leisure & entertainment	24.5
Manufacturing	20.3
Transportation & warehousing	19.4
Other Services	17.1
Construction	10.1
Utilities	4.5
Mining	1.7
Agriculture, forestry, & hunting	0.4 — **Agtech**

Not pictured: the US Information Sector accounted for over 263 Billion USD in intermediate goods and services in 2021.

Commentary

- Intermediate goods & services produced by the IT sector are demanded across every US sector. Total use of intermediate and final expenditure for information services accounted for almost $2 Trillion USD in 2021.

- Goods and services purchased by the IT-enabled economy result in the development of crossover subindustries such as **Fintech, Healthtech, and Edtech.**

- Nearly **every part of the modern economy has exposure to the IT sector** to manage employees & operations, run machinery, improve safety, and manage information.

Sources: BEA, US Chamber of Commerce

IT employment is difficult to measure precisely due to the diversity of occupations in both IT and non-IT sectors

Overlap between IT professionals and IT sector is blurry

IT Sector

(>6M US Jobs)
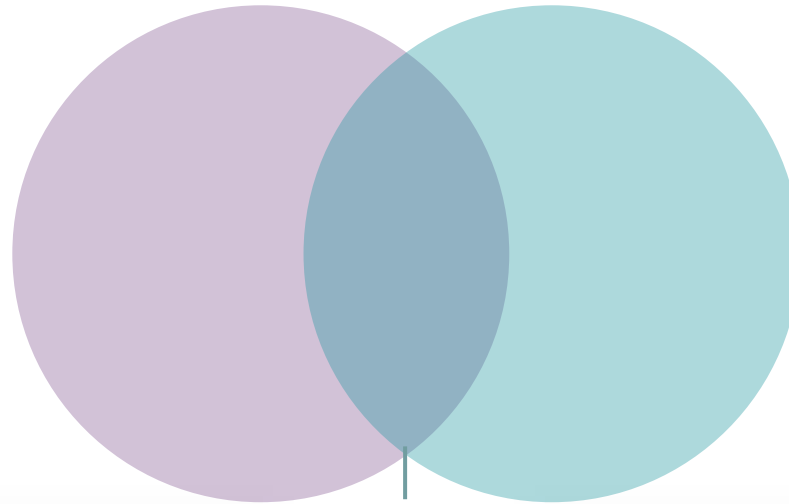
IT Employment

(~6M US jobs)

~40%

Commentary

The overlap between IT professionals and the IT sector is blurry.

- Over 90% of jobs in the United States now require digital skills, regardless of education level.

- Meanwhile, some workers in the IT sector are not necessarily performing IT-work.

- The estimated overlap between employment as an IT professional and the IT sector is ~40% according to CompTIA.

Examples of jobs in the IT sector that perform non-IT work

- Human resources managers

- Accountants and bookkeepers

- Maintenance and sanitation workers

Examples of IT jobs not necessarily found in the IT sector

- Web developers

- Network and system administrators

- Electrical and hardware engineers

Sources: CompTIA, National Skills Coalition

Workers in traditionally-defined IT occupations (e.g. software developers) tend to be concentrated in services sectors

Percent of workers in sector employed in IT occupations (US, 2021)

Percentage of sector employment in an IT occupation
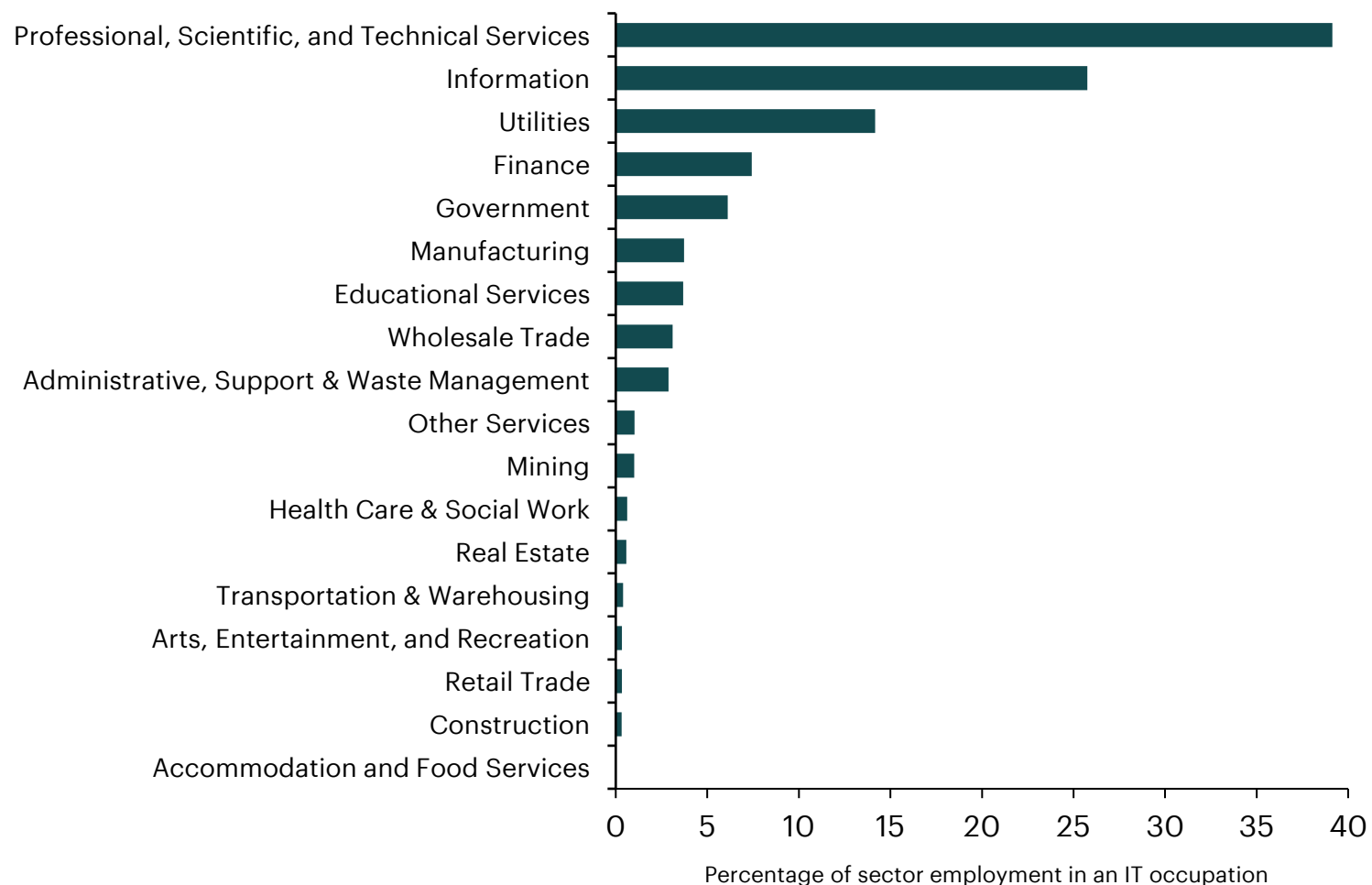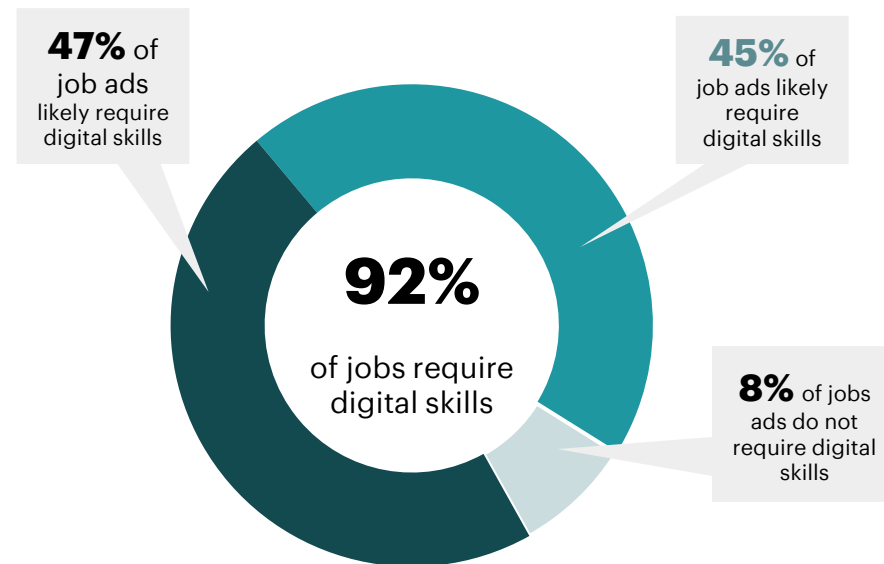
Commentary

IT professionals are found across most sectors but generally concentrated in services sectors:

- The occupation with the most workers in the United States is Software Developers – who are principally concentrated in the Professional, Scientific, and Technical sector.

- About 12% of US IT workers are computer user specialists, 10% are computer systems analysts. Both occupations are concentrated in the Information and Professional, Scientific, and Technical sectors.

Source: BLS, OES, Accenture Strategy Research

Demand for workers with broader "digital" skills, however, is much greater and more widespread across sectors

Over 90% of jobs in US (regardless of education level) require digital skills

Sectoral demand for digital skills

Bar chart categories (top to bottom):
- Information
- Professional & technical services
- Management of companies
- Finance & insurance
- Manufacturing
- Government
- Utilities
- Real estate & rental leasing
- Wholesale trade
- Support services & waste management
- Educational services
- Mining
- Agriculture, Forestry, & Hunting
- Construction
- Accommodation & leisure
- Health care & social assistance
- Transportation & warehousing
- Retail trade
- Other services

X-axis: % of job postings (0–100)

Legend:
- Definitely a digital skill required
- Likely or definitely a digital skill required

47% of job ads likely require digital skills

45% of job ads likely require digital skills

92% of jobs require digital skills

8% of jobs ads do not require digital skills

Education level Required	% of ads requiring a likely digital skill	% of ads requiring a digital skill
High School	94%	46%
Associate's	97%	47%
Bachelor's	99%	74%
Master's	97%	46%
PhD	97%	39%

Sources: CompTIA, National Skills Coalition

3

Puerto Rico's IT Sector

Key highlights and takeaways

1 The majority of Puerto Rico's IT companies are young (established in the last 7 years), small and of local origin.

2 Puerto Rico has at least 236 companies developing core IT goods and services. Most are concentrated in IT Services subsector and located in San Juan or Guaynabo. Around 5,000 people are employed in the core IT sector.

3 There are few companies with exposure to emerging technologies (e.g. AI, Robotics) and even fewer operating in the cross-over tech space, with the majority in Fintech.
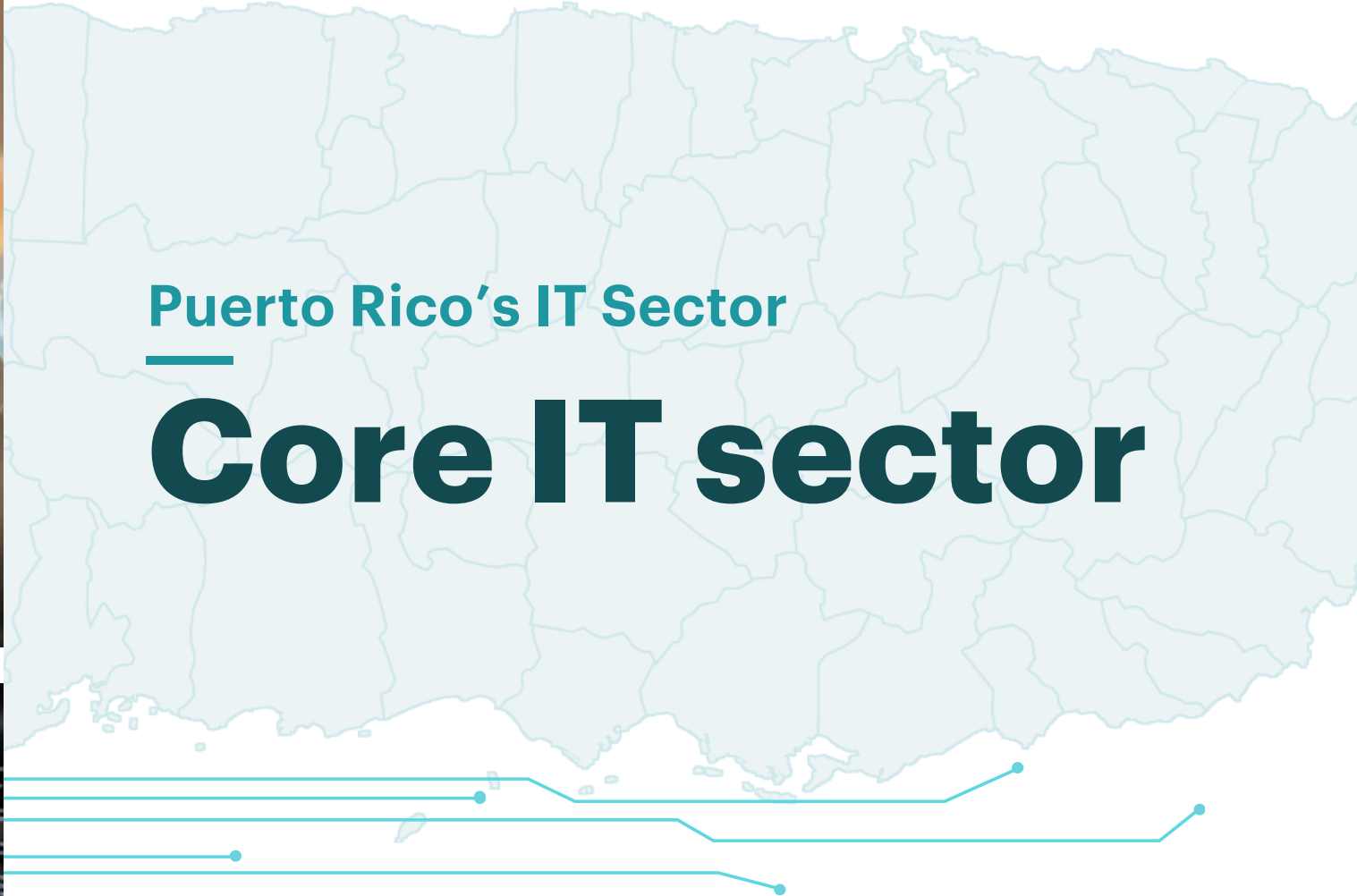
4 The broader IT-enabled economy is a major source of employment. Up to 14K Puerto Ricans work in IT occupations, and about 30K work in IT-related sectors.

5 In line with the specialization of the core IT sector, Puerto Rican IT occupations are concentrated in IT Service roles.
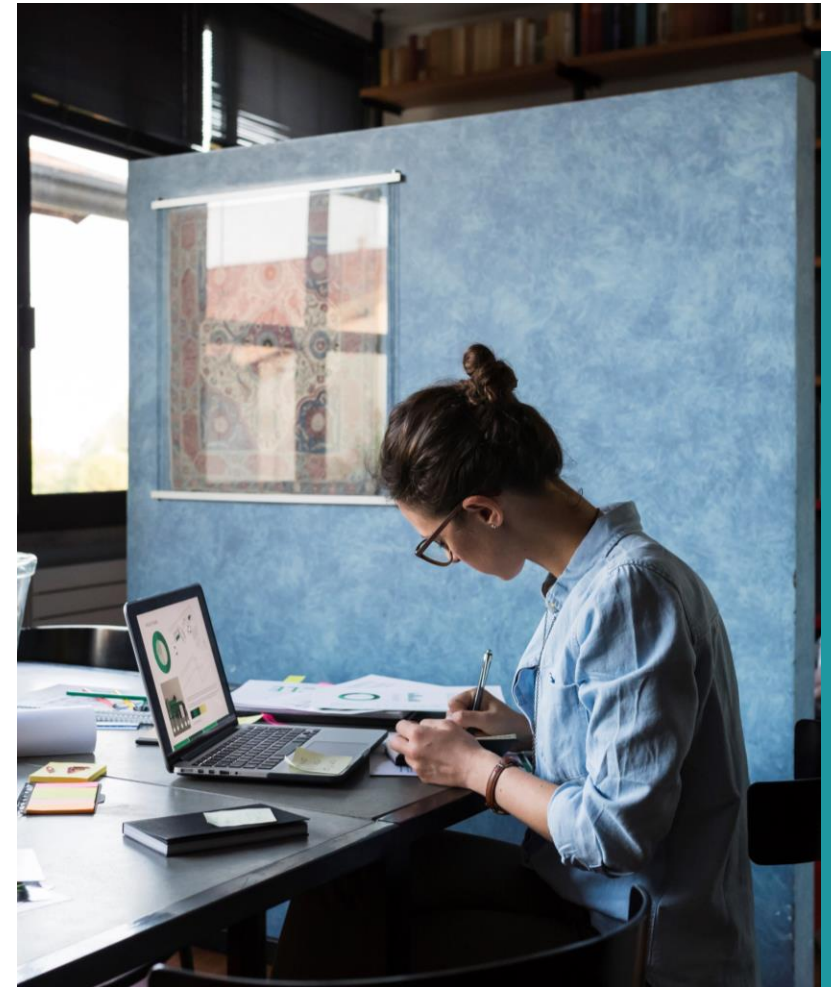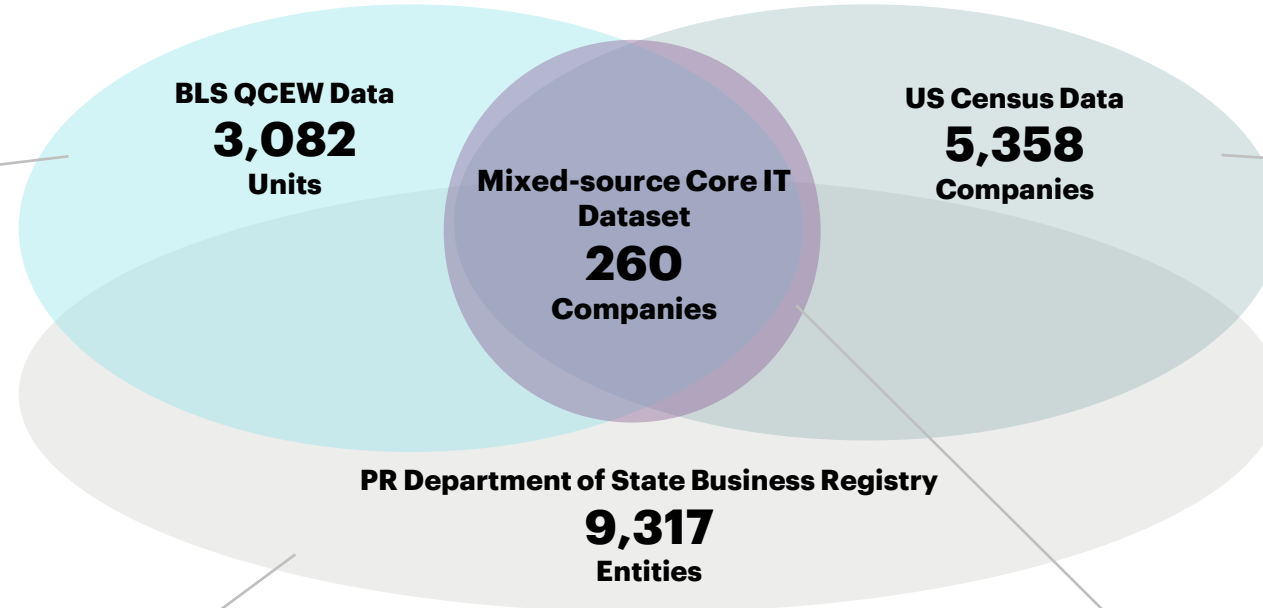
Puerto Rico's IT Sector

Core IT sector

"How many IT companies?" is not a straightforward question

Triangulation of data sources on IT companies

The Bureau of Labor Statistics counted over 3K units in relevant 6-digit NAICS codes for Puerto Rico in 2021. An economic unit produces goods or services in a single location, when a single location is responsible for two or more distinct activities, they are treated as separate establishments. The majority of units are concentrated in the professional, scientific, and technical fields.

BLS QCEW Data
3,082
Units

Mixed-source Core IT Dataset
260
Companies

US Census Data
5,358
Companies

The 2017 U.S. Census sorted companies by 2-digit NAICS codes and counted 868 companies in the Information sector and 4,490 companies in the professional services sector across Samoa, the Northern Mariana Islands, Guam, Puerto Rico, Virgin Islands with little detailed information on firms.

PR Department of State Business Registry
9,317
Entities

The Department of State's Registry and Economic Survey dataset counts over 9K active entities (including companies) by relevant 4-digit NAICS codes in 2021. Approximately 3K have 0 employees, and 2.5K have fewer than 10 employees. Most entities are found under professional, scientific, and technical NAICS codes – which overlaps significantly with the pharmaceutical sector.

A custom dataset of companies compiled from various vendors (Pitchbook, Crunchbase), supplemented with additional research, that filters and identifies companies who engage in Core IT sector activities. This dataset enables us to estimate revenue & employee numbers, identify subindustries, exposure to emerging technologies, & geographic locations of operation, and company longevity.

Business registry data suggests most IT companies are small and headquartered in Puerto Rico

Frequency of sizes (left) and headquarter locations of IT sector companies (right)
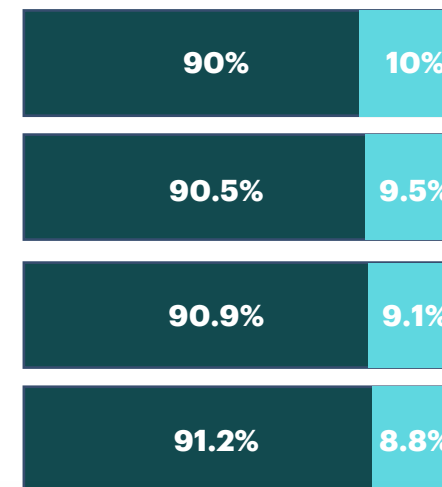
Company Sizes
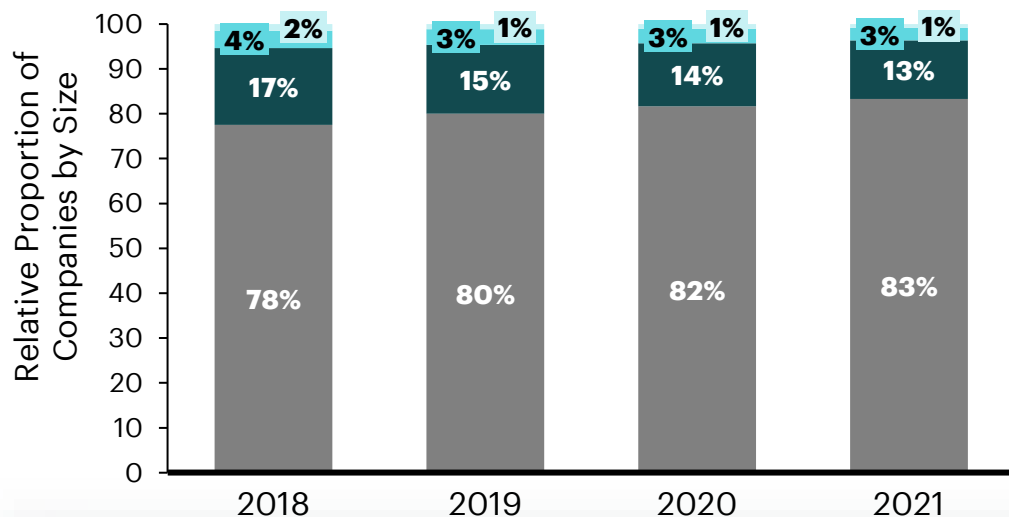
- Large
- Medium
- Small
- Micro

- Large = 250 + employees
- Medium = 50-249 employees
- Small = 10-49 employees
- Micro = 1-9 employees

Chart (left): Relative Proportion of Companies by Size

Year	Large	Medium	Small	Micro
2018	2%	4%	17%	78%
2019	1%	3%	15%	80%
2020	1%	3%	14%	82%
2021	1%	3%	13%	83%

Chart (right): Headquarter Location

Year	PR-Based Companies	Non PR-Based Companies
2018	90%	10%
2019	90.5%	9.5%
2020	90.9%	9.1%
2021	91.2%	8.8%

Commentary

- The vast majority of companies in Puerto Rico are small and micro-sized, both by revenue (not pictured) and by employee number.

- Most companies are based in Puerto Rico.

- Department of State data suggests Puerto Rico has relatively little exposure to Hardware & Infrastructure manufacturing and high exposure to the IT Services and Software subsectors.

- About 70% of IT-connected companies are found in two sectors: Management, Scientific, & Technical Consulting Services (NAICS Code 5416) and Other Professional, Scientific, & Technical Services (NAICS Code 5419).

Most companies across the IT sector are relatively young: 18% have been created since 2020, 48% from 2018-2021, and 61% from 2015-2021

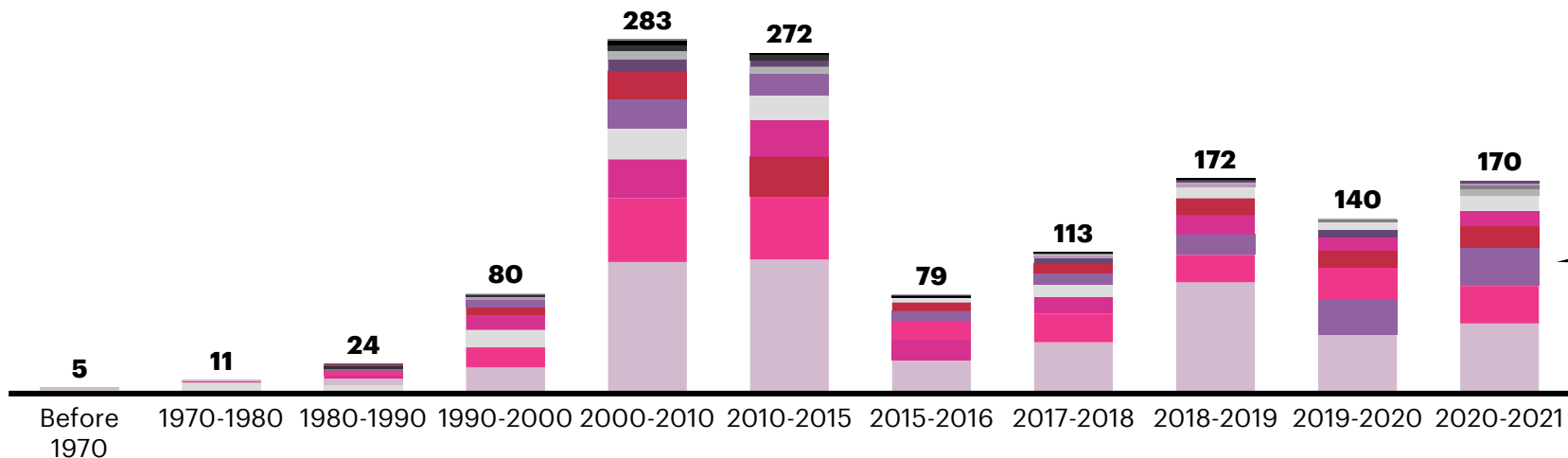## Number of IT-related companies including those with overlap with the pharma industry
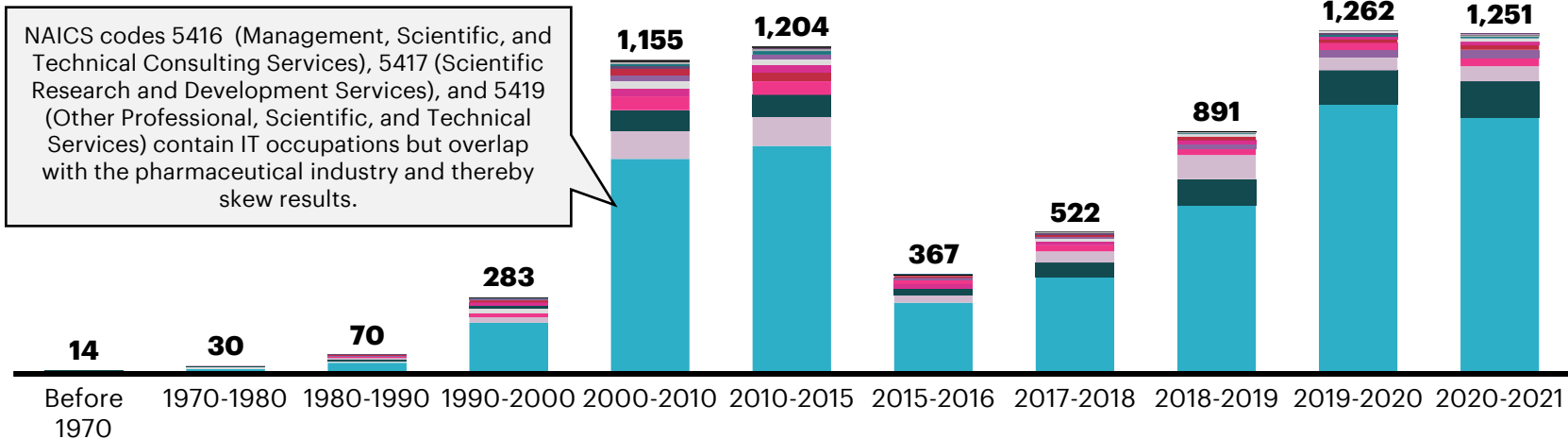
NAICS codes 5416 (Management, Scientific, and Technical Consulting Services), 5417 (Scientific Research and Development Services), and 5419 (Other Professional, Scientific, and Technical Services) contain IT occupations but overlap with the pharmaceutical industry and thereby skew results.

Values (including): Before 1970: 14; 1970-1980: 30; 1980-1990: 70; 1990-2000: 283; 2000-2010: 1,155; 2010-2015: 1,204; 2015-2016: 367; 2017-2018: 522; 2018-2019: 891; 2019-2020: 1,262; 2020-2021: 1,251

Joint legend

- ■ Comp. & Peripheral Equip. Manuf.
- ■ Comms Equip. Manuf.
- ■ Audio & Video Equip. Manuf.
- ■ Other Electrical Equip. & Comp. Manuf.
- ■ Electrical Goods
- ■ Information (misc.)
- ■ Software Publishers
- ■ Broadcasting
- ■ Telecomms
- ■ Information Services
- ■ Data Processing Services
- ■ Comp. Systems Design & Related Services
- ■ Manag., Scientific, & Technical Consult. Services
- ■ Scientific Research & Development Services
- ■ Other Professional, Scientific, & Technical Services

Number of IT-related companies excluding those with overlap with the pharma industry

Values (excluding): Before 1970: 5; 1970-1980: 11; 1980-1990: 24; 1990-2000: 80; 2000-2010: 283; 2010-2015: 272; 2015-2016: 79; 2017-2018: 113; 2018-2019: 172; 2019-2020: 140; 2020-2021: 170
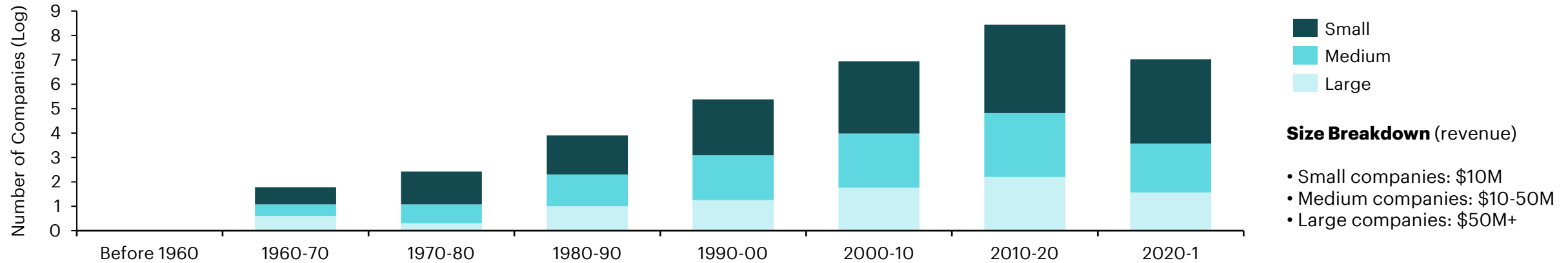
There were 30 new software publishers in 2020, 30 information services firms, 18 computer systems design & related services firms, 12 data processing services firms, and 56 miscellaneous Telecoms services firms.

Sources: Departmento de Estado de Puerto Rico, Accenture Strategy Analysis

Many IT companies founded 10+ years ago remain small, suggesting ongoing struggles to grow

Number of IT-related companies by approximate revenue size

Size Breakdown (revenue)

- Small companies: $10M
- Medium companies: $10-50M
- Large companies: $50M+

Legend: Small, Medium, Large

Number of IT-related companies by employee number

Size Breakdown (employees)

- Small companies: 1-50
- Medium companies: 50-250
- Large companies: 250+

Sources: Departmento de Estado de Puerto Rico, Accenture Strategy Analysis
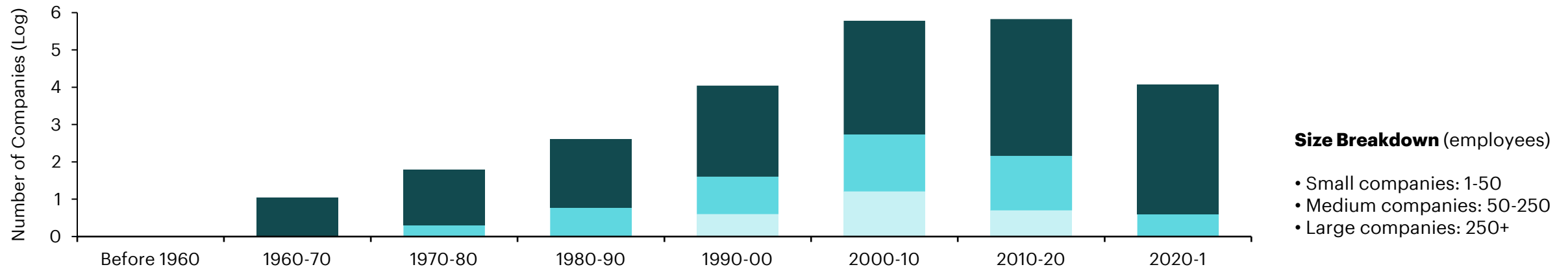
Core IT sector dataset supports this observation:

Most Core IT Puerto Rican companies are small, relatively well established, and employ relatively few individuals. Most companies are located in San Juan, and relatively few focus directly on emerging technologies (AI, IoT, Blockchain, AR/VR).

260+
Core IT Companies

75%
of companies are small

26
Companies have exposure to emerging technologies

~5,000
Estimated Employment

32
Average Age

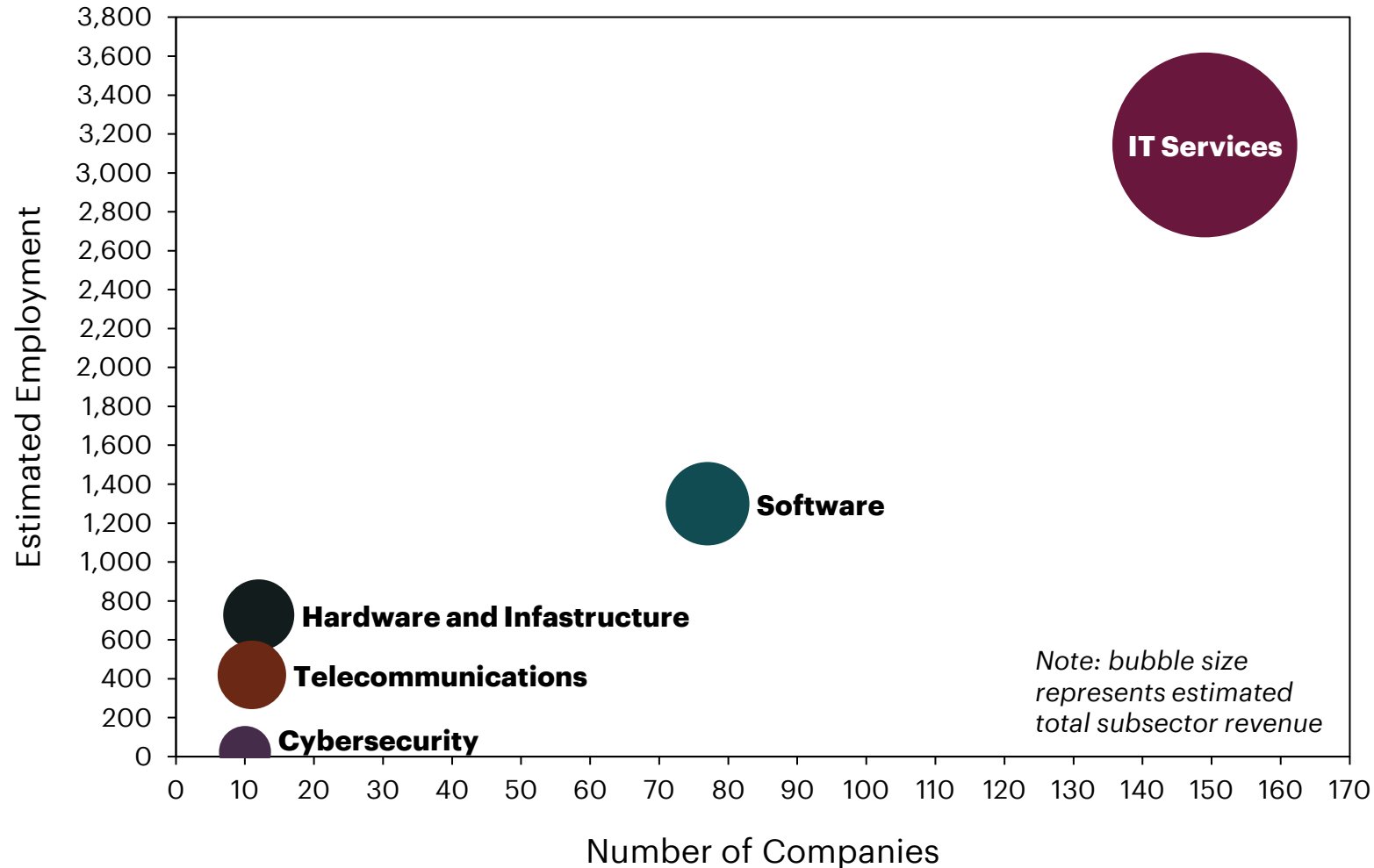## 16
Median Age

72%
of companies are located in San Juan

Puerto Rico's Core IT sector is concentrated in the IT services subsector

Relative size of IT subsectors by number of companies & estimated employment

Note: bubble size represents estimated total subsector revenue

Commentary

- With 58% of the total number of companies active in Puerto Rico's estimated core IT sector, the IT services subsector is both the main employer and the highest grossing sector by total estimated revenue.

- The software subsector is the next largest by total employment and number of companies, representing approximately 30% of total companies in the core IT sector.

- Together, hardware & infrastructure and telecommunications services account for about 9% of total core IT sector employers in Puerto Rico.

Sources: Accenture Strategy Analysis

Companies in both Core IT sector and wider IT-enabled economy have relatively limited exposure to emerging technologies

Number of companies with exposure to emerging technologies

Core IT Sector
(companies developing or specializing in emerging technologies)

Blockchain 12 · Robotics 1 · Cloud 1 · AI 8 · AR/VR 1 · IoT 3

IT Enabled Economy
(companies broadly leveraging technologies in business models)

Blockchain 21 · Robotics 6 · Cloud 9 · AI 8 · AR/VR 2 · IoT 5
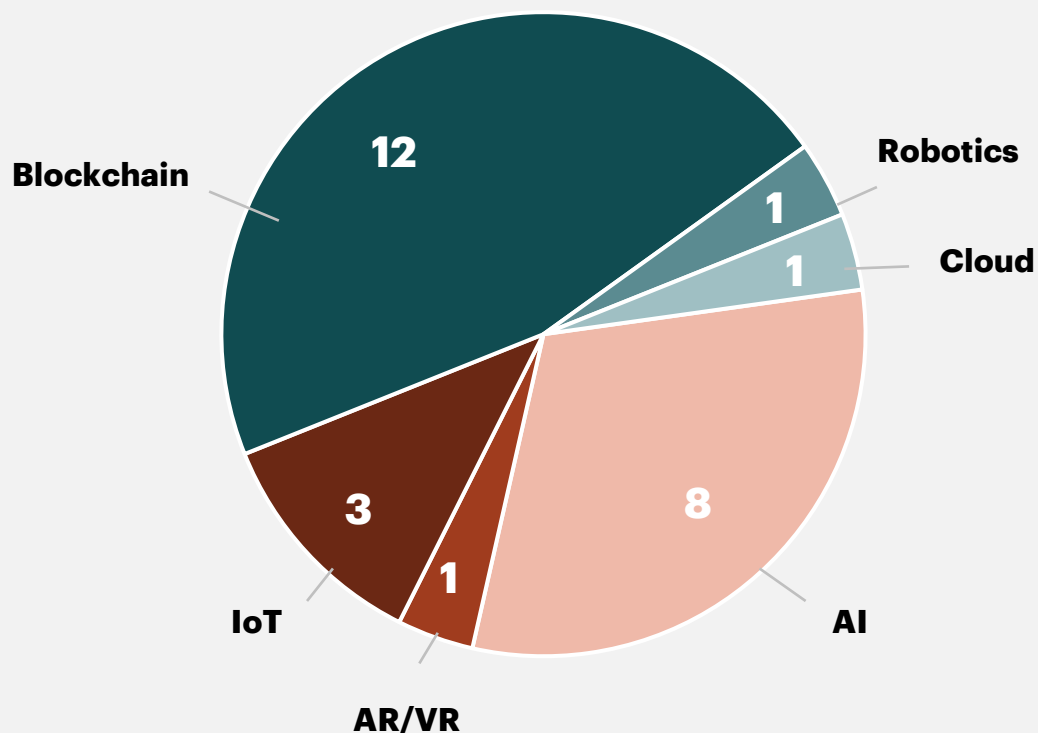
Note: AI includes machine learning, natural language processing, intelligent systems, and predictive analytics; Blockchain includes cryptocurrencies; Cloud includes Cloud infrastructure, data services, management, computing, security, private cloud, cloud storage.

Sources: Crunchbase, Pitchbook, Accenture Strategy Analysis
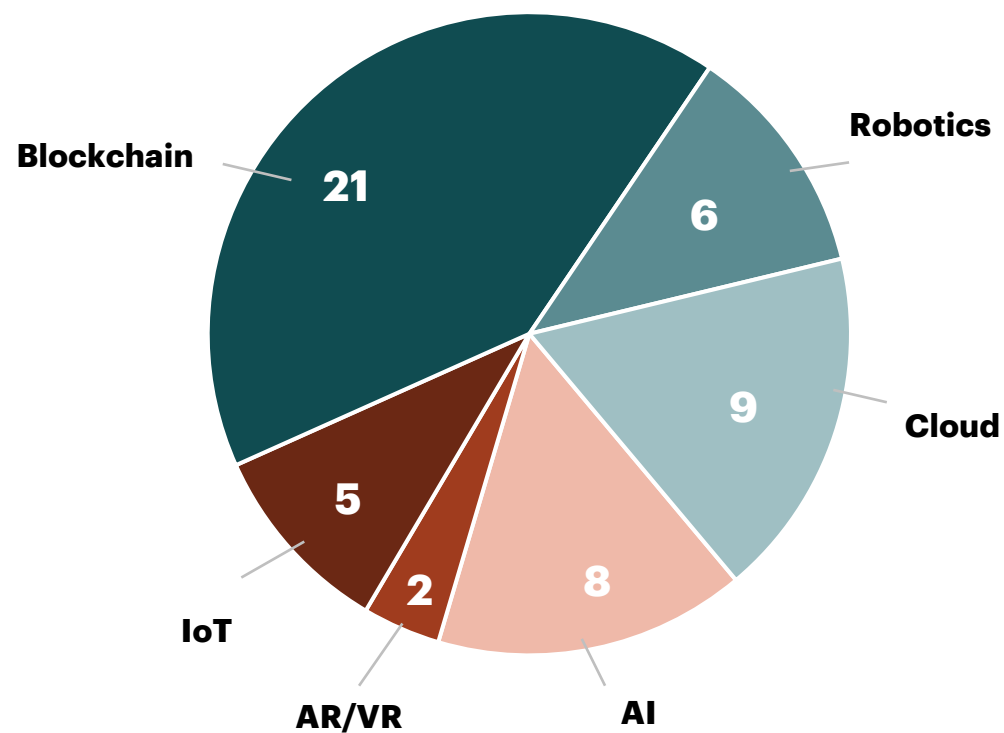
Pie numbers = number of companies with exposure to emerging technology

Puerto Rico has relatively few companies operating in the cross-over tech space of the broader IT enabled economy

Number of companies operating in cross-over tech spaces

Approximately 11 companies are developing IT technologies, two companies have more than 50 employees (notably Evertec).

FinTech
19

AgTech
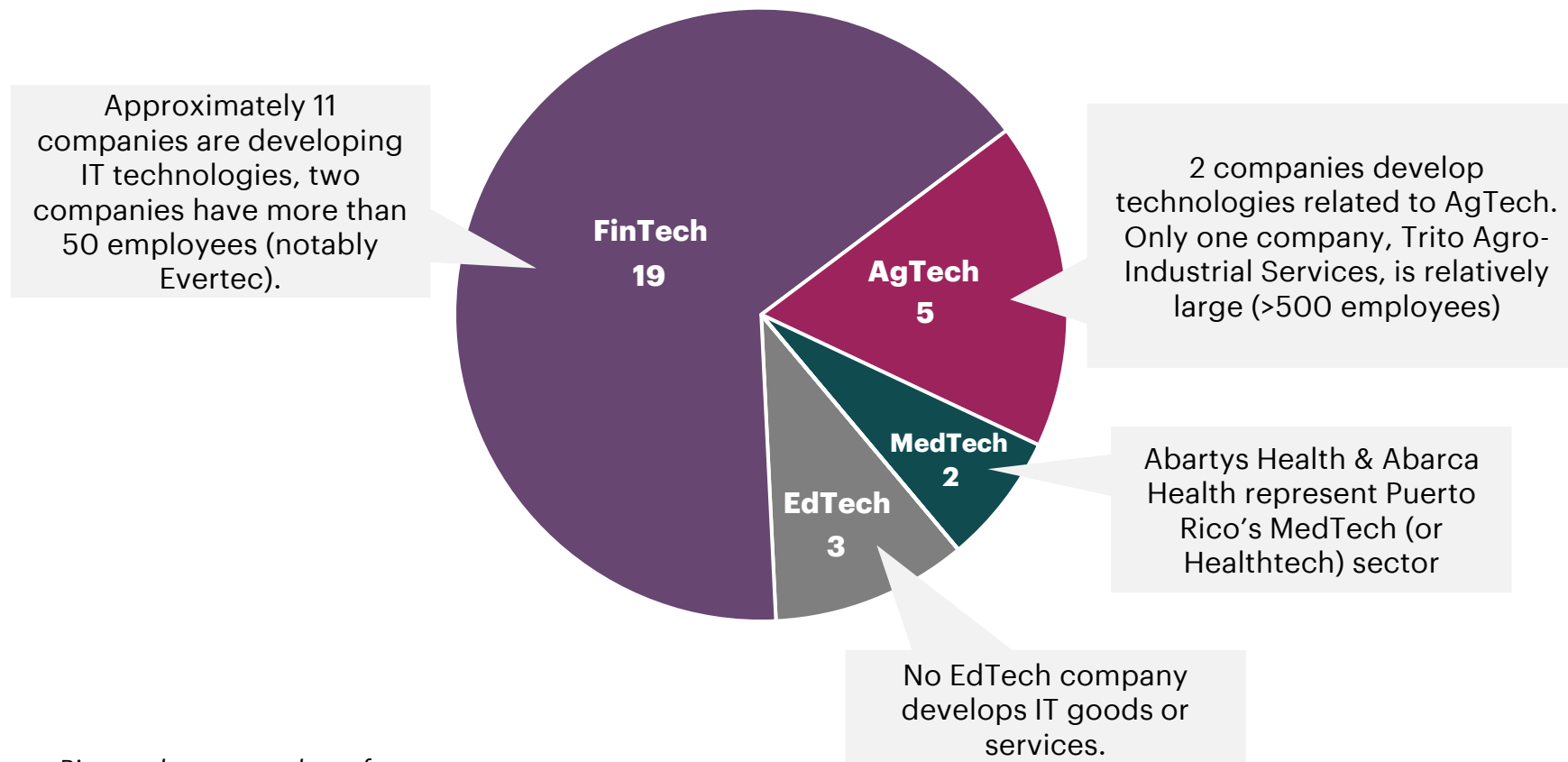**5**

2 companies develop technologies related to AgTech. Only one company, Trito Agro-Industrial Services, is relatively large (>500 employees)

MedTech
2

Abartys Health & Abarca Health represent Puerto Rico's MedTech (or Healthtech) sector

EdTech
3

No EdTech company develops IT goods or services.

Pie numbers = number of companies with exposure to emerging technologies

Commentary

- Most of Puerto Rico's cross-over tech companies operate in the FinTech space; **relatively few of Puerto Rico's FinTech companies build core IT services.**

- Puerto Rico has **no major companies** working in the RealTech (real estate technology), or LegalTech (bureaucratic or jurisprudential technology).

- **The majority** of the players in sector-specific technology solutions spaces **do not provide IT goods or services** and are therefore not considered core IT companies.

Sources: Crunchbase, Pitchbook, Accenture Strategy Analysis

Puerto Rico's Core IT sector is centered in and around San Juan

Number of Core IT firms by municipality

Activity Concentrations:
- Software Development (21% of co's)
- Platform Services (16%)
- Business Process Services (16%)
- IT Consulting (13%)
- Data Management & Analytics (9%)

Activity Concentrations:
- Software Development (25% of co's)
- IT Consulting (18%)
- Business Process Services (11%)
- Platform Services (11%)
- Data Management & Analytics (10%)
- Infrastructure Services (10%)

Arecibo — 1

San Juan — 188

Guaynabo — 43

Trujillo Alto — 3

Mayagüez — 9

Caguas — 12

Las Piedras — 1

Humacao — 1

Ponce — 2

Source: Accenture Strategy Analysis

Subsector Snapshot: IT Services

Puerto Rico's largest subsector is relatively young and concentrated in San Juan

# of Co's	Average Age (years)	Median Age (years)
149	**32**	**13**

Example Companies

Established

Nagnoi

ClickUp

Evertec

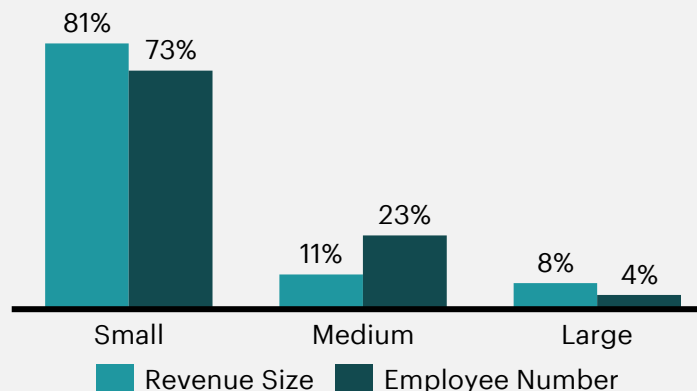**Emerging**

Renova Solutions

Beryllium Corporation

Distribution of Companies by Revenue and Employee Numbers

- Small: 81% (Revenue Size), 73% (Employee Number)
- Medium: 11% (Revenue Size), 23% (Employee Number)
- Large: 8% (Revenue Size), 4% (Employee Number)
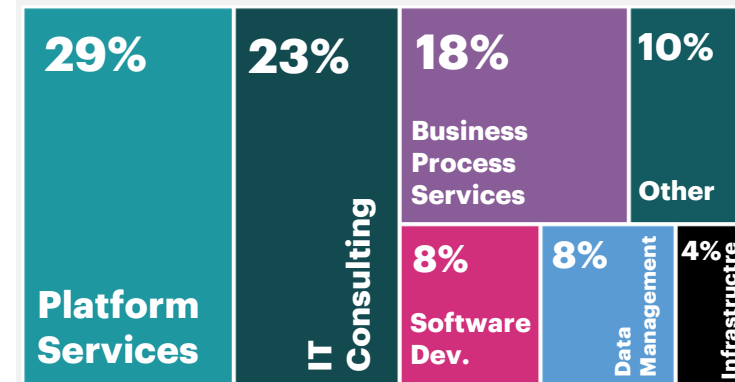
Legend: Revenue Size, Employee Number

- Small companies: <$1-10M | 1-50 employees
- Medium companies: $10-50M | 50-250 employees
- Large companies: $50M + | 250+ employees

Key Professions

- Web Developer
- IT Consultant
- Computer Programmer
- UX/UI Designer

Composition of Activities

- 29% Platform Services
- 23% IT Consulting
- 18% Business Process Services
- 10% Other
- 8% Software Dev.
- 8% Data Management
- 4% Infrastructre

Geographic Concentration

- 93% San Juan
- 7% Outside San Juan

The IT Services subsector tends to be concentrated in the Greater San Juan area.

Subsector Snapshot: Software

Puerto Rico has a budding software subsector of relatively small companies

# of Co's	Average Age (years)	Median Age (years)
77	32	6

Example Companies

Established

eMobile POS   Wovenware   Rock Solid Technologies

Emerging

TerraFirma SOFTWARE   LUSZOL®

Terra Firma   Luszol

Distribution of Companies by Revenue and Employee Numbers

- Small: 81% (Revenue Size), 82% (Employee Number)
- Medium: 10% (Revenue Size), 18% (Employee Number)
- Large: 10% (Revenue Size), 0% (Employee Number)

Legend: Revenue Size, Employee Number

- Small companies: <$1-10M | 1-50 employees
- Medium companies: $10-50M | 50-250 employees
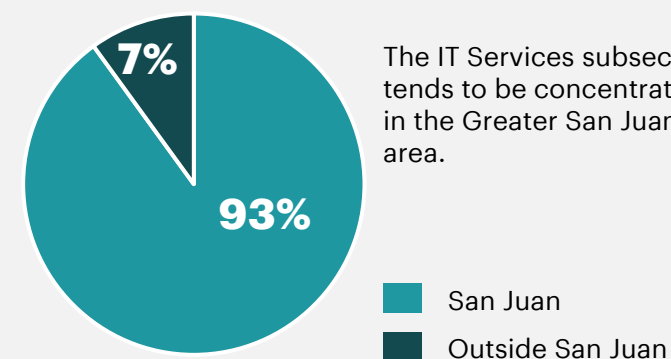- Large companies: $50M + | 250+ employees

Key Professions

- Front-end developer
- Full-stack developer
- Business analyst
- Node JS engineer

Composition of Activities

- 55% Software Development
- 14% Business Process Services
- 9% Platform Services
- 9% Infrastructure Services
- 7% Data Management & Analytics
- 5% Other
- 3% Sales

Geographic Concentration

The Software subsector is concentrated in the Greater San Juan area.

- 92% San Juan
- 8% Outside San Juan

Subsector Snapshot: Hardware & Infrastructure

Puerto Rico's Hardware subsector is well established, small, and spread across the island

# of Co's	Average Age (years)	Median Age (years)
14	51	28
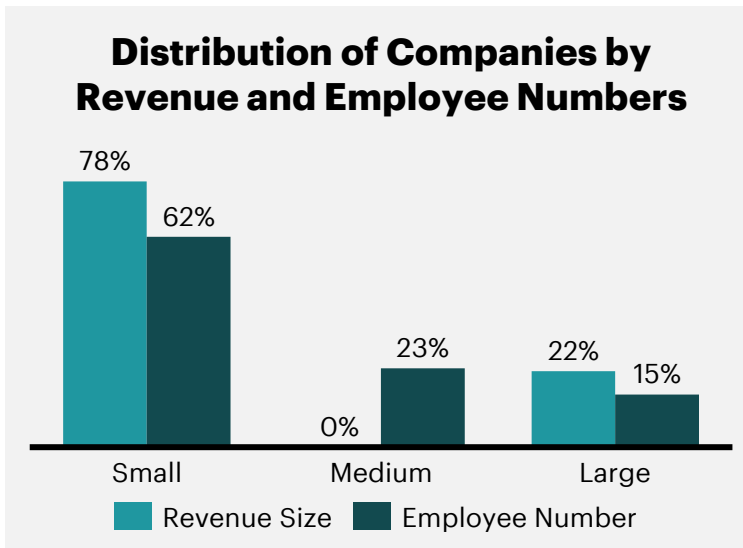
Example Companies

Established

Benchmark Solutions

Accurate Solutions & Designs, Inc.

Emerging

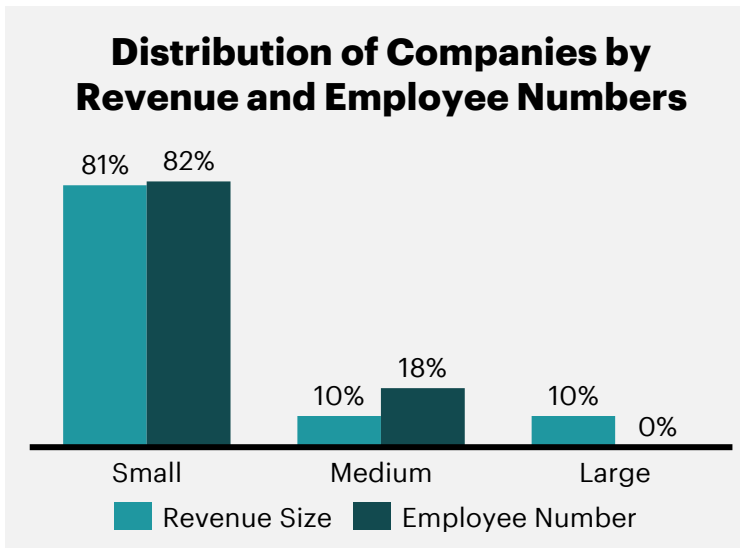AeroCarve US

Kytelabs

Distribution of Companies by Revenue and Employee Numbers
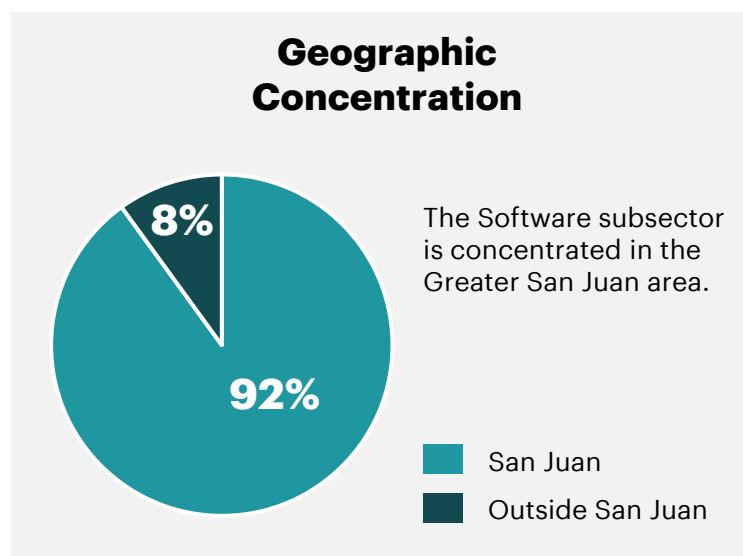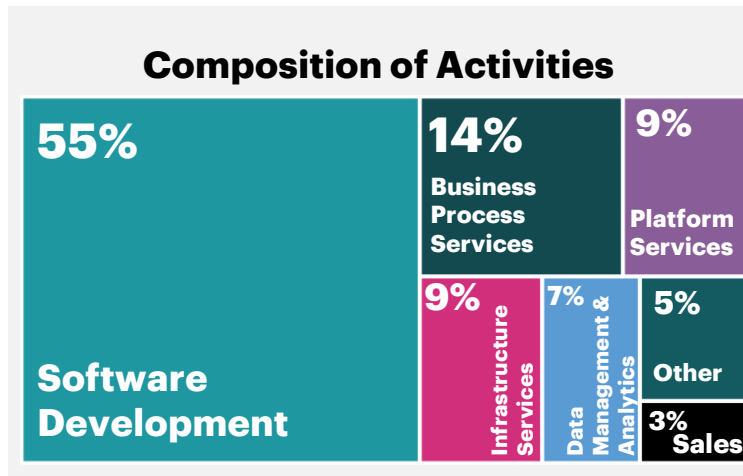

- Small companies: <$1-10M | 1-50 employees
- Medium companies: $10-50M | 50-250 employees
- Large companies: $50M + | 250+ employees

Key Professions
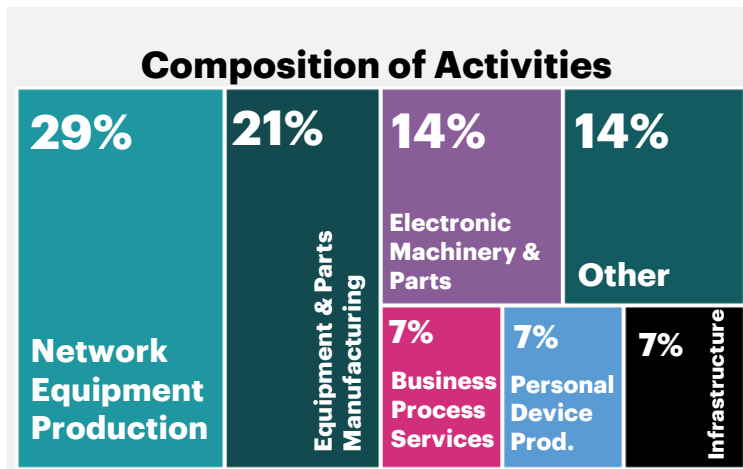
- System Engineer
- Hardware Technician
- Network Solutions Architect
- Product Manager

Composition of Activities

| 29% Network Equipment Production | 21% Equipment & Parts Manufacturing | 14% Electronic Machinery & Parts | 14% Other |
| | | 7% Business Process Services | 7% Personal Device Prod. | 7% Infrastructure |

Geographic Concentration

The Hardware & Infrastructure subsector is spread across the island.

- San Juan (50%)
- Outside San Juan (50%)

Subsector Snapshot: Telecommunications

Puerto Rico's relatively small Telecommunications subsector is the youngest core IT subsector

# of Co's	Average Age (years)	Median Age (years)
11	20	21

Example Companies

Established

Criticalhub Networks

Total Telecom Corp

Emerging

FM Tech Group

BPO Telecom

Distribution of Companies by Revenue and Employee Numbers

- Small: 71% (Revenue Size), 78% (Employee Number)
- Medium: 14% (Revenue Size), 11% (Employee Number)
- Large: 14% (Revenue Size), 11% (Employee Number)

Legend: ■ Revenue Size ■ Employee Number

- Small companies: <$1-10M | 1-50 employees
- Medium companies: $10-50M | 50-250 employees
- Large companies: $50M + | 250+ employees

Key Professions
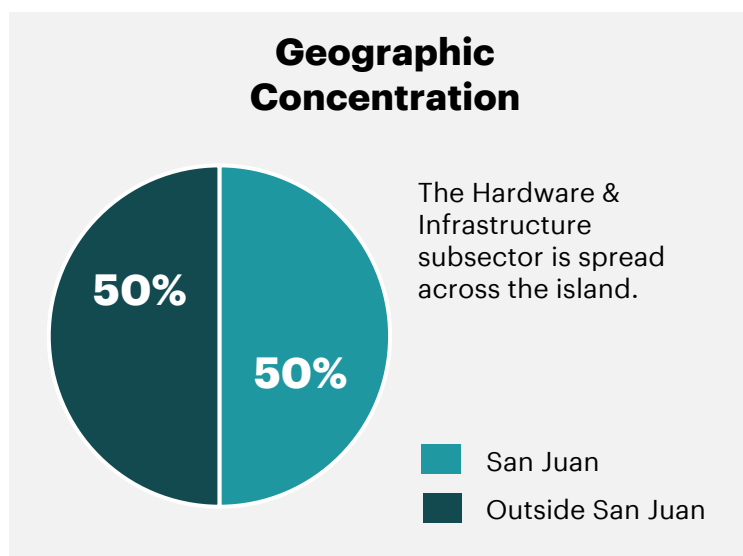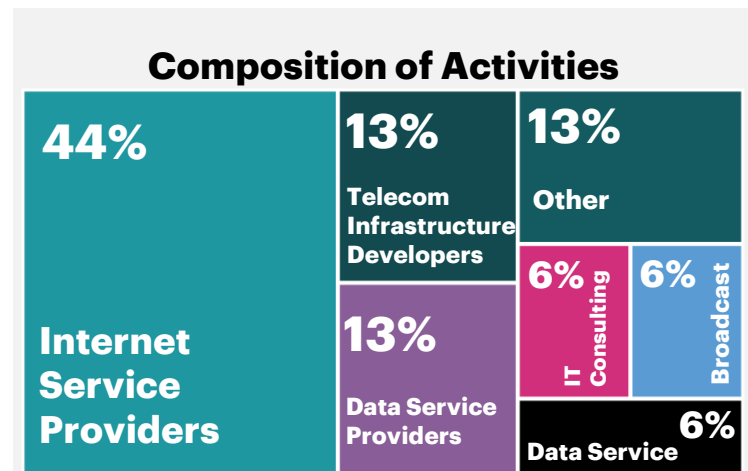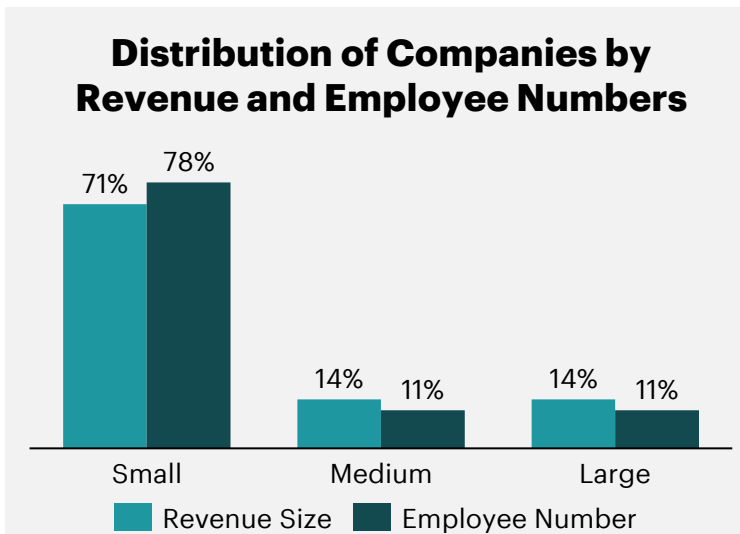
- Equipment Installer
- Telecom Specialist
- Network Engineer
- Communications Engineer

Composition of Activities

- 44% Internet Service Providers
- 13% Telecom Infrastructure Developers
- 13% Other
- 13% Data Service Providers
- 6% IT Consulting
- 6% Broadcast
- 6% Data Service

Geographic Concentration

- 91% San Juan
- 9% Outside San Juan

The Telecommunications subsector is concentrated in the greater San Juan area.

Legend: ■ San Juan ■ Outside San Juan

Subsector Snapshot: Cybersecurity

Puerto Rico has a small cybersecurity subsector with lots of potential

# of Co's	Average Age (years)	Median Age (years)
10	23	22

Example Companies

Established

Neptuno

Protective Security Systems

Emerging

VPNet

Polyswarm

Distribution of Companies by Revenue and Employee Numbers

	Small	Medium	Large
Revenue Size	100%	0%	0%
Employee Number	78%	11%	11%

Legend: Revenue Size | Employee Number
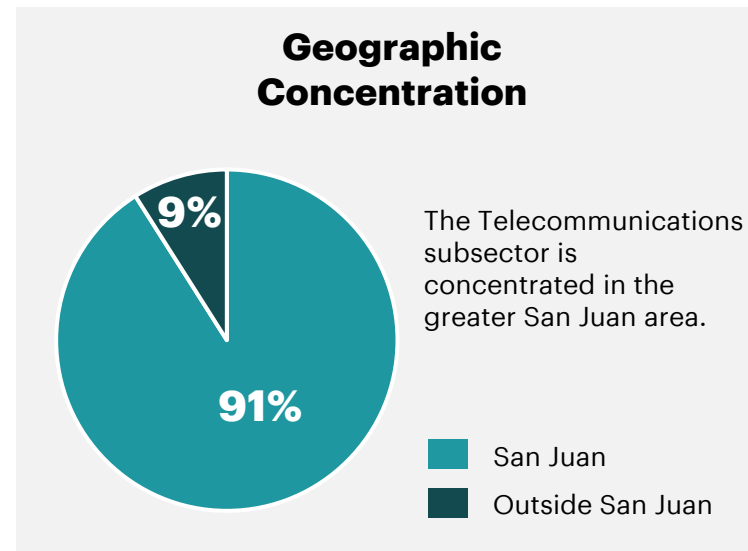
- Small companies: <$1-10M | 1-50 employees
- Medium companies: $10-50M | 50-250 employees
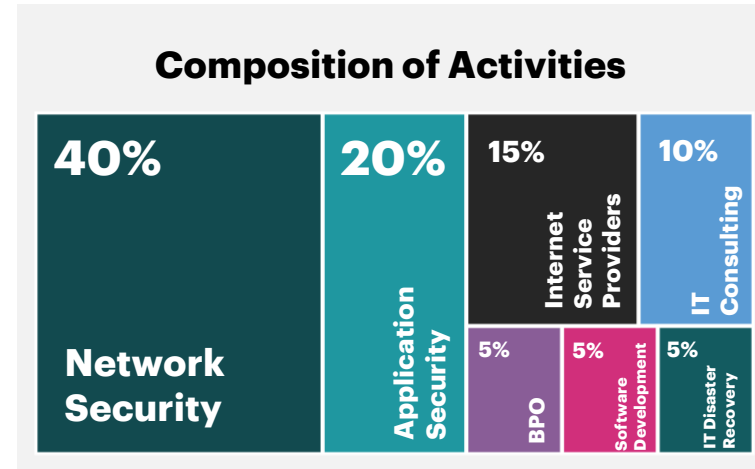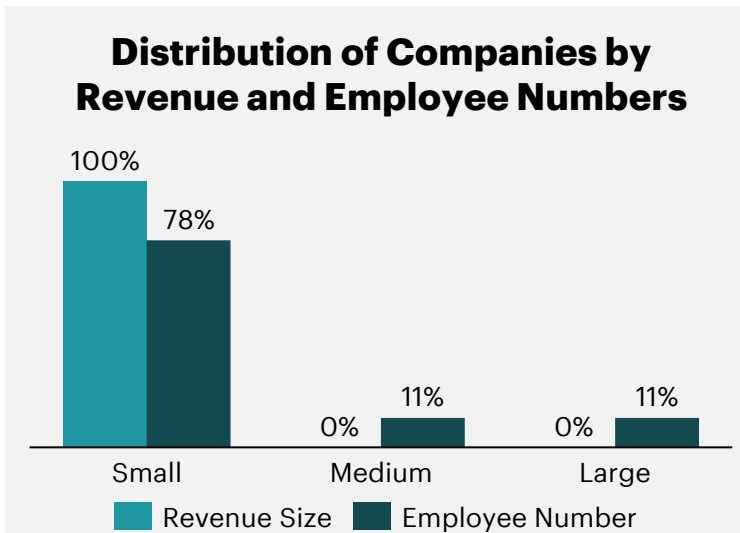- Large companies: $50M + | 250+ employees
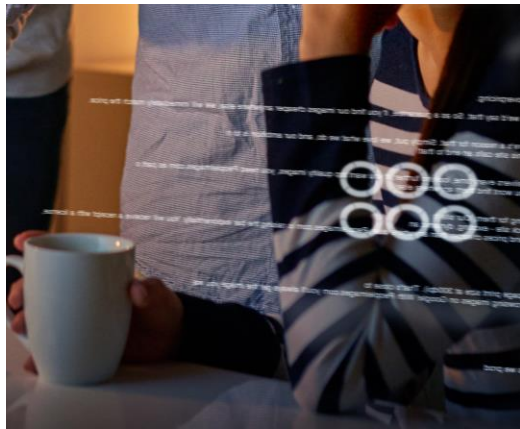
Key Professions

- Security Architect
- Incident Security Officer
- Database Administrator
- Malware Analyst

Composition of Activities

- 40% Network Security
- 20% Application Security
- 15% Internet Service Providers
- 10% IT Consulting
- 5% BPO
- 5% Software Development
- 5% IT Disaster Recovery

Geographic Concentration

- 90% San Juan
- 10% Outside San Juan

The Cybersecurity subsector is entirely concentrated in the greater San Juan area.
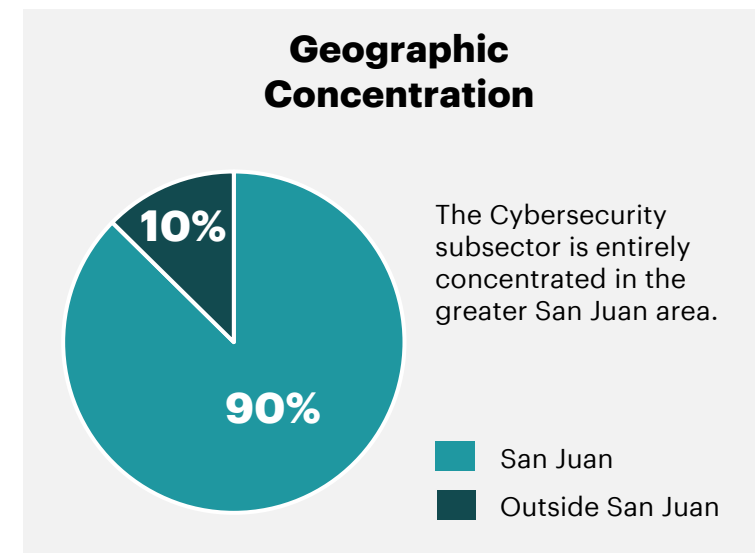
Puerto Rico's IT Sector

IT-Enabled Economy

Measures of IT employment must be triangulated from multiple perspectives

Who is an IT worker, how many IT workers are there, and which sector do they support?

Occupational Roles

Occupational data is available from BLS through its State Occupational Employment & Wage Estimates (OEWS) dataset. OEWS produces employment estimates for approximately 830 occupations based on surveys of business establishment and is published annually.

Pros: Provides a view on all workers who perform IT work.

Cons: Not constrained to the IT Industry.

Industry Classification

Industry occupational data is available from BLS through its Quarterly Census of Employment and Wages (QCEW) dataset. QCEW publishes a quarterly count of employment by employers by detailed industry (defined by NAICS code).

Pros: Provides a view of all workers who work in IT sectors.

Cons: Not constrained to IT Occupations.
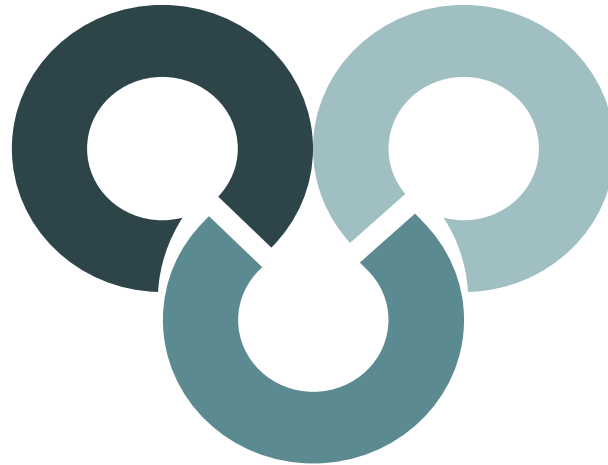
Occupation by Industry

Accenture developed a dataset of occupation by industry to study the number of workers by relevant occupations within identified industries. The data is available at 4-digit NAICS code industry depth. This precise matchup of industry and occupation forms the bedrock of our employment analysis.

There are up to 14,000 individuals performing IT-related work in Puerto Rico based on OEWS Data

Overlap w/ IT sector	Occupational Code	Occupation title	Number of workers	Percent of total
	15-1211	Computer Systems Analysts	980	7%
	15-1212	Information Security Analysts	340	2%
	15-1231	Computer Network Support Specialists	440	3%
	15-1232	Computer User Support Specialists	3,750	27%
	15-1241	Computer Network Architects	240	2%
	15-1242	Database Administrators	280	2%
	15-1243	Database Architects	40	0%
	15-1244	Network & Computer Systems Administrators	680	5%
	15-1251	Computer Programmers	1,190	9%
	15-1252	Software Developers	1,170	8%
	15-1253	Software Quality Assurance Analysts & Testers	260	2%
	15-1254	Web Developers	220	2%
	15-1255	Web & Digital Interface Designers	150	1%
	15-1299	Computer Occupations, All Other	650	5%
	17-2061	Computer Hardware Engineers	200	1%
	17-2071	Electrical Engineers	580	4%
	17-2072	Electronics Engineers, Except Computer	140	1%
	17-3023	Electrical & Electronic Engineering Technologists & Technicians	1,070	8%
	17-3024	Electro-Mechanical & Mechatronics Technologists & Technicians	50	0%
	11-3021	Computer and Information Systems Managers	1,390	10%

Medium overlap

Heavy overlap

Total   **13,820**

Source: May 2021 OEWS from BLS; verified with the DOL's PMP

Over 30,000 people work in IT-related sectors in Puerto Rico based on QCEW Data

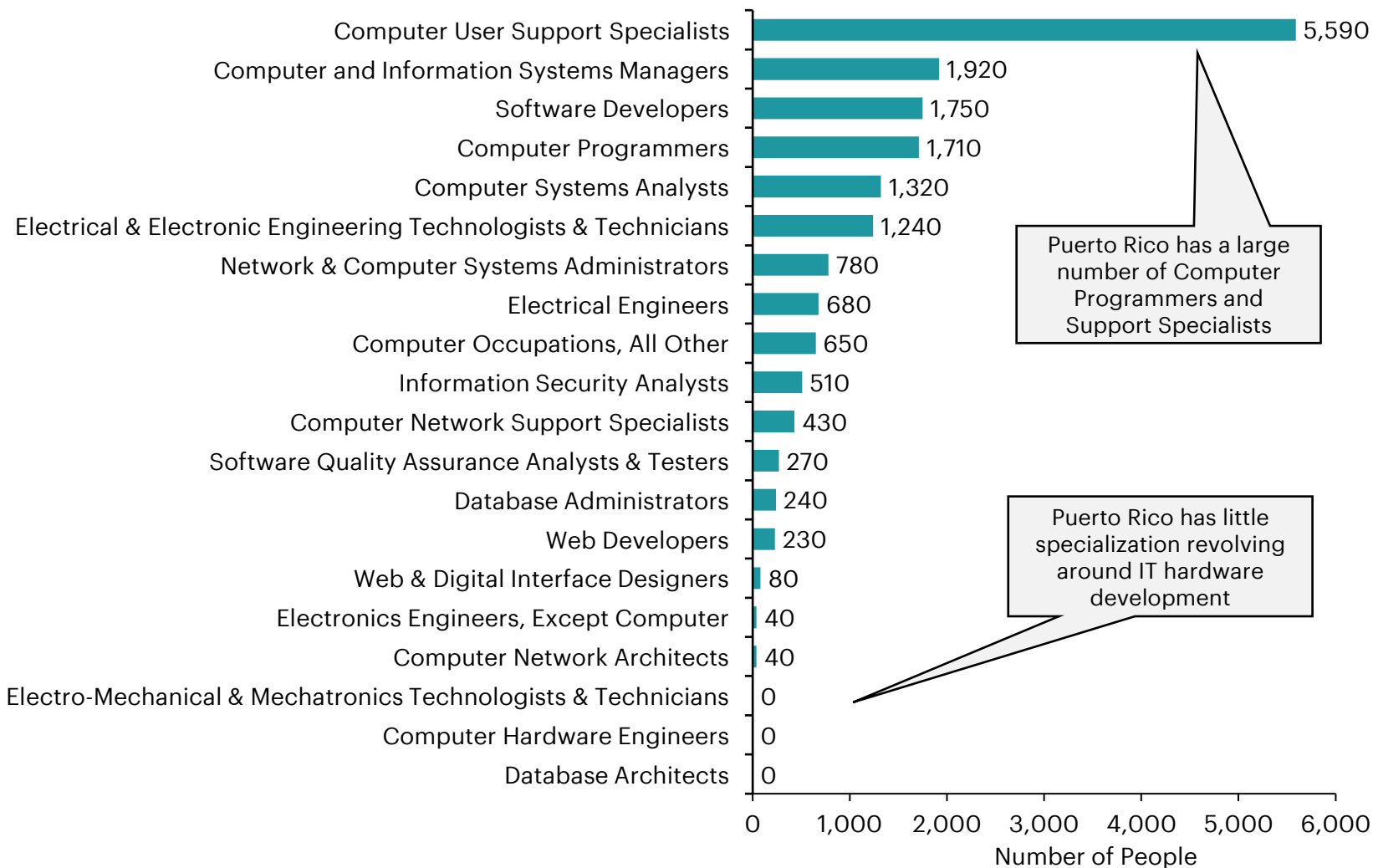| Overlap w/ IT sector	6-Digit NAICS Code	Sector	Total Employment	Percent of Total
	423420	Office equipment merchant wholesalers	221	1%
	423430	Computer & computer peripheral equipment & software merchant wholesalers	219	1%
	423610	Electrical apparatus & equipment, wiring supplies, & related equipment merchant wholesalers	1,105	3%
	423620	Household appliances, electric housewares, & consumer electronics merchant wholesalers	574	2%
	423690	Other electronic parts & equipment merchant wholesalers	407	1%
	423710	Hardware merchant wholesalers	612	2%
	423830	Industrial machinery & equipment merchant wholesalers	1,004	3%
	513210	Software publishers	144	0%
	517111	Wired telecommunications carriers	2,350	7%
	517112	Wireless telecommunications carriers (except satellite)	3,773	11%
	517121	Telecommunications resellers	29	0%
	518210	Computing infrastructure providers, data processing, web hosting, & related services	2,592	8%
	519290	Web search portals & all other information services	266	1%
	541330	Engineering services	5,158	15%
	541511	Custom computer programming services	2,824	8%
	541512	Computer systems design services	2,546	8%
	541513	Computer facilities management services	194	1%
	541519	Other computer related services	133	0%
	541611	Administrative management & general management consulting services	5,403	16%
	541618	Other management consulting services	278	1%
	541690	Other scientific and technical consulting services	909	3%
	541714	Research & development in biotechnology (except nanobiotechnology)	248	1%
	541715	Research & development in the physical, engineering, & life sciences	601	2%
	541720	Research & development in the social sciences & humanities	117	0%
	541990	All other professional, scientific, & technical services	824	2%
	611430	Professional & management development training	109	0%
	811210	Electronic & precision equipment repair and maintenance	742	2%
		Total	**33,382**	

- Medium overlap
- Heavy overlap

Source: September 2022 QCEW from BLS

Accenture's occupation by industry data shows that IT professionals are concentrated in the IT Services & Software subsectors

Number of IT professionals by occupation based on the matchup of occupation by industry as defined by BLS

Occupation	Number of People
Computer User Support Specialists	5,590
Computer and Information Systems Managers	1,920
Software Developers	1,750
Computer Programmers	1,710
Computer Systems Analysts	1,320
Electrical & Electronic Engineering Technologists & Technicians	1,240
Network & Computer Systems Administrators	780
Electrical Engineers	680
Computer Occupations, All Other	650
Information Security Analysts	510
Computer Network Support Specialists	430
Software Quality Assurance Analysts & Testers	270
Database Administrators	240
Web Developers	230
Web & Digital Interface Designers	80
Electronics Engineers, Except Computer	40
Computer Network Architects	40
Electro-Mechanical & Mechatronics Technologists & Technicians	0
Computer Hardware Engineers	0
Database Architects	0

Puerto Rico has a large number of Computer Programmers and Support Specialists

Puerto Rico has little specialization revolving around IT hardware development
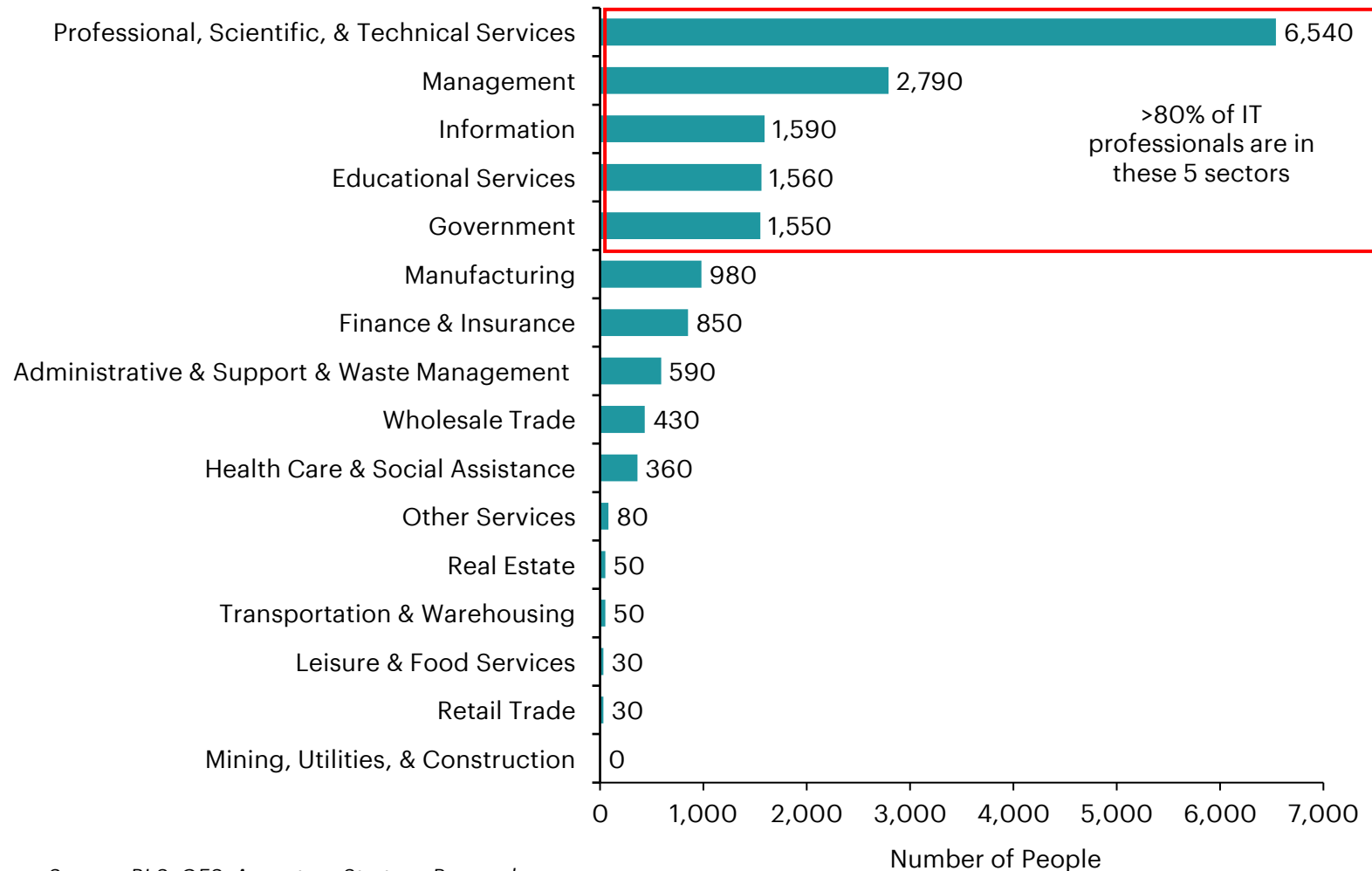
Commentary

- The top IT occupation in Puerto Rico is computer user specialists, backed up by over 500 computer network support specialists and over 1,300 system analysts. Puerto Rico has a cumulative 3,460 computer programmers and software developers.

- Puerto Rico does not have employment in the subindustries (as defined by the BLS) related to the development of hardware and telecommunications equipment.

- This data suggests Puerto Rico has software development capabilities and information technology specialization, and lacks infrastructure or hardware development capabilities.

Source: BLS, OES, Accenture Strategy Research

The overlap of occupational roles by sector shows IT talent is fairly concentrated in a few sectors

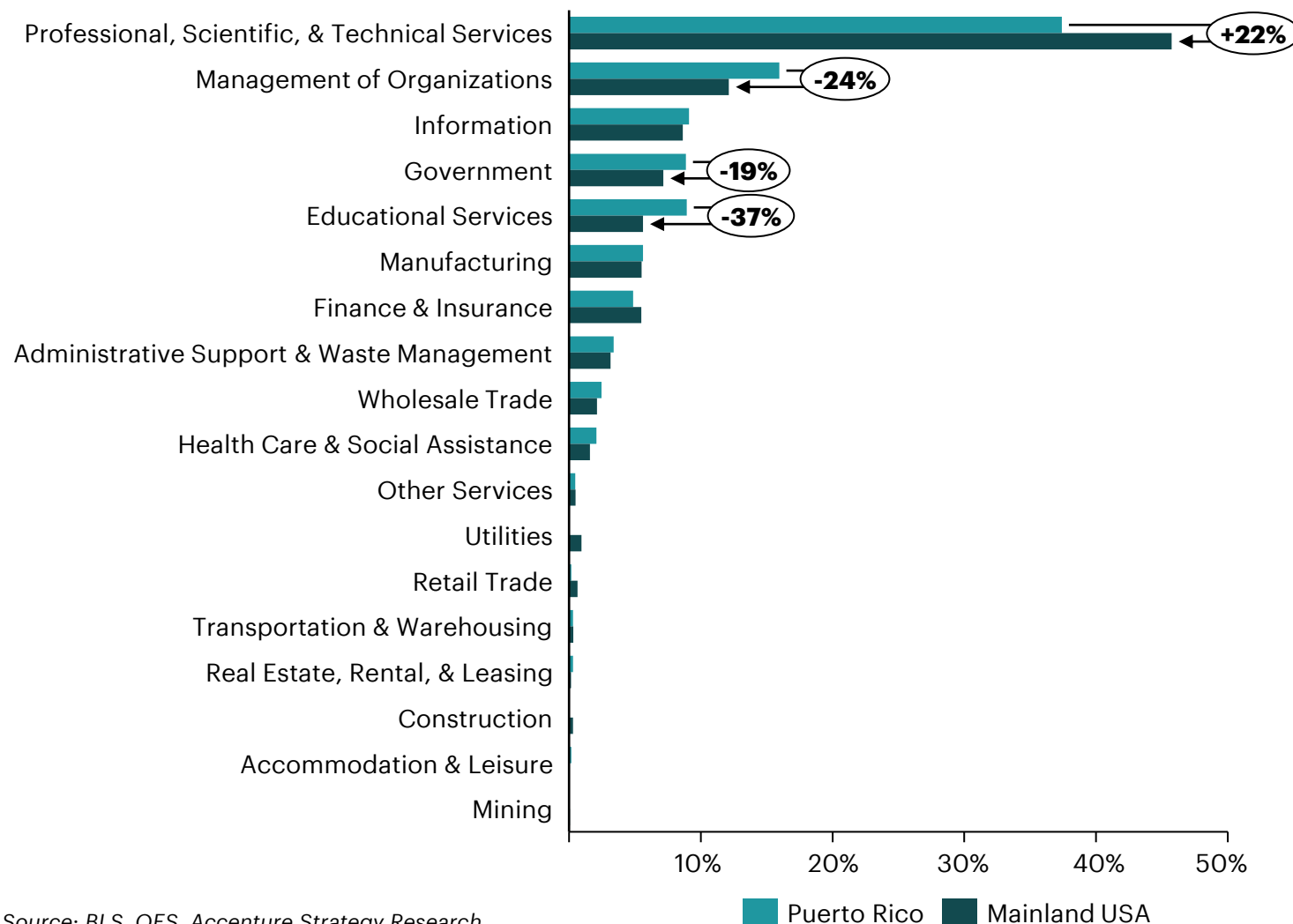## IT professionals by industry based on the matchup of occupation by industry as defined by BLS

Industry	Number of People
Professional, Scientific, & Technical Services	6,540
Management	2,790
Information	1,590
Educational Services	1,560
Government	1,550
Manufacturing	980
Finance & Insurance	850
Administrative & Support & Waste Management	590
Wholesale Trade	430
Health Care & Social Assistance	360
Other Services	80
Real Estate	50
Transportation & Warehousing	50
Leisure & Food Services	30
Retail Trade	30
Mining, Utilities, & Construction	0

>80% of IT professionals are in these 5 sectors

Number of People

Commentary

- The largest number of Puerto Rican IT professionals are found in the Professional, Scientific, & Technical Services industry.

- Most industries with IT employment employ labor across occupations, but the relative weighting of employment varies.

- The management industry employs across occupations and a relatively high percentage of web developers and information systems managers.

- Government principally employs miscellaneous occupations.

- The education industry employs a large chunk of web developers.

Source: BLS, OES, Accenture Strategy Research

Compared to the mainland US, Puerto Rico has relatively more IT Employment in Education, Government and Management

Relative distribution of IT occupations across industries (as defined by the BLS), Puerto Rico vs. Mainland US

Professional, Scientific, & Technical Services — **+22%**
Management of Organizations — **-24%**
Information
Government — **-19%**
Educational Services — **-37%**
Manufacturing
Finance & Insurance
Administrative Support & Waste Management
Wholesale Trade
Health Care & Social Assistance
Other Services
Utilities
Retail Trade
Transportation & Warehousing
Real Estate, Rental, & Leasing
Construction
Accommodation & Leisure
Mining

10% 20% 30% 40% 50%

■ Puerto Rico ■ Mainland USA

Commentary

In the mainland US, about 45% of IT professionals are found in the Professional, Scientific, & Technical Services industry, followed by 12% found in Management, 8% in Information, 7% in Government, and 6% in Education.
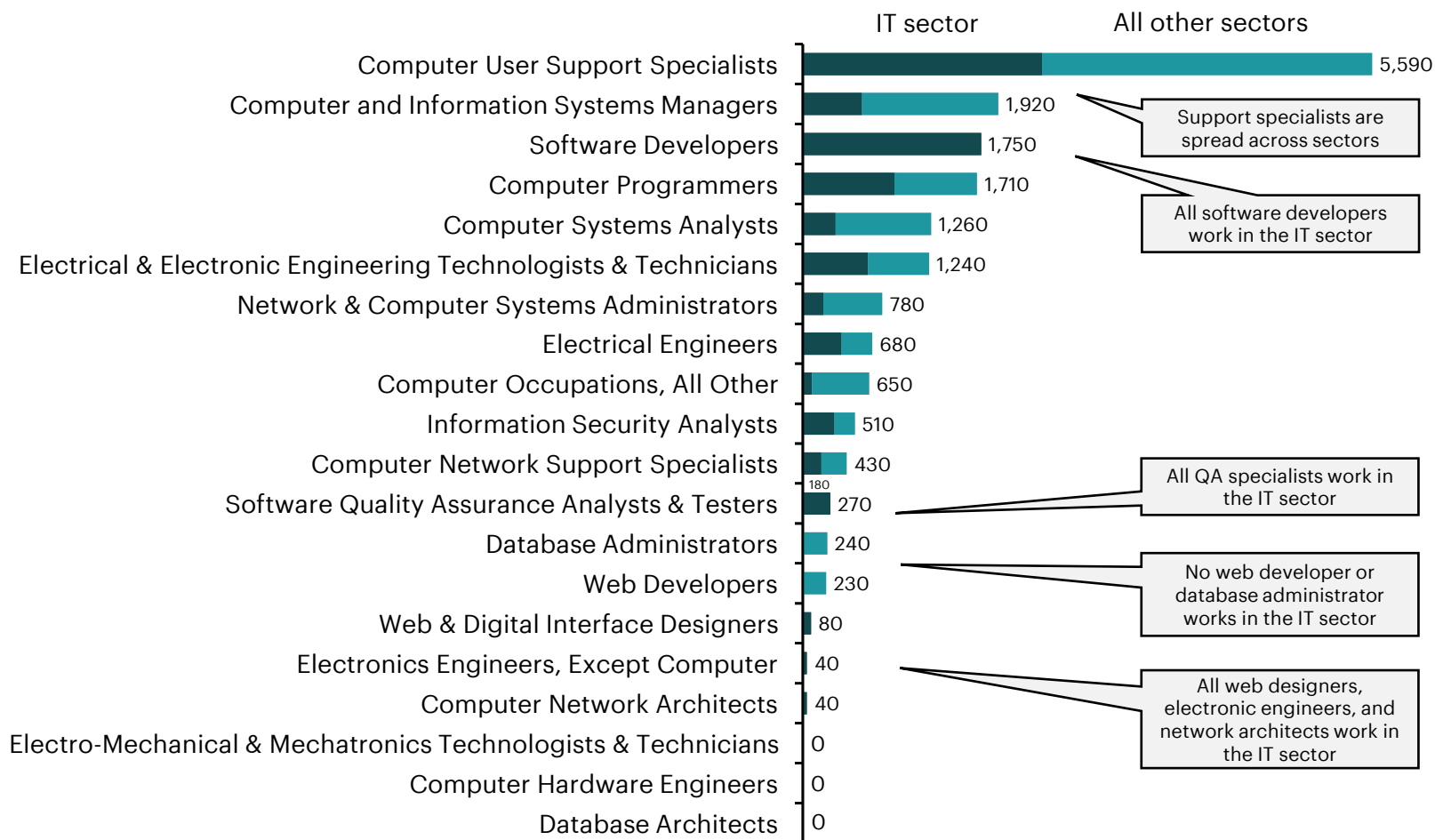
Puerto Rico's distribution of IT professionals is broadly similar to the US distribution with a few notable differences:

- There are over 20% fewer IT professionals in the professional, scientific, and technical services industry than the US average.

- There are 19-24% more IT workers in the Management & Government industry than the US average.

- There are nearly 40% more IT professionals in educational services in Puerto Rico than the US average.

As industries with a comparative overrepresentation of IT professionals in Puerto Rico are not core suppliers of IT services and goods, this distribution suggests there is unmet potential.

Source: BLS, OES, Accenture Strategy Research

Some IT occupations are found only in the core IT sector and others only in non-IT sectors

Total number of Puerto Rican IT occupations by industry (as defined by BLS) categorized as part of the IT sector
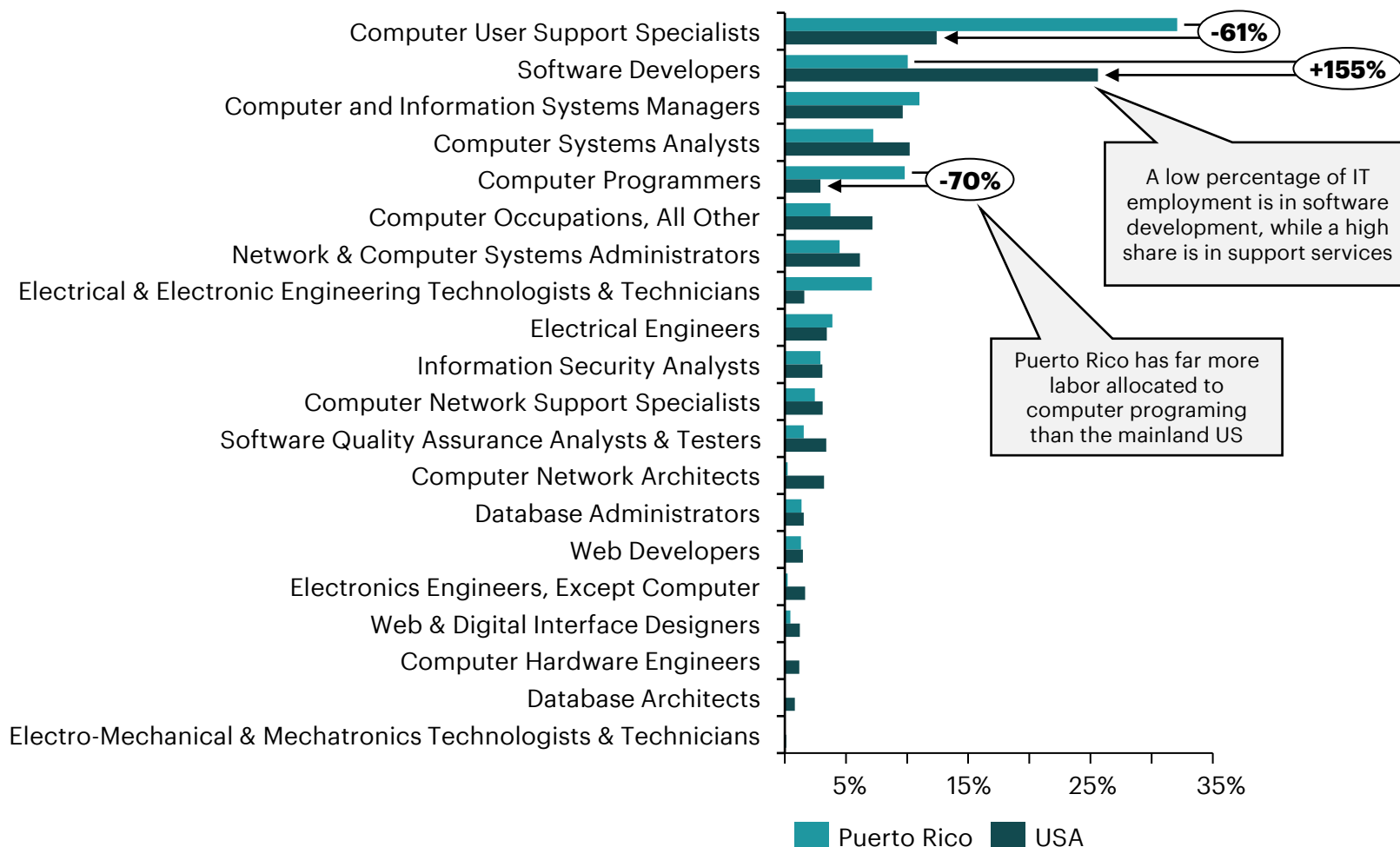
IT sector   All other sectors

Occupation	Value
Computer User Support Specialists	5,590
Computer and Information Systems Managers	1,920
Software Developers	1,750
Computer Programmers	1,710
Computer Systems Analysts	1,260
Electrical & Electronic Engineering Technologists & Technicians	1,240
Network & Computer Systems Administrators	780
Electrical Engineers	680
Computer Occupations, All Other	650
Information Security Analysts	510
Computer Network Support Specialists	430
Software Quality Assurance Analysts & Testers	270 (180)
Database Administrators	240
Web Developers	230
Web & Digital Interface Designers	80
Electronics Engineers, Except Computer	40
Computer Network Architects	40
Electro-Mechanical & Mechatronics Technologists & Technicians	0
Computer Hardware Engineers	0
Database Architects	0

Support specialists are spread across sectors

All software developers work in the IT sector

All QA specialists work in the IT sector

No web developer or database administrator works in the IT sector

All web designers, electronic engineers, and network architects work in the IT sector

Commentary

"IT sector" is defined here as the combination of the information and professional, scientific, and technical services industries (as defined by the BLS).

- While software developers are entirely concentrated in the IT sector, all other IT occupations are spread across economic sectors.

- The Information industry tends to employ similar numbers across occupations, with concentrations in computer user specialists, software developers, computer systems managers, and computer network specialists.

- The professional & technical industry also employs across occupations but employs the lion's share of user support specialists, software developers & programmers, and most electrical technicians & engineers.

Source: BLS, OES, Indeed, Accenture Strategy Research

The relative distribution of IT professionals suggests Puerto Rico is specialized in IT Services

Labor distributions of IT occupations compared to mainland US as defined by BLS

A low percentage of IT employment is in software development, while a high share is in support services

Puerto Rico has far more labor allocated to computer programing than the mainland US

Commentary

- Compared to the mainland, Puerto Rico has a high density of Computer User Support Specialists, Miscellaneous Computer Occupations, and Electric Engineers & Technicians. Puerto Rico also has a higher occupational density of Computer Programmers.

  - Computer user support specialists, also called help-desk technicians, usually provide technical help to non-IT computer users.

- Puerto Rico has more computer programmers and fewer software developers than the mainland US. Average programmer salaries are nearly 50% less than developer salaries.

  - A programmer is a coding professional. Programmers make, test and troubleshoot the coding languages within a software application to make sure it runs successfully.

  - A developer is a software professional who writes, manages and debugs the code in computer programs. Developers typically specialize in a specific type of coding language.

Source: BLS, OES, Accenture Strategy Research

4

IT Ecosystem of Puerto Rico

Key highlights and takeaways

1   A high-performing IT sector ecosystem has strong institutions that coordinate to execute the range of functions needed to support IT growth.

2   In Puerto Rico, there is a lack of a standard definition for the core IT sector and a convening body to bring together the many disparate ecosystem players. As a result, current sector development efforts are siloed, fragmented and unable to deliver large-scale change.

3   Puerto Rico's core IT sector ecosystem could be strengthened by carving out roles for organizations who can serve as champions for specific areas of an overarching IT sector vision and strategy.

A high-performing IT sector ecosystem has strong institutions that coordinate to execute the range of functions needed to support IT growth

Key IT sector ecosystem elements

There is a **clear and unified vision** for the IT sector, underpinned by an **actionable strategy** and supported by **policy mechanisms** that enable the progress of the other areas of the ecosystem

Small, medium, and large enterprises (domestic and foreign) can **succeed**, create meaningful **partnerships**, and **advocate for their interests** in an organized manner

Entrepreneurs are **informed and can access** resources to equip themselves with the **knowledge, tools, capital, and networks** needed to **develop and scale** their businesses

Distinct sources of **capital are available, right-sized, and timely** to support various players in the ecosystem across stages of growth

Institutions are **attuned to market needs** and help meet the sector's demand by providing an accessible **pipeline of knowledgeable and skilled talent**

Aligned to the overall vision, there are robust research & innovation **hubs that propel the growth of the sector** (domestic & foreign), **attract workers**, and provide evidence-based **policy recommendations** to governing bodies

IT Sector Ecosystem diagram with connected nodes: Strategy & Policy, IT Companies & Community, Entrepreneurship Support, Funding, Knowledge & Skills Development, Research & Innovation
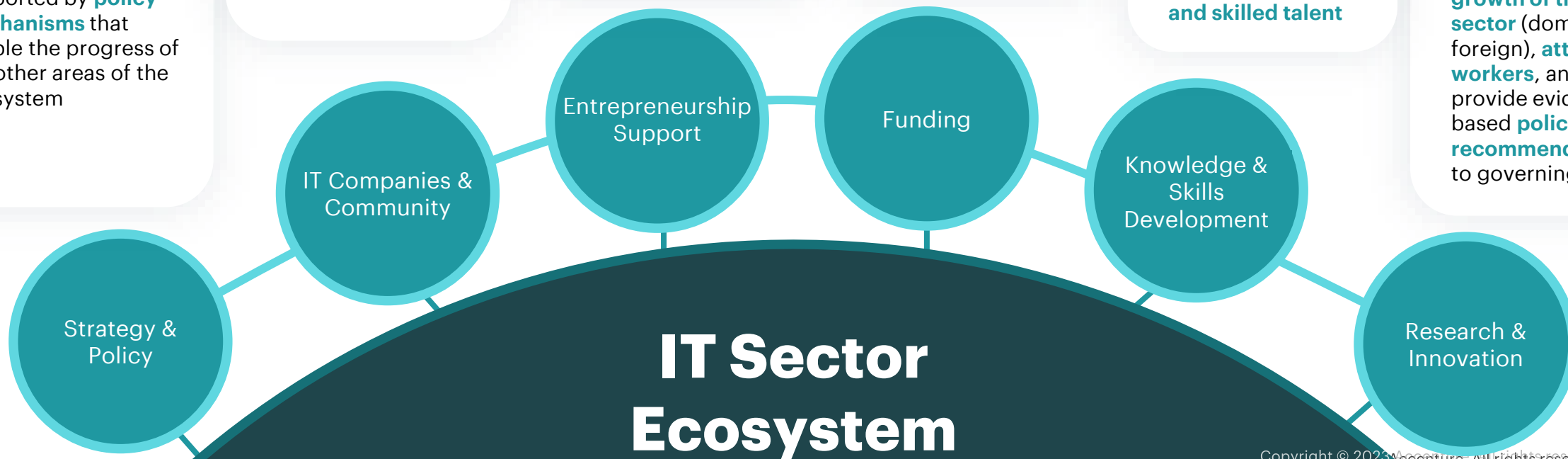
Major Players in Puerto Rico's IT Sector Ecosystem

See Appendix D for a larger list (non-exhaustive) of stakeholders aligned to each area

PRIDCO

DDEC

IT Companies (Domestic & Foreign) (Micro, Small, Medium, Large)

Private Institutions of Higher Education

K – 12 Schools

Higher Education Research Centers and Partnerships

Entrepreneurship Support

Funding

Knowledge & Skills Development

IT Companies & Community

Strategy & Policy

Research & Innovation

IT Sector Ecosystem
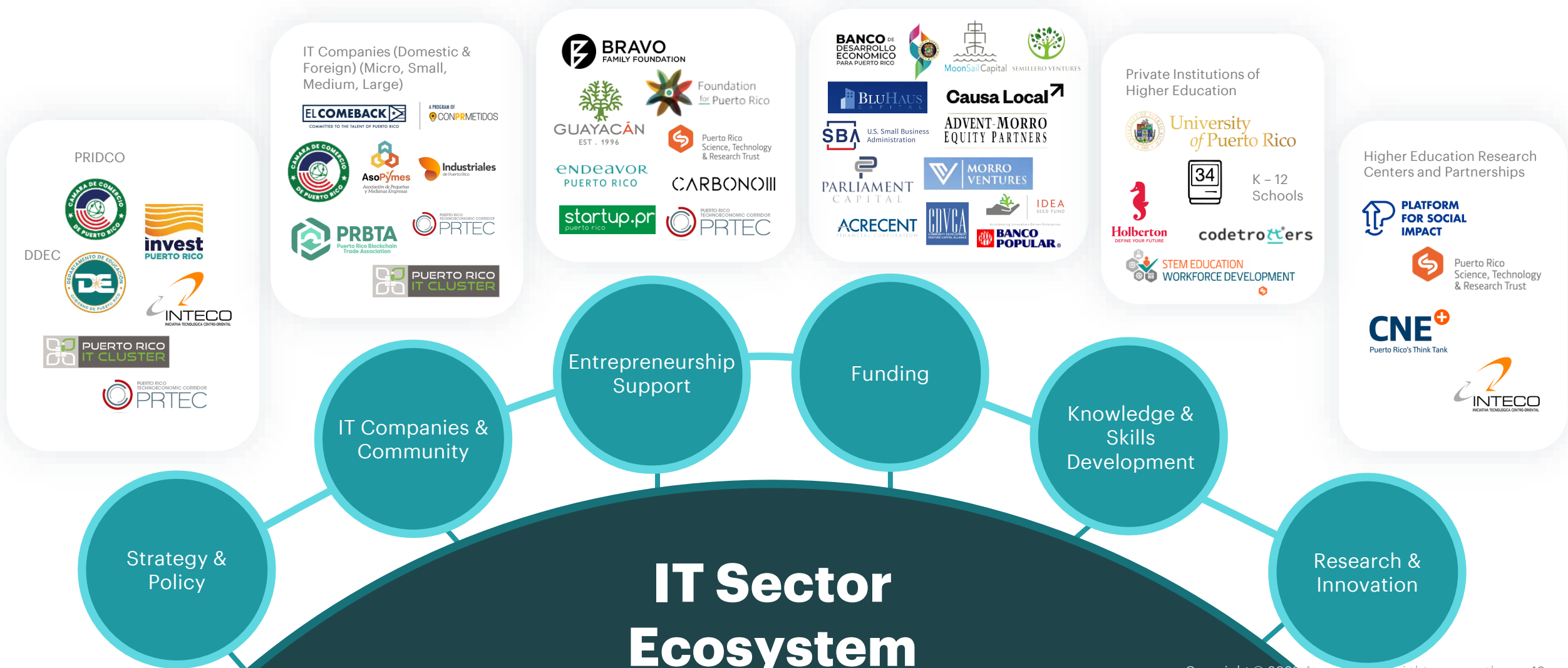
Puerto Rico's IT Sector Ecosystem Performance Across Areas

The lack of a primary convener and/or changemaker within and between each area of the ecosystem has created **fragmentation**, **duplication** in efforts, **weak relationships**, and a **lack of mobilization.**

Organizations are focused on bits and pieces of this area- but **lack the resources**, the **organizational maturity**, the **strategic planning muscle**, or the **convening power** to **develop and drive policy and strategy** for Puerto Rico's IT sector ecosystem as a whole.

There are professional organizations that **represent and advocate** for **the business community** at large **or certain subsectors of IT**. However, they **struggle with branding** & promotion, **recruiting** different voices, **and interorganizational collaboration**.

Several organizations provide **incubator and accelerator opportunities**, but the majority are **focused on startups rather than scaling**. There is also an **appetite for B2B mentorship** models.

The island's fiscal stresses have made the development and scale of businesses difficult. Additionally, **funding opportunities are not well socialized or understood**.

Insufficient talent pipeline due to low STEM degree graduation rates, **lack of alignment** of higher education curriculums **with market needs**, lack of soft skills in graduating students. There is also **limited competition in the non-traditional skilling space**.

Research and innovation is happening in pockets across the island- especially in university centers. **However, these efforts are not concerted and are underutilized-** they **should be** aligned and **used to inform policy building & investments**.

Strategy & Policy ⭐⭐☆☆☆

IT Companies & Community ⭐⭐⭐☆☆

Entrepreneurship Support ⭐⭐⭐⭐☆

Funding ⭐⭐⭐☆☆

Knowledge & Skills Development ⭐⭐☆☆☆

Research & Innovation ⭐⭐⭐☆☆

IT Sector Ecosystem

Our research and stakeholder engagement efforts revealed other key challenges and gaps in the ecosystem

Across the Ecosystem

- There is a **lack of consensus and data** (government and third party) on the **definition of the IT sector and metrics** around its size and performance

Strategy & Policy (Government Institutions)

- Lack of **continuity** in strategic planning and execution with each **election cycle**

- **Bankruptcy limits transformation** and necessary investments, many layers of approval stifle progress

- **Bottlenecks of regulatory processes** (ex. permitting) due to understaffing and other factors

- PR-based IT companies perceive that the government is **disproportionately focused on attracting mainland / foreign investment** rather than developing homegrown businesses

- Lack of **partnership between the public higher education system** (University of Puerto Rico network) **and the government**

- **Lack of coordination and awareness of the WIOA systems and the services** that the institutions could provide to employers and workers

- Lack of **standardization and communication** across government departments

- Cannot meet the **real estate and workforce demands** required for mainland / foreign companies who **want to establish factories** in Puerto Rico

IT Sector Companies & Community

- **Talent acquisition** is the primary concern, which is exacerbated by a **declining population** (low birth rate and brain drain), **understaffed HR departments**, challenges with the **university talent pipeline**, and **non-standardized sources for job postings**

- **Mainland and foreign IT Companies** are often **excluded and/or not participatory** in the local business community

- Several IT sector companies **do not have a diversified portfolio of business**- with many primarily focused on government contracts (PR and federal)

- Some small / new IT companies are **not familiar with** the breadth of private and public funding, entrepreneurship support, and business community **organizations and opportunities available**

5

Benchmarking

Key highlights and takeaways

1 Benchmarking was performed across four comparator groups: structural peers, growing international hubs, US states, and aspirational targets.

2 Relative to international comparators, Puerto Rico ranks in the bottom half of the pack across benchmarking dimensions. It outperforms other growing hubs due to its high salaries and high service sector productivity, but lags behind other groups due to challenges in infrastructure, the economic environment, and deficiencies in the scientific & innovation ecosystem.

3 Compared to US States, Puerto Rico's standing is less favorable—it has relatively good education capacity, but has a less developed science and innovation ecosystem, and below-average IT infrastructure.

Why Benchmark?

Benchmarking the Puerto Rican IT sector is crucial for understanding its performance, competitiveness, and growth potential. It can guide strategic planning, promote investment, drive innovation, and facilitate continuous improvement, ultimately contributing to the development of the IT sector and the overall economy of Puerto Rico.

Strengths and Weaknesses

Allows for a comparison of the Puerto Rican IT sector against other regions or countries, providing insights into its strengths and weaknesses. This can help identify areas where the Puerto Rican IT sector excels and where it may need improvement, allowing for strategic planning and resource allocation.

Competitiveness

Assess the competitiveness of the Puerto Rican IT sector in the global market. By comparing it with other regions or countries, Puerto Rico can determine its competitive positioning and identify areas where it can enhance its competitive advantage. This can inform decision-making and policy development to support the growth and sustainability of the IT sector.

Innovation

Expose the Puerto Rican IT sector to new ideas, technologies, and best practices from other regions or countries. It can encourage innovation and facilitate knowledge sharing, leading to the adoption of cutting-edge technologies, processes, and strategies that can improve the overall performance of the IT sector in Puerto Rico.

Growth

Highlight the potential of the Puerto Rican IT sector, attracting investment from local and foreign companies. By showcasing its comparative advantages, benchmarking can help create a favorable environment for investment and economic growth, leading to job creation, revenue generation, and economic development.

Monitoring Progress: *Provides a benchmark against which progress can be measured over time. It allows for tracking the performance of the Puerto Rican IT sector and evaluating the effectiveness of policies, programs, and initiatives aimed at its development. It helps in setting realistic targets, monitoring progress, and making data-driven decisions to achieve desired outcomes.*
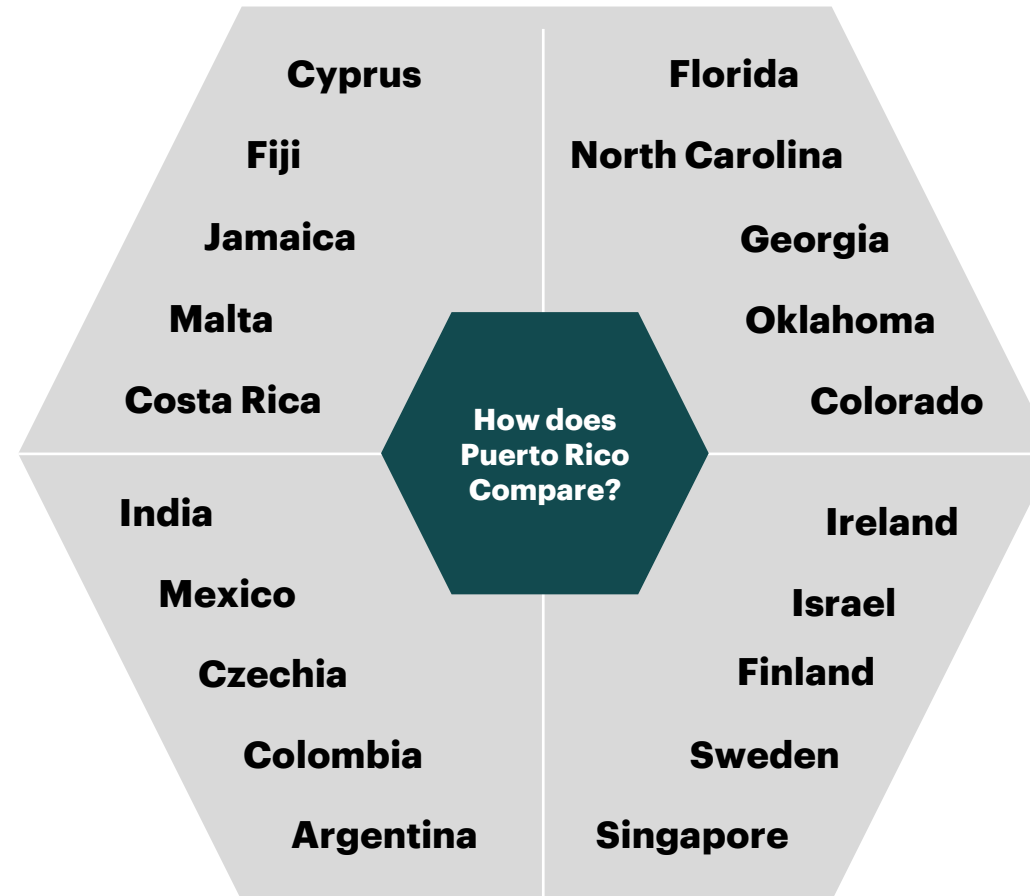
We compare Puerto Rico to four groups of jurisdictions for insights into current IT competitiveness and potential future growth opportunities

Structural Peers

This grouping is composed of **structurally-similar peers** with growing IT sectors or who are currently looking to boost their IT sectors. These structural peers are **generally island-nations** with governments that actively support IT sector growth. Structural peers should be thought of as either **competitors for similar markets or nations in similar positions** as Puerto Rico.

Growing International Hubs

The international grouping consists of countries across the world, at **different levels of IT-sector and developmental maturity**, with targets to grow their IT sectors. This group is important to extract insights into common IT sector growth requirements across countries, regardless of underlying conditions. They also **suggest requirements for subsector success** and provide **insight into Puerto Rico's relative global positioning**.

Structural Peers
Cyprus
Fiji
Jamaica
Malta
Costa Rica

Growing International Hubs
India
Mexico
Czechia
Colombia
Argentina

How does Puerto Rico Compare?

US States & the US Overall
Florida
North Carolina
Georgia
Oklahoma
Colorado

Aspirational Targets
Ireland
Israel
Finland
Sweden
Singapore

US States & the US Overall

As an important player in the internal market of the United States, **Puerto Rico competes with states for demand of services, goods, and labor**. Several states are at somewhat comparable levels of IT sector maturity and serve as guidelines for success and highlight relative strengths.

Aspirational Targets

Countries with thriving IT sectors as a fundamentally major part of their economy provide **insight into what is required to become an IT champion**. They act as a **"North Star" for long-term directional planning**, to compare Puerto Rico's current state, and to assess feasible avenues for growth.

IT sector overview of **structural peers**

Jamaica
- Jamaica is home to **560+ IT and software companies**; with **~70% being international companies** that relocated to the island country
- Its **mature BPO sector** employs 44k agents and generates $700M+ revenues
- It is in the middle of digital transformation and in the 4th stage of the **"Smart Nation" project**; aims to generate 70k digital services jobs by 2025
- The country is **embracing AI**; companies are incorporating AI as a part of their digital transformation strategy

Fiji
- Fiji has a small high-tech sector with many software development companies present; **2021 high-tech exports were worth about $1.95M**
- **BPO operations is the leading sector**; employing 8k people, with a potential to reach 25k by 2025
- **Access to major regions** (NA, ANZ, APAC), **adequate internet infrastructure, abundant skilled technical labor, low costs and tax incentives** make it an attractive location for back-office operations and call centers for customer sales, credit card processing, lending operations, payments, account functions
- Government launched 'digitalFIJI' to develop a **$1B digital economy** through digital transformation and enhanced IT infrastructure

Malta
- IT has been on the rise for almost 3 decades, having peaked with the increasing number of **gaming companies** setting up a base in Malta
- The sector has grown massively to a point where it now contributes to some **15% to GDP** and employing more than 10,000 people
- The government did not only heavily invest in IT products but also drafted an **eGovernment strategy** to support IT activities; **100% government services are now online with local companies being assigned a majority of the work**
- Ongoing **IT investments**, trained youth, **skilled workforce and proximity to Central and Western Europe enables growth** in the IT sector

Cyprus
- IT sector contributed **$3.3B to the economy in 2022**, up 58% from $2.1B in 2021
- The sector expanded, particularly in the areas of software development, web design, and digital marketing; also gaining traction in Fintech
- The government is working on deploying **5G high-speed Broadband**
- The number of software developers and other IT-related jobs has been rising quickly during the last few years
- More than 1,200 international companies, most being in tech, have relocated to Cyprus in 2022, alongside 9,800 specialized members of staff

Costa Rica
- **IT service exports represent 7% of the country's GDP**, with 169+ companies in the country, with expertise in digital technology and design
- Costa Rica's rise in the modern trade of technology and services is fueled by **robust offshoring/nearshoring platforms, next-gen digital capabilities and a prolific software service sector**
- **The telecommunications sector has been the biggest beneficiary of the technological advancements** in the Costa Rican market
- Universities and training institutes produce highly trained individuals, who are sought by high-tech MNCs as their demand grows

Source: Accenture Strategy analysis

IT sector overview of **US states**

Florida

- IT accounts **for 6.4% ($79.7B) of Florida's economy** and ~500k IT jobs; Tampa, Tallahassee, and South Florida are rapidly growing tech hubs
- The state has seen one of the highest tech hirings in 2022 with ~27k new tech jobs and 2.7k new business establishments
- As the **nation's third-largest tech sector**, 38,796+ high tech companies call Florida home
- Florida is also one of the **fastest-growing spots for tech startups and software developers**, and has witnessed exciting **growth in cybersecurity**

North Carolina

- North Carolina's tech sector has been **rapidly growing** over the last 5 years – at **twice the rate of the national average**
- Nearly 300K tech jobs enable ~ 21K businesses to generate **contributing $47.4B (7.5%) to the state GDP**
- Having **major tech players including Google, Cisco and SAS** here is part of the reason the state boasts the second-fastest growing IT sector
- North Carolina continues to attract companies on the cutting edge of innovation and cement its reputation as a magnet for high-tech sectors
- The state's tech sector jobs have grown by 18% over the past five years, which is well above the national average of 8.9%

Colorado

- The IT sector generated about **12.2% ($52.6B) of Colorado's GDP**
- Denver is becoming one of the top tech hubs in the US
- About 8.3% (~250k) of Colorado's workforce is employed in the rapidly growing tech sector (~20k business establishments), one of the fastest growing in the nation
- **Workforce shortages** remain a challenge for the tech sector in Colorado

Oklahoma

- With a **$6.3B (3%) contribution to Oklahoma's GDP**, the tech sector provides 58k jobs through 4.7k establishments
- While Oklahoma currently **ranks poorly in innovation and tech** within US States, it is **actively investing** developing the IT sector from business initiatives to government strategies at multiple levels
- Emerging tech markets are concentrated in the Midwest and South, with some, like **Tulsa, realizing double-digit growth in tech talent** professionals in the last half-decade

Georgia

- The tech sector in Georgia is rapidly growing with ~294k tech employees and 17.5k businesses contributing **8.9% ($59.5B) to the state economy**
- Numerous software companies in Atlanta are creating cutting-edge solutions that benefit the tech economy and countless customers
- With the increasing sophistication of cyber attacks, Atlanta has made an effort to train its workforce for a digital future
- Atlanta – sometimes referred to as 'Silicon Peach' – is ranked as **a top rising startup city by Forbes with 12 accelerators, 13 incubators**, and about a thousand tech companies in operation

Source: Accenture Strategy analysis

IT sector overview of **growing hubs**

Colombia

- The **4th largest IT market in LATAM**, the country has received investments from global tech firms in the recent years
- The government's commitment to digital transformation has been the driving force behind Colombia's transformation by 2022
- Despite a small hardware sector, **software and services has emerged as an important regional nearshoring center**
- Almost 400 global tech companies have opened offices in Medellin, in particular, which aims to turn itself into a global tech hub **with tax incentives and educational initiatives** deployed to that end.

Mexico

- Mexico's proximity to the US has enabled it to tap into the world's largest economy while serving as a gateway to LATAM
- **38 IT clusters throughout the country offer software development, call center, high-tech manufacture, and engineering services**
- Mexico is following the global trend towards a service-centric IT sector, where most technologies are offered under a service contract or lease, leading to opportunities in Software as a Service (**SaaS**), Infrastructure as a Service (**IaaS**), and Platforms as a Service (**PaaS**)
- Mexico has a high proportion of graduate students in science & engineering and its IT revenues reached approximately $60B in 2021

Czechia

- The Czech Republic is a rapidly growing technology hub that is beginning to compete with higher-value OECD peers
- The country employs over 300K people in the IT sector; **demand for services and high-tech manufacturing has outstripped supply of workers**
- The country has seen an influx of foreign companies in recent years due to a favorable investment environment, while local players are among the world's most renowned technology companies
- Local companies are **known for their BPO services, software development outsourcing, cybersecurity products, tech startups and R&D centers**

India

- India's economic development has been significantly influenced by the IT sector; **7.4% of GDP in FY22, expected to be 10% by 2025**
- It is the global center for IT being the **largest exporter of BPO and IT services and accounting for 55% of global outsourcing market share**
- The sector has more than 17,000 firms, of which over 1,000 are large firms with over 50 delivery locations in India
- The country's fast digital adoption was accomplished through a mix of government action, commercial innovation and investment, and new digital applications

Argentina

- Argentina had the **3rd largest IT sector in South America** worth approximately $7B in 2022
- **Outsourcing of software development and call/contact centers** continues to see new investments, exports, and increased sales
- **Cybersecurity technology adoption** is between two to three years behind more mature markets
- The pay-as-you-go subscription model of infrastructure as a service, platform as a service, and software as a service drives the adoption of cloud-based solutions and is anticipated to facilitate the growth of the IT market

Source: Accenture Strategy analysis

IT sector overview of aspirational targets

Singapore

- Ranked as the "**world's most digitally connected country**" according to the WEF, Singapore's IT sector represents approximately **17% of its GDP**
- It has an advanced and high-value enterprise market where software and services spending are expected to drive continued growth
- Leading sub-sectors **include cybersecurity, AI, quantum tech, cloud computing, IoT, industrial automation, fintech, 5G and smart solutions**
- Singapore is a matured market and an early adopter of new technologies. Home **to 80+ of the top 100 tech firms**, Singapore, to promote its tech-focused vision, actively markets itself as a sandbox and testbed for new product testing and development

Ireland

- With a highly creative and talented workforce, an open economy and a **competitive corporate tax environment**, Ireland has successfully attracted 16 of top 20 tech companies and top 3 enterprise software providers; employing over 106k people in the IT sector
- The IT sector constitutes ~20% to GVA, provides 25% tax revenues and 6% employment; growing 2-3x faster than the pre-pandemic growth levels
- Ireland is the **second largest exporter of computer and IT services** in the world, with Dublin being Europe's leading hub of innovative gaming cos
- High quality technical talent is readily available due to the **strong partnerships forged between government, sector and third-level institutions**

Israel

- With only 0.1% of the world's population, Israel attracts **approximately 13% of global investment in cyber-security**, holds the highest rank in R&D expenditures per GDP and the second-highest rate of VC funding in the world
- Israel has many high-tech companies across **telecommunications equipment, software, semiconductors, biotechnology and medical** electronics
- Recognizing its talented workforce, **leading MNCs have built R&D in Israel** (exported $41B service work in 2022), some others manufacture advanced products and many others have purchased local companies; buying their patents and acquiring their human talent

Finland

- Called "the **world's telecommunications test laboratory**", Finland has notable home-grown inventions such as SMS, 5G, and the Linux OS
- Many **international companies use Finland as a test laboratory for experimental launches of new products and services** before going global
- Nearshoring (outsourcing to a neighboring country) is an extremely attractive and very viable option for Nordic companies
- The software sector, including a fast-growing gaming sector, is a leading sub-sector

Sweden

- A technologically advanced country, Sweden's IT and telecom sector consists of companies focusing on **software development, hardware and digital IT services** – such as international streaming services for music, development of computer games and digitalization of financial services
- The country offers a dynamic environment for IT development, innovation and multiple investment opportunities in telecom, web, industrial IT, computer games, e-commerce, imaging and e-Health
- Software development and IT sourcing and consulting are the leading subsectors in the country

Source: Accenture Strategy analysis

As a commonwealth, Puerto Rico can be compared on international country-level data to glean insights into relative strengths and weaknesses in the enabling environment for IT sector performance

Benchmarking

International Benchmarking

Benchmarking dimensions

We benchmark Puerto Rico on six critical dimensions of the enabling environment for the IT sector

ECONOMIC BACKGROUND

The productivity of the population, size of the economy, and access to capital, provide foundations to develop an IT sector

HUMAN CAPITAL

Literacy rates, quality of schools, education of the population all contribute to a successful IT sector

IT INFRASTRUCTURE

Internet and telephone penetration, electricity consumption, and hardware prices affect the tech potential of the population and reflect the presence of IT-dependent infrastructure

SCIENTIFIC & INNOVATION ECOSYSTEM

Patents filed, educational attainment, R&D inputs and outputs are correlated with IT sector complexity and health

GOVERNANCE QUALITY

The ease of starting a business, regulatory quality & environment, and rule of law affect all companies and enable growth

CYBER INFRASTRUCTURE

Cybersecurity and internet server safety are critical to developing a stable IT sector

Overall, Puerto Rico ranks in the bottom half among comparators
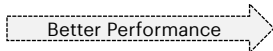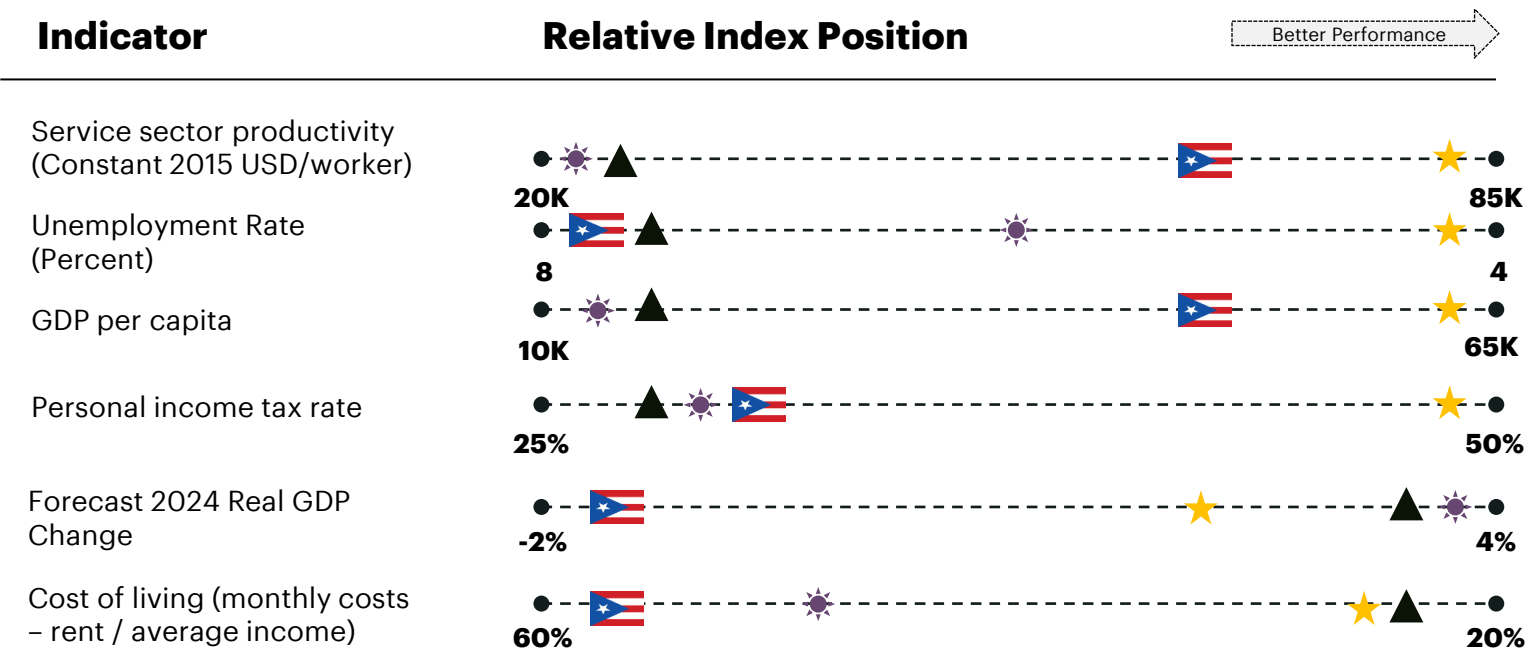
Summary of benchmarking results

Geographic Regions		Benchmarking Dimensions						
		Overall Rank	**Economic Background**	**Governance Quality**	**Science & Innovation**	**Human Capital**	**IT Infrastructure**	**Cybersecurity**
USA	**Puerto Rico**	**10**	11	11	11	13	9	10
USA	**US Average**	**2**	2	6	4	1	4	2
Structural Peers	**Cyprus**	**9**	9	7	10	3	8	8
Structural Peers	**Malta**	**8**	3	10	8	8	7	8
Structural Peers	**Fiji**	**15**	12	12	14	16	15	16
Structural Peers	**Costa Rica**	**11**	10	14	13	10	12	12
Structural Peers	**Jamaica**	**15**	15	8	16	13	17	16
Growing Hubs	**Czechia**	**7**	6	9	3	9	10	5
Growing Hubs	**Argentina**	**11**	12	16	9	11	11	12
Growing Hubs	**Colombia**	**13**	16	13	15	12	14	11
Growing Hubs	**Mexico**	**13**	12	17	12	15	13	12
Growing Hubs	**India**	**17**	17	15	17	17	15	12
Aspirational Peers	**Singapore**	**3**	1	2	6	7	1	4
Aspirational Peers	**Sweden**	**1**	5	1	1	2	6	1
Aspirational Peers	**Finland**	**3**	7	3	1	5	3	2
Aspirational Peers	**Israel**	**5**	8	5	5	4	2	7
Aspirational Peers	**Ireland**	**5**	4	4	6	6	5	6

Note: Numbers indicate relative rank of out the total group off 17 comparators. Green colors are associated with high ranking; red colors are associated with poor ranking.

Source: Accenture Strategy analysis

Puerto Rico faces a challenging economic environment

Benchmarking: Economic Background

Indicator

Relative Index Position

Better Performance

Indicator		
Service sector productivity (Constant 2015 USD/worker)	20K	85K
Unemployment Rate (Percent)	8	4
GDP per capita	10K	65K
Personal income tax rate	25%	50%
Forecast 2024 Real GDP Change	-2%	4%
Cost of living (monthly costs – rent / average income)	60%	20%

Commentary

- Puerto Rico's economic context is difficult with high public debt, high unemployment, and a worsening economy.

- The government receives only about 12% of GDP in taxes – about the same level as Ghana. While Puerto Ricans have much lower income tax rates than advanced countries, there is little flexibility available to the government: facing high prices, average Puerto Ricans spend much of their income on basic day-to-day expenses.

- Since Puerto Rico is integrated into the broader US labor market, US employers must choose between comparatively cheaper but less productive PR labor, and comparatively more expensive but more productive mainland labor.

Legend

🇵🇷 **Puerto Rico**

▲ **Structural Peer Average**

✹ **Growing Hub Average**

★ **Aspirational Target Average**
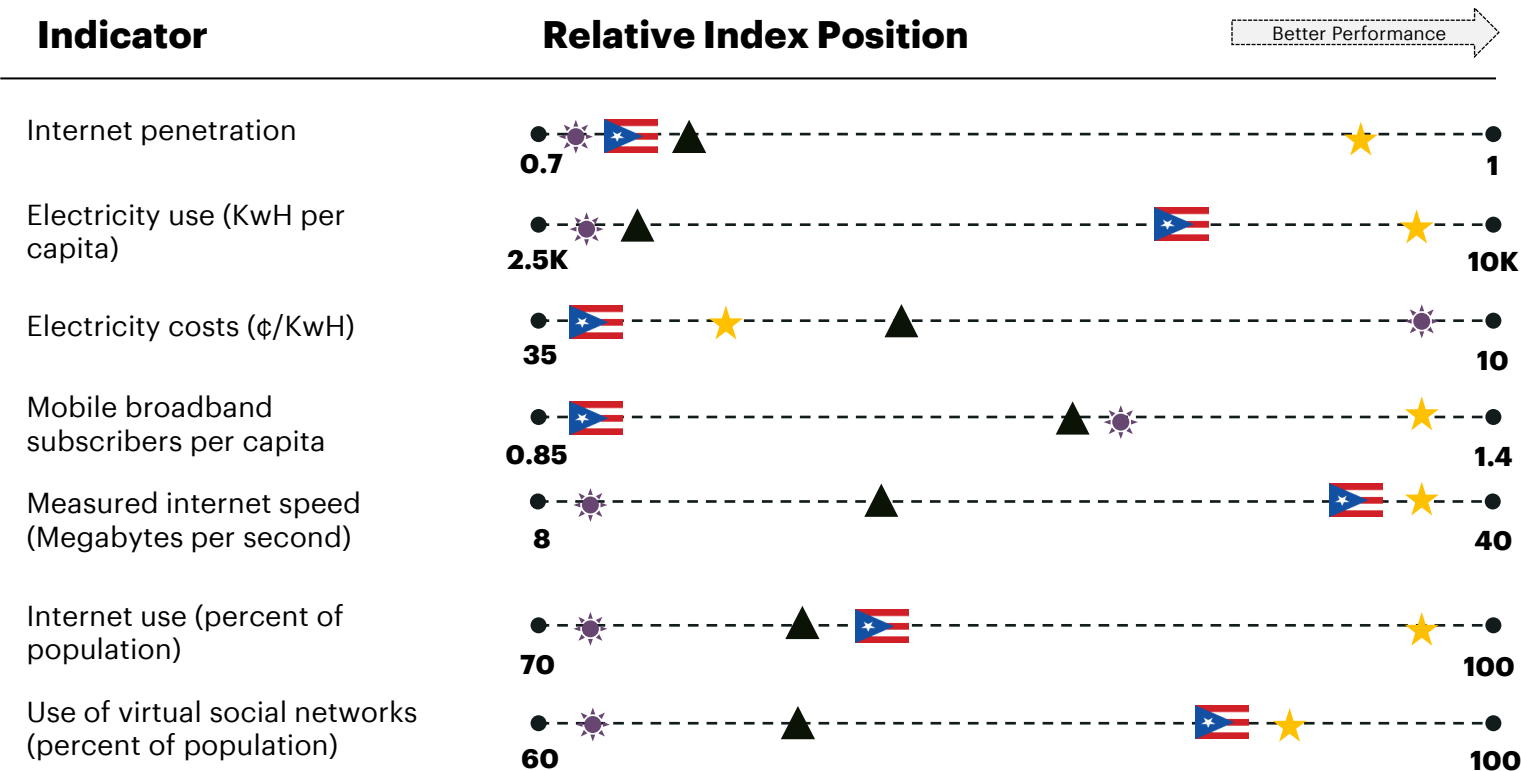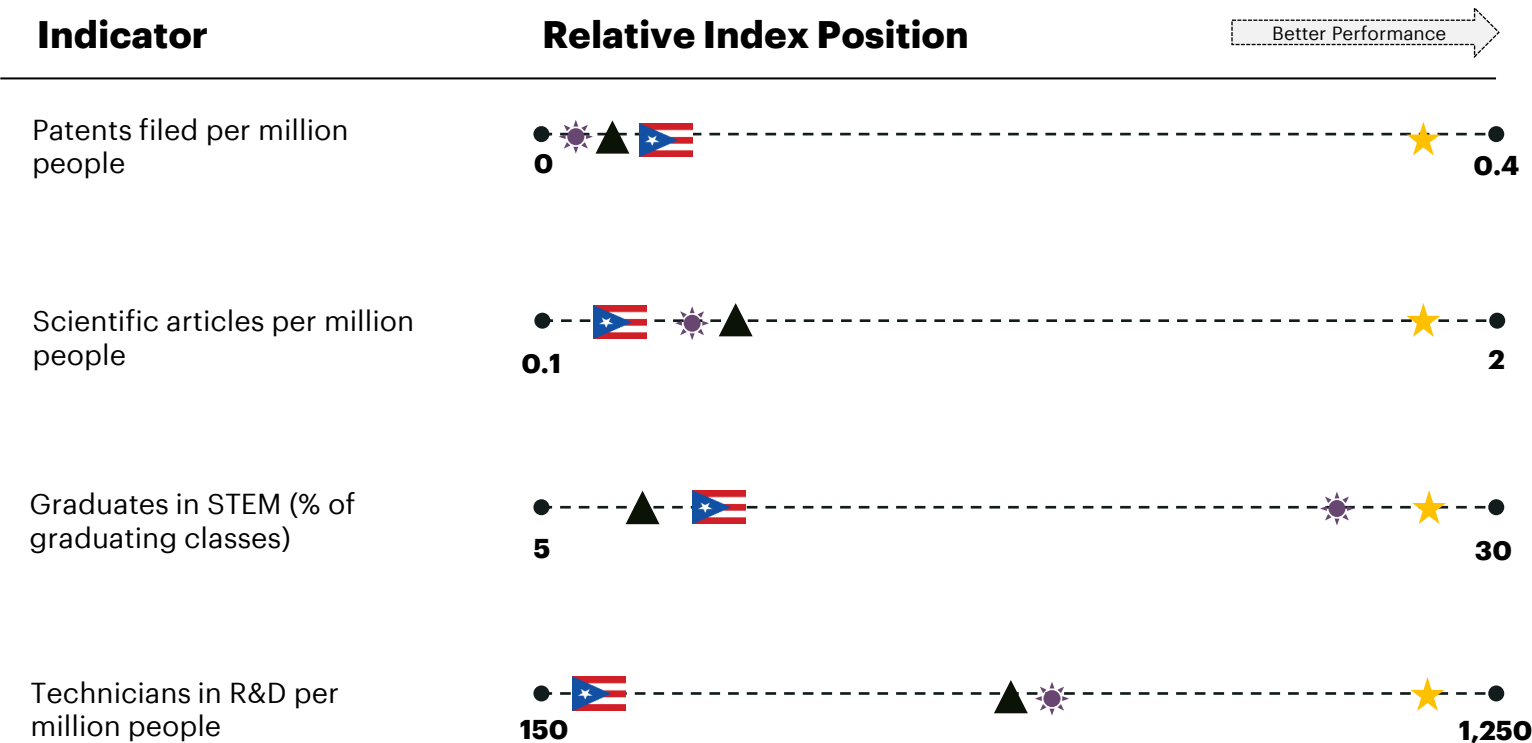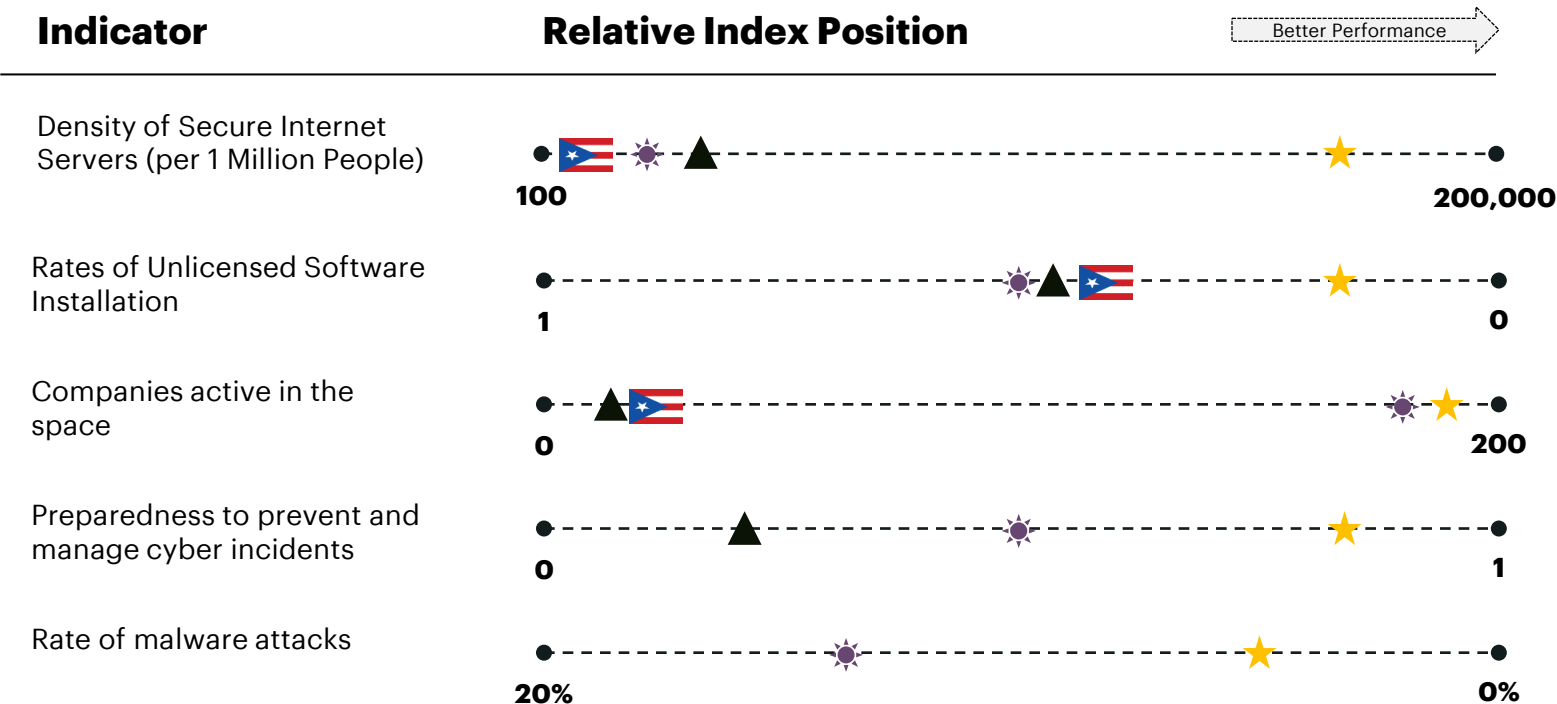
Overall Performance on Indicator

Puerto Rico's economic background is mixed.

Puerto Rico has good basic education and high relative wages but struggles in higher education

Benchmarking: Human Capital
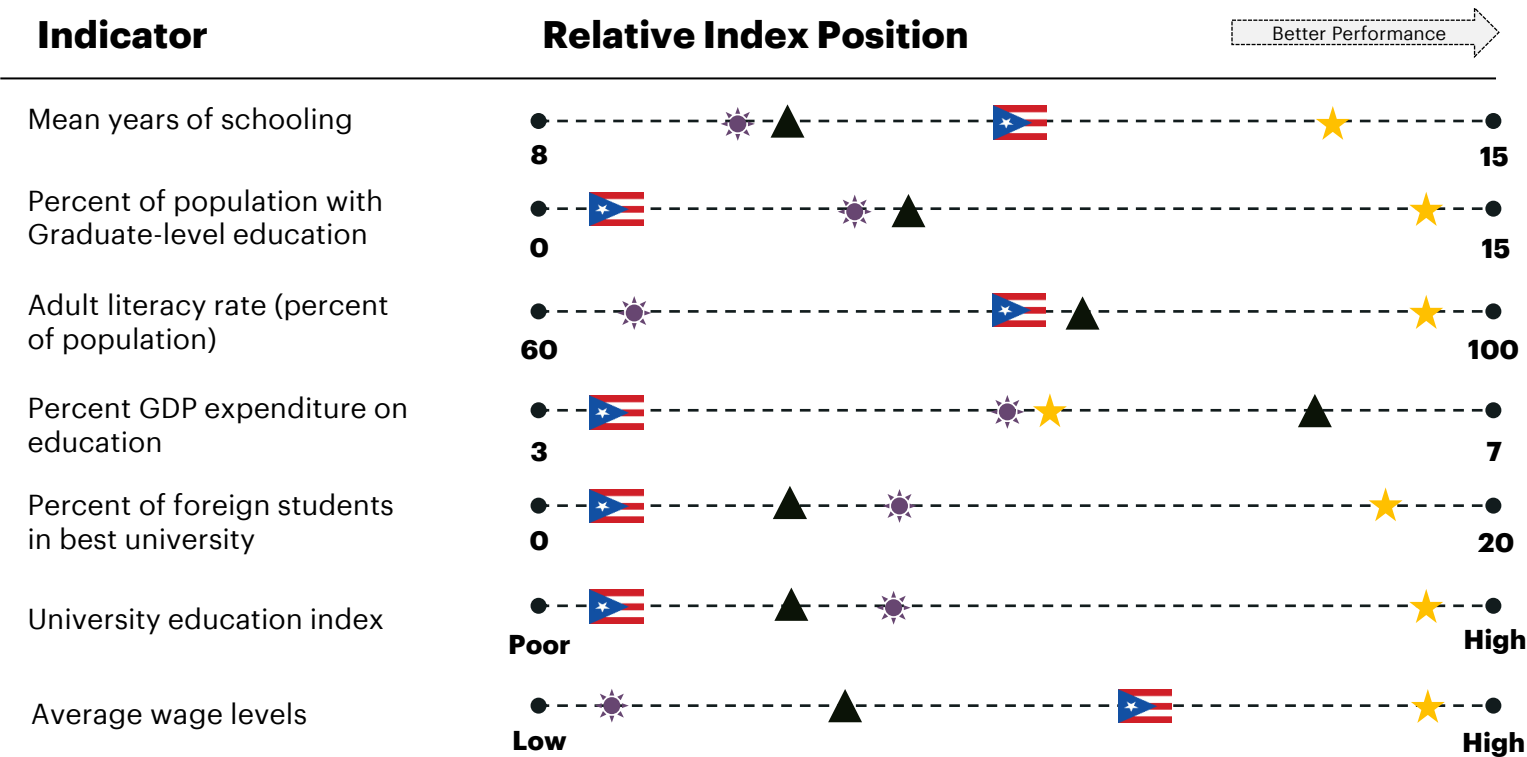
Indicator

Relative Index Position

Better Performance

Indicator	Scale
Mean years of schooling	8 — 15
Percent of population with Graduate-level education	0 — 15
Adult literacy rate (percent of population)	60 — 100
Percent GDP expenditure on education	3 — 7
Percent of foreign students in best university	0 — 20
University education index	Poor — High
Average wage levels	Low — High

Legend

Overall Performance on Indicator

- Puerto Rico
- Structural Peer Average
- Growing Hub Average
- Aspirational Target Average

Puerto Rico's Human Capital infrastructure is relatively poor.

Commentary

- Puerto Rico has good literacy and average years of schooling rates.

- Puerto Rico falls behind in higher education. The commonwealth spends considerably less on education and its schools are not widely renown.

- Higher education is a fundamental requirement for most high-value service jobs.

- Puerto Rico has relatively high hourly wages compared to less developed nations, making it difficult to thrive in low-value sectors.

- Meanwhile, Puerto Rico has low productivity compared to highly developed countries, making it tricky to succeed in high-value sectors.

High electricity costs and low coverage coexist with relatively high use of IT infrastructure

Benchmarking: IT Infrastructure

Indicator	Relative Index Position
	Better Performance →
Internet penetration	0.7 ... 1
Electricity use (KwH per capita)	2.5K ... 10K
Electricity costs (¢/KwH)	35 ... 10
Mobile broadband subscribers per capita	0.85 ... 1.4
Measured internet speed (Megabytes per second)	8 ... 40
Internet use (percent of population)	70 ... 100
Use of virtual social networks (percent of population)	60 ... 100

Commentary

- Puerto Rico could further improve internet and broadband coverage. A sizeable number of Puerto Ricans lack access to IT infrastructure services.

- When available, internet & data services are quite good.

- The greatest infrastructure barrier comes from cost of electricity, which compare disfavorably to both peers and competitors.

Legend

Overall Performance on Indicator

- 🇵🇷 **Puerto Rico**
- ▲ **Structural Peer Average**
- ✴ **Growing Hub Average**
- ★ **Aspirational Target Average**

Puerto Rico's IT infrastructure is quite good.

Puerto Rico lacks a developed scientific and innovation ecosystem and could graduate more in STEM subjects

Benchmarking: Innovation & Science Ecosystem

Indicator	Relative Index Position	Commentary

Better Performance →

Patents filed per million people
0 — 0.4

Scientific articles per million people
0.1 — 2

Graduates in STEM (% of graduating classes)
5 — 30

Technicians in R&D per million people
150 — 1,250

Commentary

- Puerto Rico files approximately the same number of patents per capita as its structural peers and international growing IT hubs.

- Puerto Ricans publish far fewer scientific articles per capita than peers or aspirational targets.

- The percent of graduating classes with STEM degrees is far below growing international hubs and aspirational targets, but on par with structural peers.

- Puerto Rico has very few technicians working in research and development.

- Puerto Rico does not have a comparative advantage in the knowledge economy. It is not a major contributor to scientific fields and does not currently have the personnel or infrastructure required to become an innovation hub

Legend

- ▰ **Puerto Rico**
- ▲ **Structural Peer Average**
- ✴ **Growing Hub Average**
- ★ **Aspirational Target Average**
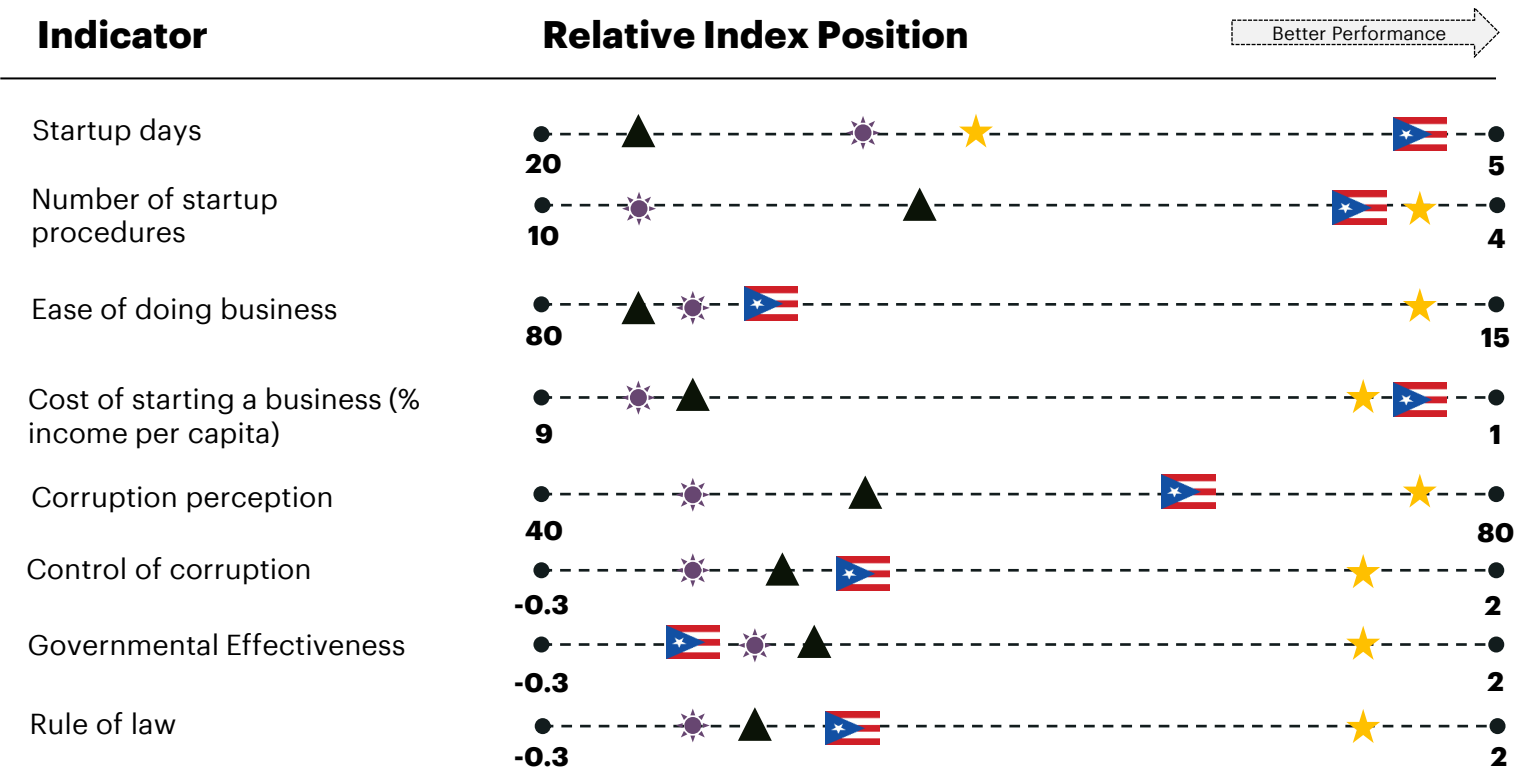
Overall Performance on Indicator

Puerto Rico's scientific and innovation ecosystem is relatively poor.

Data is too sparse to conclusively determine the relative competence of Puerto Rico's cybersecurity infrastructure

Benchmarking: Cybersecurity

Indicator	Relative Index Position	Commentary

Better Performance

Density of Secure Internet Servers (per 1 Million People)
100 — 200,000

Rates of Unlicensed Software Installation
1 — 0

Companies active in the space
0 — 200

Preparedness to prevent and manage cyber incidents
0 — 1

Rate of malware attacks
20% — 0%

Commentary

- There is a dearth of data for Puerto Rico's cybersecurity context.

- The density of secure internet servers compared to the density of the population does not bode well, but it is possible that Puerto Ricans have access to other internet servers and that the comparatively low internet usage rate makes the low server concentration a less important issue.

- In contrast, Puerto Rico has moderately good (low) rates of unlicensed software installation.

Legend

Overall Performance on Benchmarked Category

?

Puerto Rico's Cybersecurity infrastructure is moderately adequate but more data is necessary to offer a conclusion.

🇵🇷 **Puerto Rico**

▲ **Structural Peer Average**

✶ **Growing Hub Average**

★ **Aspirational Target Average**

It is easy & cheap to start a business in Puerto Rico; the government is perceived as relatively uncorrupt but ineffective

Benchmarking: governance quality

Indicator	Relative Index Position

Better Performance

Commentary

Indicator

Startup days — 20 ... 5

Number of startup procedures — 10 ... 4

Ease of doing business — 80 ... 15

Cost of starting a business (% income per capita) — 9 ... 1

Corruption perception — 40 ... 80

Control of corruption — -0.3 ... 2

Governmental Effectiveness — -0.3 ... 2

Rule of law — -0.3 ... 2

- Puerto Rico has streamlines processes for starting businesses, though the cost is comparatively high.

- Compared to aspirational targets, it is comparatively difficult to do business in Puerto Rico, but better than compared to structural peers and growing international hubs.

- Metrics for corruption suggest Puerto Rico is doing relatively well, which enables economic activity.

- The rule of law is relatively good in Puerto Rico but leaves room for improvement.

- Puerto Rico's government is seen as ineffective, which hampers potential growth.

- While Puerto Rico benefits from US laws and judicial processes, its government performs comparatively poorly at fulfilling long-term public services.

Legend

Overall Performance on Indicator

Puerto Rico's governmental infrastructure is relatively good.

🏴 **Puerto Rico**

▲ **Structural Peer Average**

✳ **Growing Hub Average**

★ **Aspirational Target Average**

Overall, Puerto Rico exhibits strength in its IT infrastructure but challenges in economic and human capital dimensions

Summary of insights from each benchmarking dimension

Economic background
- While Puerto Rico's comparatively low taxes are beneficial for stimulating business, high costs of living and a worsening economic picture create a challenging economic environment.

Human capital
- Puerto Rico has good underlying rates of literacy and overall base educational outcomes compared to peers but struggles in higher-education. Wages are comparatively high.

IT Infrastructure
- Electricity use is high across the island, as is the proportion of people using online social networks compared to peers.
- Puerto Rico could improve its electricity costs and increase broadband coverage.

Scientific and Innovation Ecosystem
- Puerto Rico does not have a comparatively strong scientific & innovation ecosystem.

Governance quality
- Puerto Rico greatly benefits from the judicial process and flexibility of the common law system of the United States. Puerto Rico would benefit from more legislative and executive stability.

Cyber Infrastructure
- Puerto Rico would benefit from additional cybersecurity investments, though paucity of data renders it difficult to gauge exactly the conditions involved in this dimension.

Most US states do not have relevant data available to be compared to international countries. Repeating the exercise with peer states would generate little novel insight as most US States are positioned relatively highly in their economic backgrounds, cybersecurity environment, and governance quality.

Since US States operate with common frameworks for budgets, education, labor, and IT markets, we can delve more deeply into Puerto Rico's relative positioning to identify strengths and shortcomings.

Benchmarking

US State Benchmarking

Benchmarking to US states suggests Puerto Rico has adequate IT infrastructure but could struggle to develop a mature innovation economy
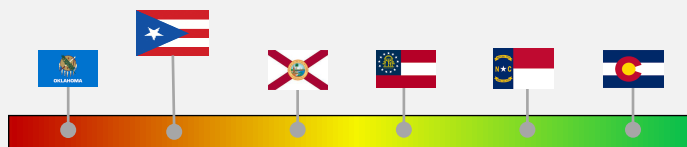
HUMAN CAPITAL

Puerto Rico has good baseline education capacity compared to the rest of the United States and selected peer states. Puerto Rico outperforms in the concentration of associate's degrees in technology fields. Puerto Rico struggles when it comes to higher levels of education, with relatively low concentrations of science & engineering bachelors and very low concentrations of doctorates in these fields.
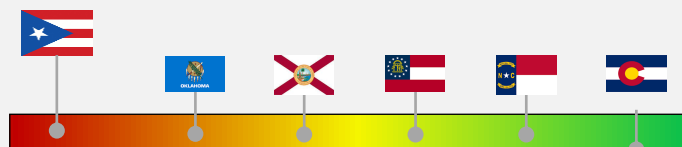
INNOVATION & SCIENTIFIC

Puerto Rico is not currently nurturing an innovation and scientific ecosystem compared to its peers and the rest of the United States. The commonwealth receives low amounts of Venture Capital and Federal funding, allocates relatively low amounts of resources to R&D, and outputs relatively little academic research.
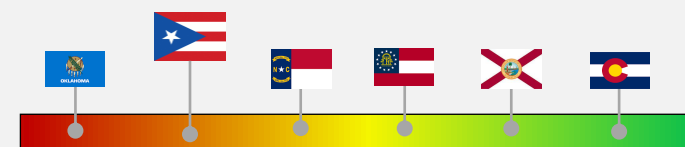
IT INFRASTRUCTURE

While Puerto Rico could benefit greatly from increasing access to internet, broadband, data plans, and reducing associated prices, the Commonwealth has adequate internet infrastructure to support its IT sector. In some parts of the island, internet speeds are extremely high and overall upstream speeds are the best of selected peers.

Human Capital: Puerto Rico tends to score well in the early phases of tertiary education

Individuals with High School or higher degree among 25-44 year old population (2019)	Associate's Degrees in Technology per 1,000 individuals 18-24 year old (2021)	Associate's Degrees in Science and Engineering per 1,000 18–24 year old (2021)	Bachelor degree holders among individuals 25-44 years old (2021)	Science & Engineering degrees as a % of higher education degrees (2021)	Bachelor's degrees in Science and Engineering per 1,000 individuals 18-24 years old (2021)	Science and Engineering Doctoral Degrees as a % of science and engineering degrees (2021)

Commentary

- Puerto Rico has a relatively well-educated overall population, as suggested by the number of individuals with High School or higher degrees among the working population. The rate of Puerto Rico – 88.8% - is just under the national average of around 90%.

- Puerto Rico has one of the **highest concentrations** of **associate's degrees** in technology, with nearly 2 people per 1,000 holding one – far higher than the national average of 1.1.

  - In contrast, Puerto Rico has the third lowest concentration of people with associate's degrees in science and engineering in the nation.

- When it comes to **Bachelor's degrees** in science and engineering, Puerto Rico is just under the national averages of number of bachelor's degrees conferred and density of bachelor's degrees in the population.

- In science and **doctoral degrees** awarded, Puerto Rico ranks in the lowest quartile in the nation.

Legend

- 🇵🇷 **Puerto Rico**
- FL **Florida**
- GA **Georgia**
- CO **Colorado**
- NC **North Carolina**
- OK **Oklahoma**

Overall Performance in educational levels

Puerto Rico's educational outputs provide relatively poor conditions for IT sector success.

Innovation & Science Ecosystem: Puerto Rico lacks a substantive science & innovation ecosystem

Individuals in Science & Engineering Occupations as a % of all occupations (2020)	**Doctorate Holders in Science, Engineering, and Health** as a % of the workforce (2019)	**Technical Workers** as a % of All Occupations (2020)	**Foreign-Born Workers** as a % of all Individuals in Science & Engineering Fields (2019)	**Knowledge & Technology Intensive sector Employment** as a % of Employment (2021)

Commentary

- While Puerto Rico trains a good number of people in science and engineering professions, it **struggles to hold on to them**. Puerto Rico is in 5th to last place in the nation for the density of people working in science & engineering occupations and 3rd to last place for the density of doctorates in the workforce.

- Puerto Rico is at the national average for the density of technical workers in its labor force due to Puerto Rico's large pharmaceutical sector.

- There is no data for the density of tech-intensive sector employment.

- Puerto Rico is second to last in the nation for the concentration of foreign-born workers in science and engineering fields at 2.76%. (*Foreign born is a broad category, ranging from naturalized citizens and long-term U.S. residents with strong roots in the United States to recent immigrants who compete in global job markets and whose main social, educational, and economic ties are in their countries of origin.*)

Legend

- 🇵🇷 **Puerto Rico**
- FL **Florida**
- GA **Georgia**
- CO **Colorado**
- NC **North Carolina**
- OK **Oklahoma**

Overall Performance in S&E labor force

Puerto Rico's labor conditions provide relatively poor conditions for IT sector success.

73

Innovation & Science Ecosystem: Puerto Rico receives comparatively little private and federal funds

R&D as a % of GDP (2018)	Federal R&D Obligations per Individual in Science & Engineering Occupations (2019)	Academic R&D Expenditure per $1,000 of GDP (2020)	Academic S & E Article Output per 1,000 S&E and Health Doctorate Holders (2019)	Academic S & E Article Output per $1M of Academic R&D (2020)	Patents Awarded per 1,000 individuals in S&E (2020)	Average Annual FSBIR Funding per $1M of GDP (2020)	VC $ Disbursed per $1M of GDP (2021)
3%	$30K	6	1.1K	6	17	$400	$16K

| 0.5% | $3K | 1 | 200 | 3.5 | 2 | $18 | $600 |

Commentary

- Puerto Rico scores poorly in the scientific & innovation ecosystem. The commonwealth allocates the **second least amount to R&D** of any state in the USA (only 0.63% of GDP is allocated to R&D – the average is over 3%).

- Puerto Rico receives the least amount of R&D funds from the federal government per employee in science & engineering occupations in the nation. It is the fourth lowest recipient of funding from the federal small business innovation research (FSBIR) program to support R&D and tech innovation in companies with fewer than 500 employees.

- For every $1,000 of GDP, Puerto Rico spends only **$1.08 in academic R&D**, the least in the nation; for every $1M of GDP, Puerto Rico receives just **$990** in **VC funding** (10th lowest in the nation

- The workforce of the state does not tend to pursue R&D: for every 1,000 worker in science & engineering occupations, Puerto Rico is awarded just 2 patents, the lowest rate in the nation.

Legend

🇵🇷	**Puerto Rico**
⬤ FL	**Florida**
⬤ GA	**Georgia**
⬤ CO	**Colorado**
⬤ NC	**North Carolina**
⬤ OK	**Oklahoma**

Overall Performance in R&D and R&D Outputs

Puerto Rico's funding for R&D and R&D outputs provide relatively poor conditions for IT sector success.

IT Infrastructure: Puerto Rico's IT Infrastructure looks relatively less strong vis-a-vis US states

	Percent of Population with Internet Access	Percent of population with one or more computing device	Percent of population with broadband of any type	Percent of population with cellular data plans	Max Advertised Downstream Speed (mbps)	Max CIR Downstream Speed (mbps)	Max CIR Upstream Speed (mbps)	Max Advertised Upstream Speed (mbps)
Puerto Rico	70.9%	82.5%	76.5%	69.2%	43.5	6.4	293.7	290.1
Florida	74.6%	96.2%	90.5%	84.4%	52.5	12.8	50.5	47.2
Georgia	81.2%	95.3%	90.0%	83.9%	54.8	12.8	23.4	20.0
Colorado	85.4%	97.0%	93.0%	87.5%	39.6	13.6	113.1	110.2
North Carolina	78.0%	94.3%	88.9%	82.6%	61.0	14.8	12.2	8.6
Oklahoma	78.7%	94.0%	87.8%	81.3%	28.6	5.0	42.4	37.0

Overall performance in IT Infrastructure

Puerto Rico's IT infrastructure is adequate to enable an IT sector

Note: "CIR" is the guaranteed rate at which a Frame Relay network will transfer information under normal line conditions

Source: US Census, FCC

Commentary

- Puerto Rico has made great strides in developing its IT infrastructure, but could benefit from expanding access.

- Puerto Rico has excellent upstream speeds – both advertised and realized. The downstream speeds could however be improved as they rank relatively poorly.

- The percent of the population without access to modern telecommunication connection or devices is one of the highest in the nation. Nearly 1 in 3 Puerto Ricans does not have a cellular data plan, 1 in 5 do not have internet access, and nearly 1 in 4 have no broadband connection at all.

- Increasing coverage and reducing prices would be beneficial in the short term as more of the island participates in 21st century digital commerce economy, digital skills are required across sectors and occupations, and workers are able to connect from distances. In the long-term, increasing the digital savviness of the population might increase the likelihood that people take interest in working in related technology fields.

6

IT Market Analysis
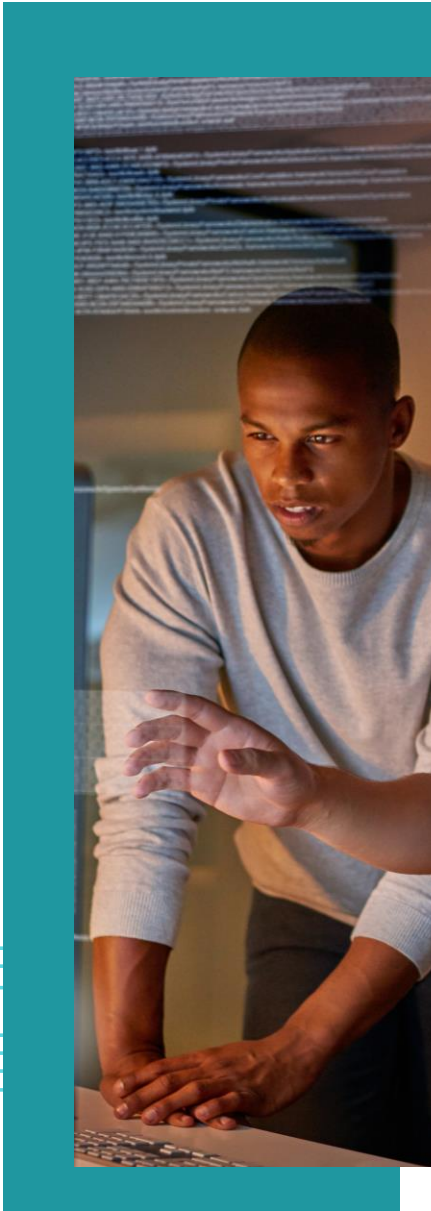
IT Market Analysis

Global IT Market Trends

Key highlights and takeaways

1 Macro trends such as digital transformation and automation will continue to underpin strong future global IT growth. The sector is also changing rapidly, with generative AI being the newest frontier for emerging technology.

2 IT Services is the largest IT subsector and expected to be among the fastest-growing over the next 5 years, along with Software and Cybersecurity. North America is the largest market in total & by subsector, but Western Europe and Asia are expected to have the highest future growth.

3 Healthcare, Energy, Banking and Education are among the key sectors that will drive future IT spending. Understanding these demand sources will allow Puerto Rican IT companies to tap into that spending for future growth.

Major global trends in the IT sector

Macro trends impacting demand

Digital Transformation: Despite reduced IT costs, companies continue to focus on digital transformation to realize operational efficiencies

Automation: Large enterprises are spending more on IT automation; moving from automating business processes to RPA and AI & ML

Security: Increased dependency on online and cloud and the increased frequency and complexity of cyber-attacks has diverted companies to focus on cybersecurity

Governments: With governments focusing on digitizing their economic operations, there is expected to be robust demand for IT applications and services

Major subsector trends

IT Services
- Growth owing to increased demand for cost-effective solutions increases the demand for **cloud software solutions** and **software as a service** (subscription model and pay-per use model)

Software
- Software uptake is rising with increasing adoption of **digitization** and **technological advancements**
- Growth in spending shows that companies are building less in-house and instead **buying solutions** to enable it to operate efficiently

Hardware & Infra
- **Slower growth in devices segment** as consumers and enterprises spent more during the pandemic and are now lengthening device refresh and replacement cycles
- **Data center infrastructure** spending continues to grow driven by cloud providers

Cybersecurity
- Growing spend attributed to remote and hybrid **working environment**, rise in **Zero Trust Network Access** and shift to **cloud-based delivery** models
- Growing statutory and regulatory rules also require companies to focus on cybersecurity

Telecom Service
- Aggressive adoption of new and emerging applications, from **5G** and **cloud** to **web3** and the **metaverse**, is expected to drive innovation
- **Network functional virtualization** technology is receiving significant investments from telecom service providers as it increases operational efficiency

Source: Accenture Strategy analysis

Emerging tech trends

Generative AI

- Introduction of pretrained models with remarkable task adaptability, which will revolutionize how and where enterprises across industries use AI
- **Generative AI will impact tasks**, not occupations, as some tasks will be automated, some others will be transformed through AI assistance, and some will be unaffected
- Companies can consume Generative AI and LLM applications through **APIs and tailor them**, to a small degree, for their own use cases

Metaverse

- Instead of viewing metaverse as a VR-based internet phase, it is being adopted as an extension of the **omnichannel customer experiences**
- VR adds an even greater degree of immersion, but there are ultimately a limited number of applications where that level of immersion pays of
- As organizations consider how to build their own metaverse for their customers, there will be less focus on headsets and virtual real estate and more focus on building depth in customer relationships and creating connections between the many digital experiences of a customer

Web3

- Considered as a modernization of the Internet, Web3 offers an **immersive user experience and decentralization**
- Using AI technologies, blockchain and NFTs as a foundation, Web3 provides users greater control over their data and online activities
- Distributed ledgers can be used in the area of **digital identity**, a central component of a creator-based internet and a priority for governments around the world as UN calls for the creation of a legal ID for all people by 2030 as part of its Sustainable Development Goals

Multi-Cloud

- The first stage of mass cloud adoption focused on the technical challenges of migrating individual systems, the lessons learned about closing cybersecurity gaps with a cloud provider and the basic concepts of integrating different cloud and on-prem components
- The next stage focuses on handling **complexity in a multi-cloud environment**
- This is gaining traction from companies interested in **expanding computing capacity, security and availability, as well as optimizing expenses**

Data

- High digitization and consequent increase of systems, people and connected tools increases the need for data generation and management
- Companies need to have a **well-defined strategy to extract value from this data** in order to gain a competitive advantage, while at the same time embracing transparency about business and industry - with a balance of privacy and confidentiality
- Data mesh and data fabric are emerging strategies both helping companies **streamline and de-silo data architectures**

Low Code/No Code

- LCNC is a **critical area within software development** that is expected to grow in importance in the coming years
- In order to reduce or eliminate the amount of code needed for program development, these tools allow users without great development experience, but with business knowledge and good logic, to also develop software and solutions to business problems without needing to code
- Many **small and medium enterprises** are employing LCNC to enable and simplify everything from customer acquisition to back-end processes

Source: Accenture POVs, CompTIA, EMIS, Accenture Strategy analysis

Despite relative weakness in 2022, IT spend is expected to gain pace over the next 5 years

2022-2027 CAGR
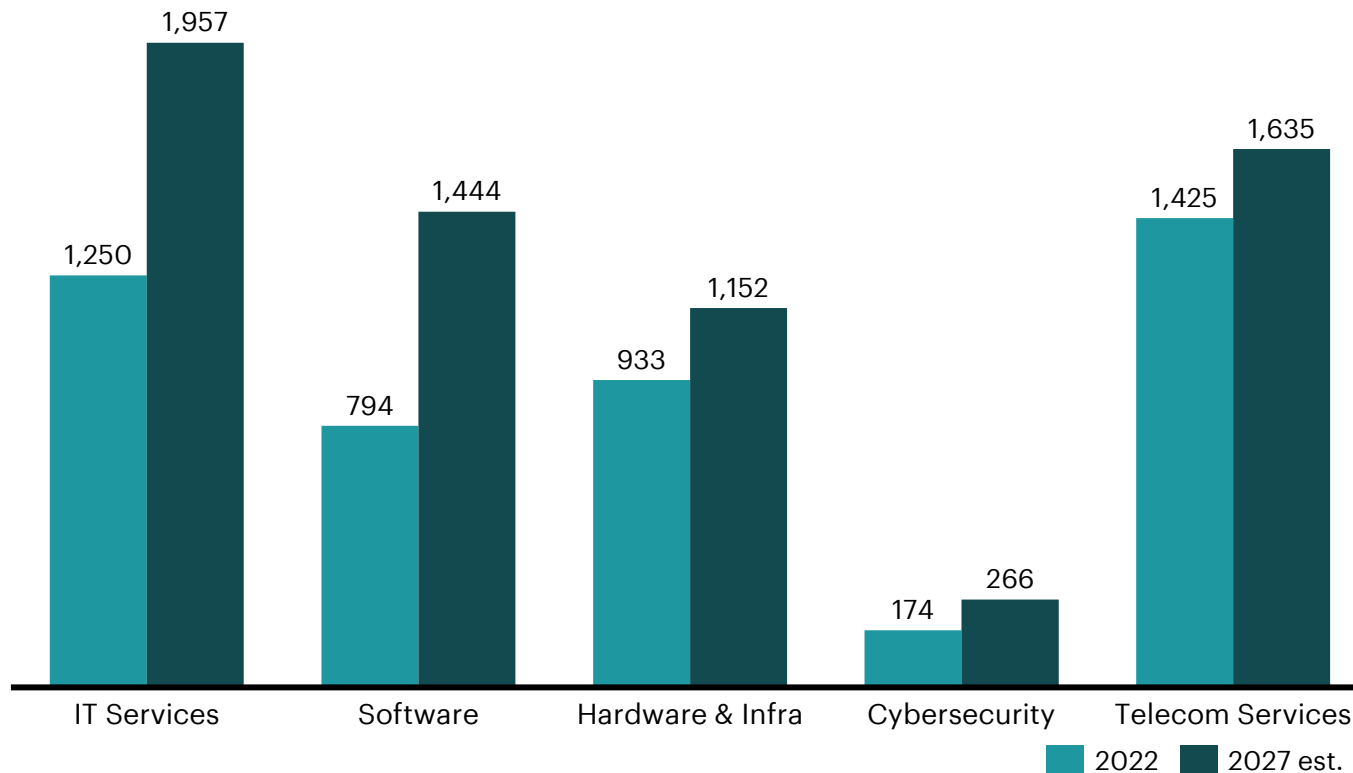
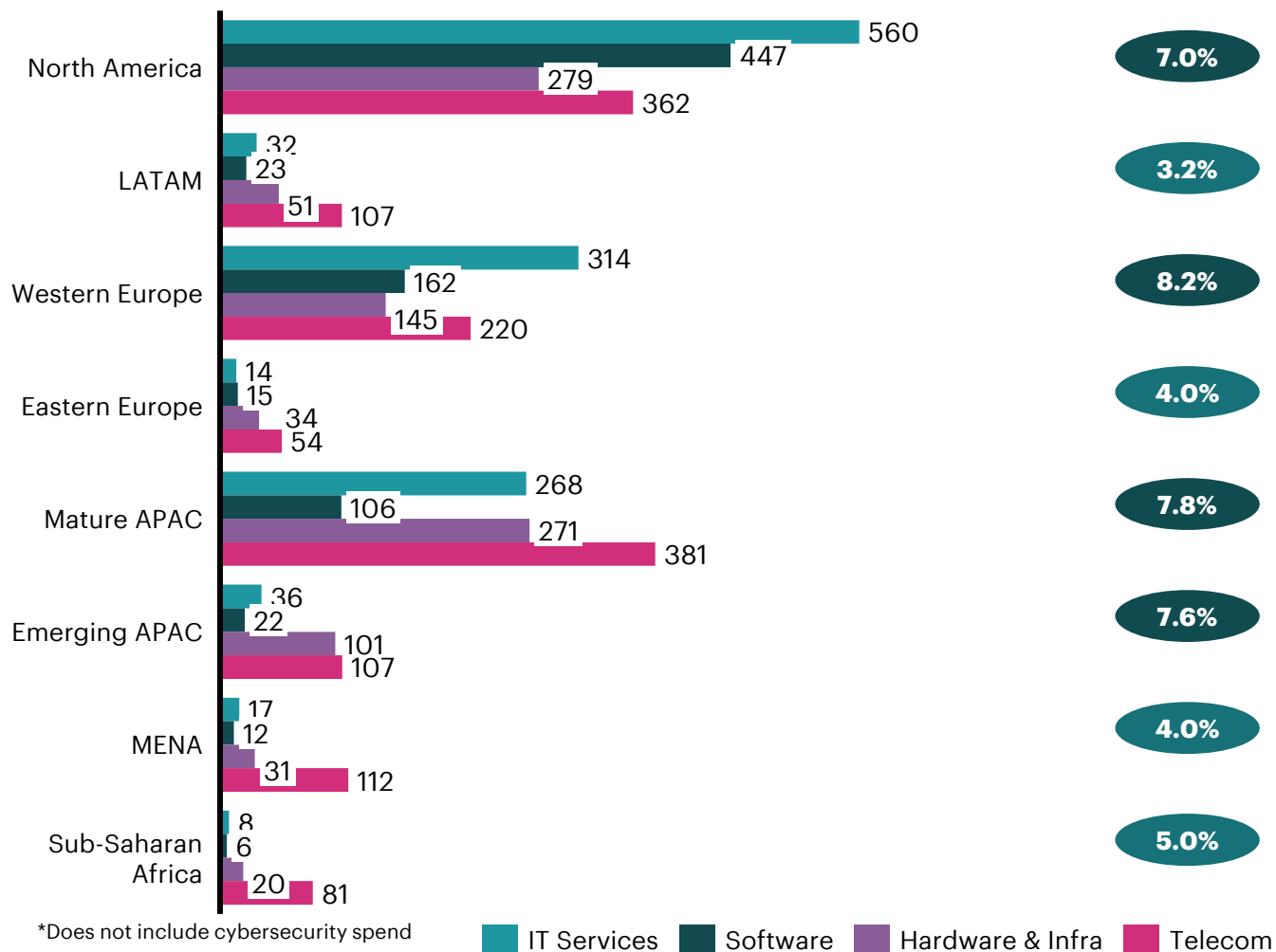| 9.4% | 12.7% | 4.3% | 8.9% | 2.8% |

Billions USD

Commentary

- **IT services** spend is expected to be high owing to increased spend on infrastructure-as-a-service offerings and IT consulting.

- Growth in **Software** is driven by increase in all enterprise application, infrastructure and vertical-specific software categories.

- **Cybersecurity**, though comparatively smaller, is expected to witness higher growth on account of increasing cyber attacks and thus the demand for cybersecurity products.

- Overall growth was limited for **Hardware and Infrastructure**, despite an increase in demand for **data center systems**.

- **Telecom** growth is driven by emerging technologies such as 5G, cloud computing, IoT, AI, etc. and their impact on enhancing communication networks.

- Reshuffling in B2B companies that overinvested in growth has no impact on IT budgets as enterprises continue to increase spending on digital business initiatives and so **IT spending remains recession proof.**

Source: Gartner, Markets and Markets, Accenture Strategy Analysis

Fastest new IT demand growth is set to come from APAC and Western Europe

2022 IT Spend (in Billions USD)*

2022-2027 CAGR

North America
- IT Services: 560
- Software: 447
- Hardware & Infra: 279
- Telecom: 362
- CAGR: **7.0%**

LATAM
- IT Services: 32
- Software: 23
- Hardware & Infra: 51
- Telecom: 107
- CAGR: **3.2%**

Western Europe
- IT Services: 314
- Software: 162
- Hardware & Infra: 145
- Telecom: 220
- CAGR: **8.2%**

Eastern Europe
- IT Services: 14
- Software: 15
- Hardware & Infra: 34
- Telecom: 54
- CAGR: **4.0%**

Mature APAC
- IT Services: 268
- Software: 106
- Hardware & Infra: 271
- Telecom: 381
- CAGR: **7.8%**

Emerging APAC
- IT Services: 36
- Software: 22
- Hardware & Infra: 101
- Telecom: 107
- CAGR: **7.6%**

MENA
- IT Services: 17
- Software: 12
- Hardware & Infra: 31
- Telecom: 112
- CAGR: **4.0%**

Sub-Saharan Africa
- IT Services: 8
- Software: 6
- Hardware & Infra: 20
- Telecom: 81
- CAGR: **5.0%**

*Does not include cybersecurity spend

Legend: ■ IT Services   ■ Software   ■ Hardware & Infra   ■ Telecom

Commentary

- The US contributed the most to the global spend at 35%, followed by China 12%, Japan 6% and UK 5%.

- While North America, Western Europe and Mature APAC dominate the IT spend, all regions are expected to witness a double-digit growth in software revenue.

- IT services spend is expected to be higher across all regions.

- IT spending affects business confidence, availability of cash and technical priorities in the short term. In the long term, IT spending contributes to IT sector growth which contributes to GDP expansion & improves productivity.

What does this mean for Puerto Rico?

Puerto Rico can take advantage of its proximity to North American countries to increase penetration in this market.

Gradually, it can also expand its presence to gain a market share in Western European countries

Source: Gartner, Accenture Strategy Analysis

Healthcare, Energy, Banking and Education sectors will drive most of this IT demand growth

Enterprise IT Spend by sector (in Billions USD)*

Sector	2022	2027 est.
Banking & Investment Services	603	930
Government	548	820
Communications, Media & Services	548	802
Manufacturing & Natural Resources	394	557
Healthcare & Life Sciences	214	351
Insurance	187	287
Power & Utilities	170	266
Retail	176	253
Education	127	193
Transportation	104	142
Wholesale Trade	59	81
Oil and Gas	25	35

2022-2027 CAGR

Sector	CAGR
Banking & Investment Services	**9.1%**
Government	8.4%
Communications, Media & Services	7.9%
Manufacturing & Natural Resources	7.2%
Healthcare & Life Sciences	**10.4%**
Insurance	**8.9%**
Power & Utilities	**9.3%**
Retail	7.6%
Education	**8.8%**
Transportation	6.5%
Wholesale Trade	6.5%
Oil and Gas	7.4%

*Does not include cybersecurity spend   ▪ 2022   ▪ 2027 est.

Commentary

- Five sectors are expected to grow higher than the average rate (8.4%):
  - **Banking and Investment Services** growth is driven by the increase in the use of IT services as they navigate emerging opportunities and challenges and continue their journey to a more agile IT infrastructure
  - **Healthcare** IT spend is driven by initiatives for the digital transformation of care delivery, transitioning to the cloud, virtual care and increasing investments in data and analytics
  - **Insurance** IT spending is largely driven by continued investments in cloud spending
  - **Power & Utilities** IT spend is high as demand for adaptation to the energy and water transition, security, analytics, customer experience applications, and IT personnel and services remains strong
  - Government and **education organizations** are continuing to invest in enterprise IT as demand for modern technology solutions that serve citizen needs expands

Source: Gartner, Accenture Strategy analysis
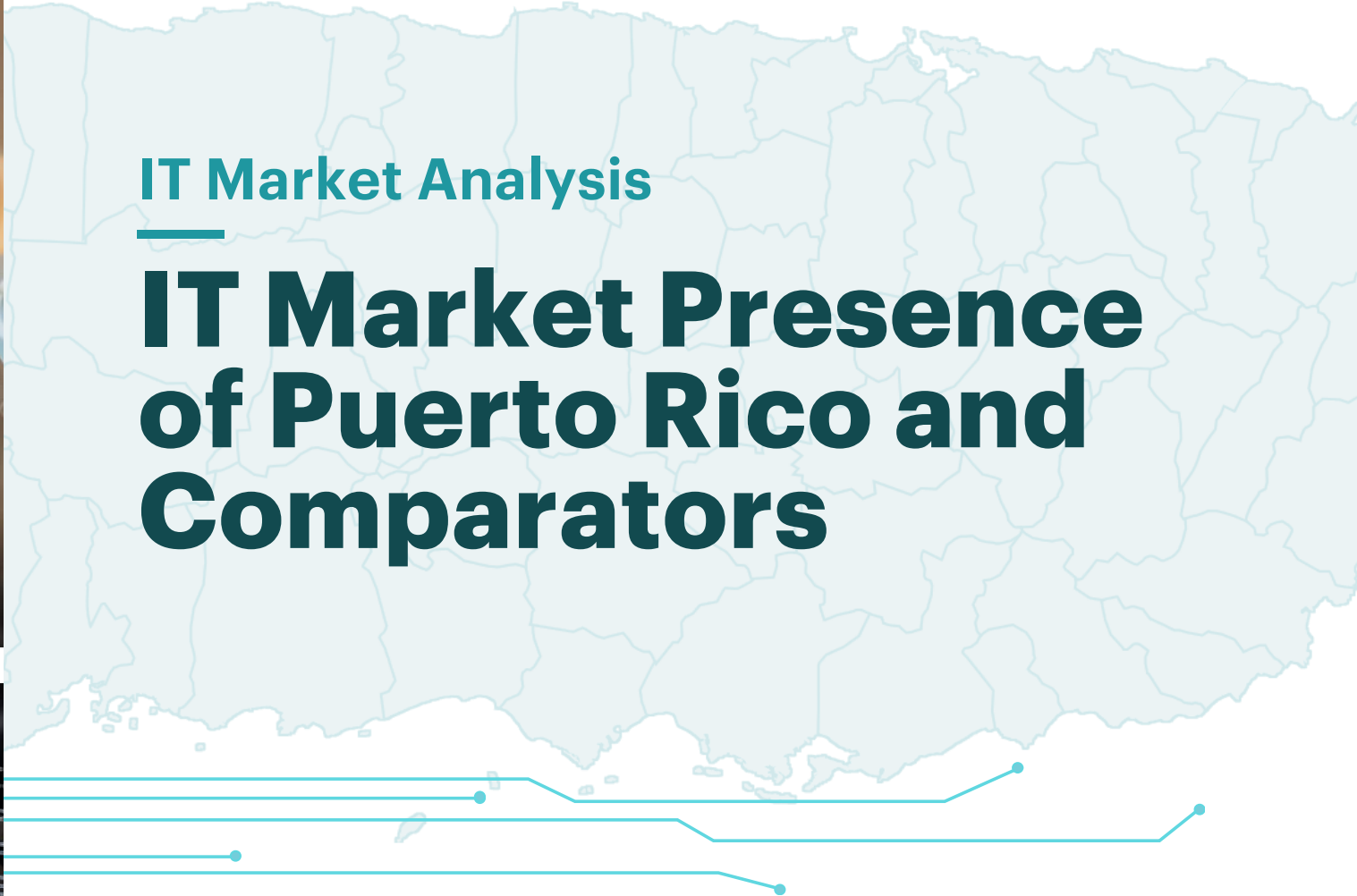
IT Market Analysis

IT Market Presence of Puerto Rico and Comparators

Key highlights and takeaways

1 Puerto Rico has relatively high market presence in the subsectors of IT services, software, and cybersecurity, and relatively limited presence in the telecom services and hardware & infrastructure subsectors.

2 The primary geographic market for Puerto Rican IT companies is the mainland United States (85-90% of the total). Other notable foreign markets include Latin America and the Caribbean.

3 Puerto Rico has comparatively lower export market diversification than most peers and competitors, including US states.

Puerto Rico's market presence is greatest in IT services and software

IT subsector maturity among structural peers and US states

Relative maturity scale

	Jurisdiction	Relative maturity of IT sector	IT Services	Software	Hardware and infrastructure	Cybersecurity	Telecom services
	Puerto Rico	Mixed	• Large segment with diversified services	• Majorly concentrated around software dev	• Few companies with limited mfg. presence	• Small sector with potential for growth	• Relatively small sector for local services
Structural Peers	**Jamaica**	Low	• Flourishing BPO sector with plans on digital expansion	• Emerging AI tech • Relies on app development	• *Insignificant local mfg. presence*	• *A few startups in the space*	• *Relatively underdeveloped with struggling players*
	Fiji	Low	• Well-established and rapidly growing BPO sector	• Many software dev. cos.	• *Insignificant local mfg. presence*	• *A few startups in the space*	• *Increasing connectivity through imported providers*
	Malta	Low	• Specialized IT service companies	• Outsourced software soln. • Global co office setups	• STMicroelectronics operates an assembly plant	• *A few startups in the space*	• Strong communication industry has helped IT dev
	Cyprus	Low	• Expanding with foreign companies relocating	• Expanding software dev. • Known for fintech	• *Insignificant local mfg. presence*	• Efforts to improve cybersecurity infra	• Fully digital with high-speed international connectivity
	Costa Rica	Mixed	• Preferred offshoring destination for large cos	• Prolific software service industry	• *Intel shut plant due to high operating costs*	• Relatively more advanced peer in the region	• Tech contributed sig. to wireless coverage
US States	**Florida**	Complex	• High demand for IT support services	• Fastest growing for tech-startups and software dev	• Mfg. electronic products incl. Semiconductors	• Witnessing growth in cybersecurity	• Developed network infrastructure
	North Carolina	Complex	• Second fastest-growing state for IT	• One of the leading states in software	• Has mfg. presence for electronic components	• Developing sector	• Developed network infrastructure
	Colorado	Mixed	• Mature IT industry	• Among top 10 states for software growth	• Microprocessor and other hardware component manufacturing	• Developing sector	• Developed network infrastructure
	Oklahoma	Mixed	• Hosts companies providing IT services	• Companies provide software programming	• Companies provide data processing and storage	• Developing sector	• Developed network infrastructure
	Georgia	Complex	• Growing IT sector with govt support	• Developed software industry	• Mfg. electronic products incl. Semiconductors	• Top 10 states for cybersecurity	• Developed network infrastructure

Note: maturity shading is based on information available through secondary sources
Source: Accenture Strategy analysis

Geographically, the mainland US is the main export destination for most Puerto Rican IT firms

Relative percentage of active exporting firms with top or second highest export destination as the mainland United States (2021) by all IT-related NAICS code according to registration data
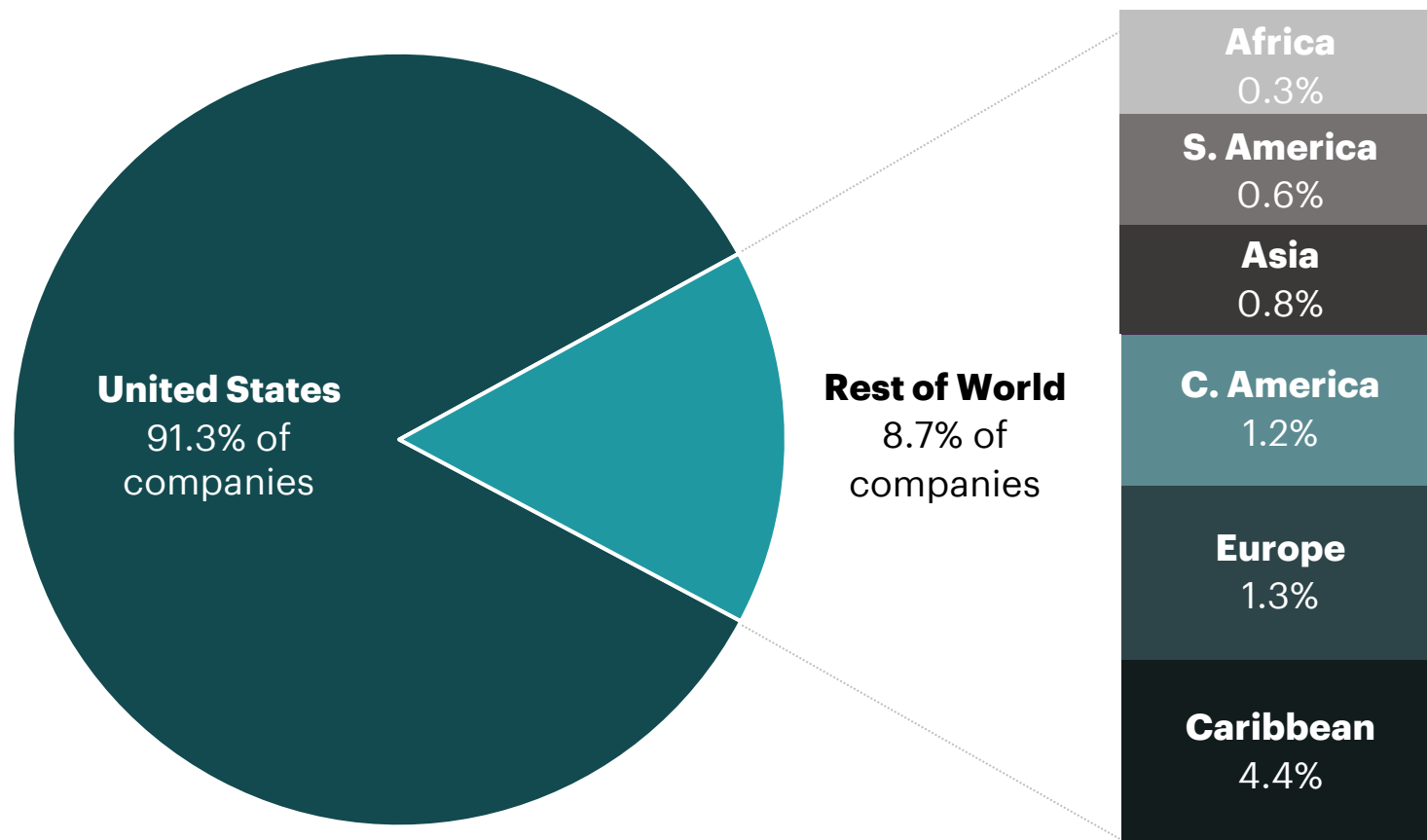

Chart categories (top to bottom):
- Other Professional, Scientific, and Technical Services
- Scientific Research and Development Services
- Audio and Video Equipment Manufacturing
- Information Services
- Management, Scientific, and Technical Consulting Services
- Telecommunications
- Other Electrical Equipment and Component Manufacturing
- Data Processing Services
- Computer Systems Design and Related Services
- Communications Equipment Manufacturing
- Information
- Software Publishers
- Computer and Peripheral Equipment Manufacturing
- Electrical Goods

The most diversified exporting sector only has 21 firms listed as part of its NAICS code

■ Percent of exporting companies with top market as mainland USA
■ Percent of exporting companies with notable export destination as mainland USA

Commentary

- Firms report a top export destination and/or a notable export destination as part of the voluntary survey they answer.

- **Information technology focused firms are heavily dependent on demand from the mainland US.** Three subsectors have 100% of firms citing the mainland as their main export destination and three more have >90% of firms with their top export destination as the mainland US.

- The (unweighted) **average proportion of companies** across subsectors **with the US as their top export destination is 83%** (weighting by number of firms in each subsector would increase that number upwards).

Source: Departmento de Estado de Puerto Rico, Accenture Strategy Analysis

For IT services, the rest of the Caribbean region is Puerto Rico's most important export destination

Relative number of companies and their main export destinations (2021) according to business registration data
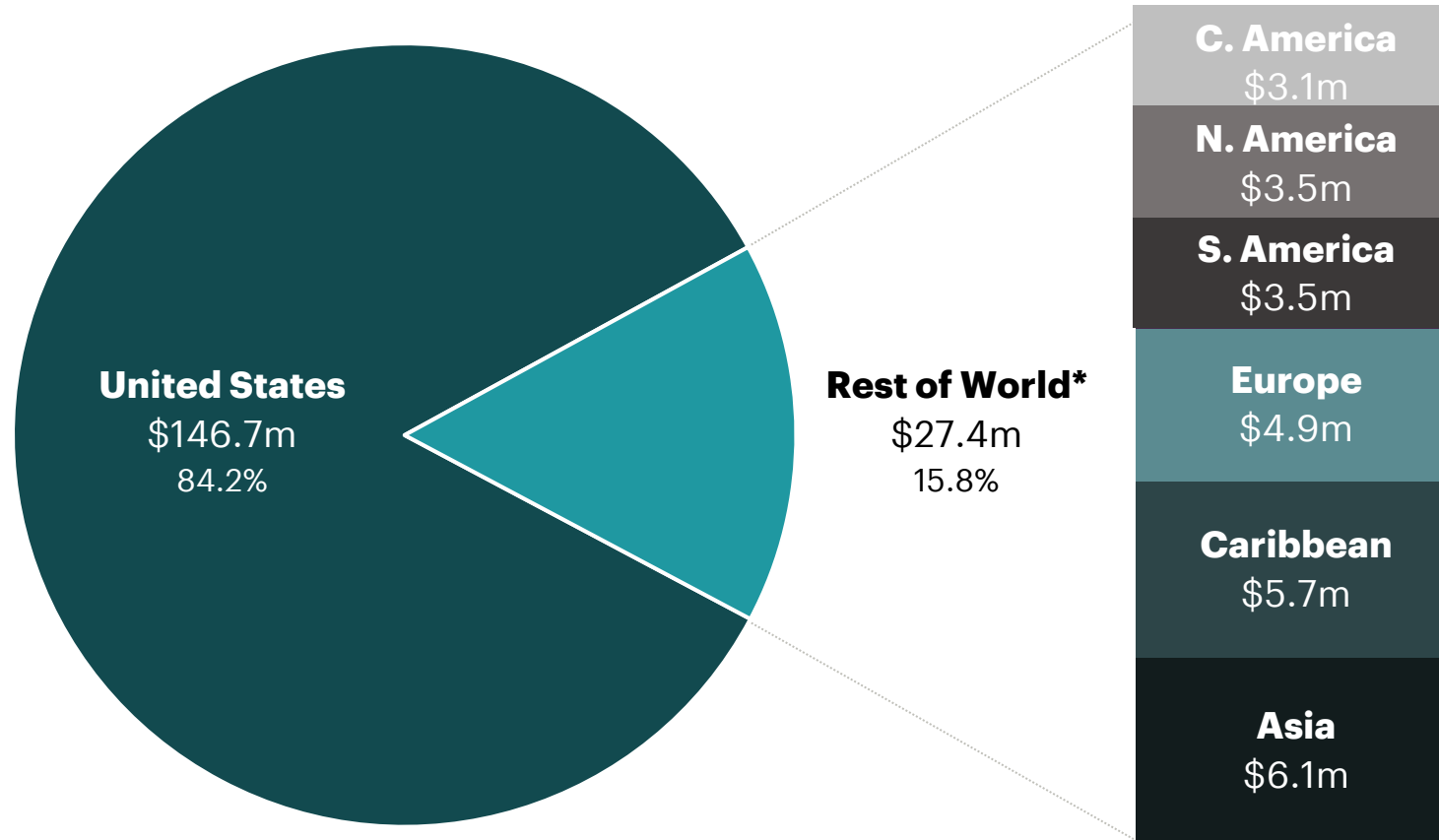
United States
91.3% of companies

Rest of World
8.7% of companies

Region	%
Africa	0.3%
S. America	0.6%
Asia	0.8%
C. America	1.2%
Europe	1.3%
Caribbean	4.4%

Commentary

- For all companies tracked in the business registry which list their activities as part of the IT services industry by NAICS code, the **mainland United States is the most common export destination**.

- The second highest export destination after the mainland U.S. is the Dominican Republic (16 companies). The third highest are the U.S. Virgin Islands (9 companies).

- Among companies which cite a notable other export destination (248 companies do in total), **60% cited the mainland US**, 8% the Caribbean, 9% Asia, 7% Europe, 6% South America, 4% Central & North America.

Source: Departmento de Estado de Puerto Rico, Accenture Strategy Analysis

For IT goods, the export market outside of mainland US is primarily other Americas, with some presence in Asia and Europe

Puerto Rico's IT goods exports destinations (2021)

United States
$146.7m
84.2%

Rest of World*
$27.4m
15.8%

C. America $3.1m
N. America $3.5m
S. America $3.5m
Europe $4.9m
Caribbean $5.7m
Asia $6.1m

Commentary

- **The United States** is the largest purchaser of IT goods from Puerto Rico, accounting for roughly 84% of the Island's exports
  - Only 16% of goods are bound for other markets than the United States, with the bulk of destined for other parts of North and South America
- Outside of the Americas, Puerto Rico exports a small amount of IT goods to Europe and Asia
  - **Singapore** is Puerto Rico's second largest IT goods trading partner, with purchases valued at $4.4m in 2021
  - **The Netherlands** is Puerto Rico's fourth largest IT goods trading partner, with purchases valued at $3.2m in 2021
- Puerto Rico's exported hardware is concentrated in simple components such as electrical connectors

Visual excludes Africa, Australia, and Oceania, which make up less than 2% of total IT exports

Sources: Puerto Rico Instituto de Estadísticas, Accenture Strategy Analysis, U.S. Census

Within regions, demand for Puerto Rico's IT goods comes from only a handful of countries and is concentrated in telecom equipment

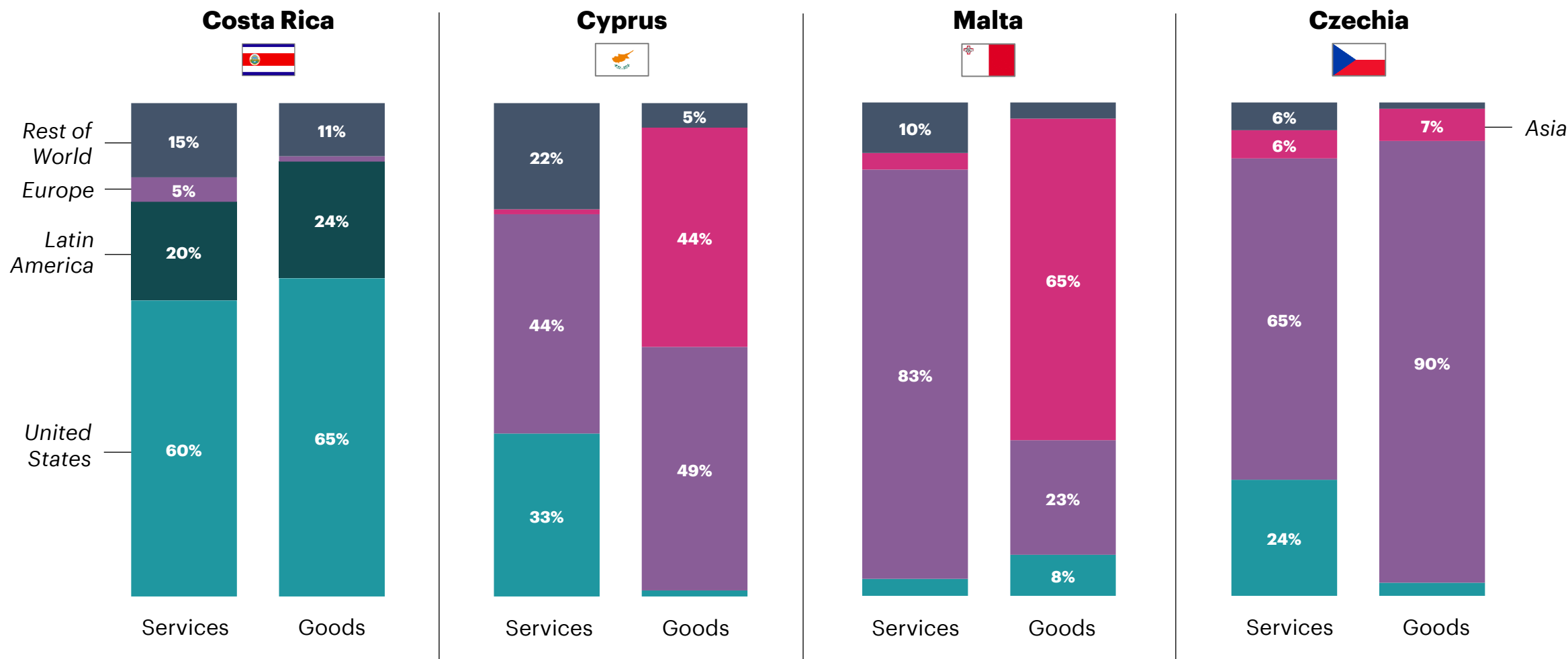## Top Puerto Rico IT goods export destinations and products demanded, 2021

Netherlands
$3.2m

Czechia
$1.2m

Hong Kong SAR
$1.1m

United States
$146.7m

Mexico
$3.3m

Costa Rica
$1.8m

Singapore
$4.4m

Ecuador
$1.6m

Chile
$1.4m

Rest of World: $9.4m
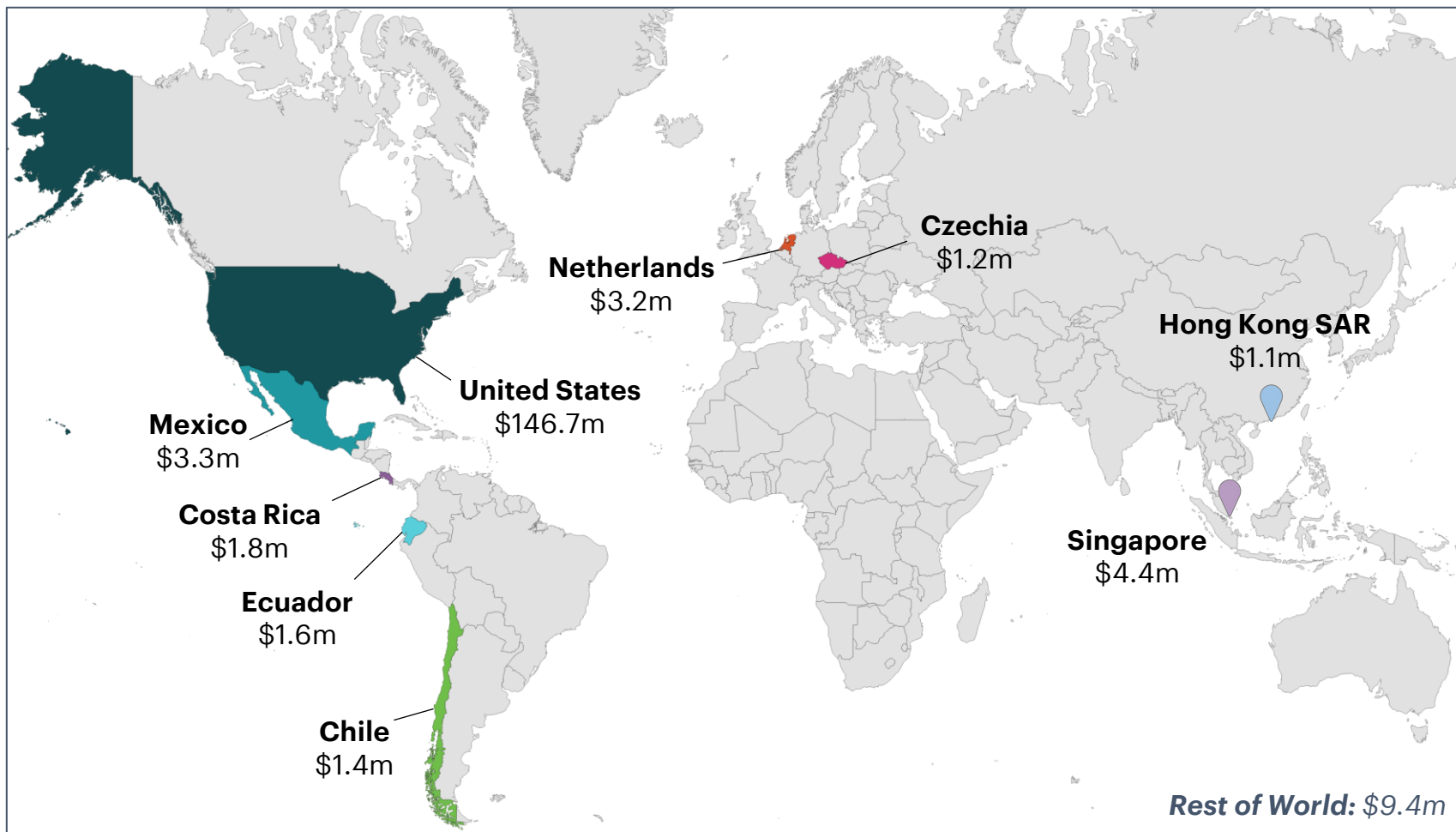
Country	Top Product(s) Demanded (with HST4 Code)
United States	• Radar Apparatus Parts (8529) • Telephone Sets (8517) • Digital Processing Units (8471)
Singapore	• Parts & Accessories of Machines (8471)
Mexico	• Voice/Image/Other Data Reception Machines (8517)
Netherlands	• Voice/Image/Other Data Reception Machines (8517) • Parts & Accessories of Machines (8473)
Costa Rica	• Modems (8517) • Voice/Image/Other Data Reception Machines (8517)
Ecuador	• Voice/Image/Other Data Reception Machines (8517)
Chile	• Portable Data Processing Machines (8471)
Czechia	• Parts & Accessories of Machines (8473)
Hong Kong SAR	• Radio Telephones (8517)

Sources: Puerto Rico Instituto de Estadísticas, Accenture Strategy Analysis
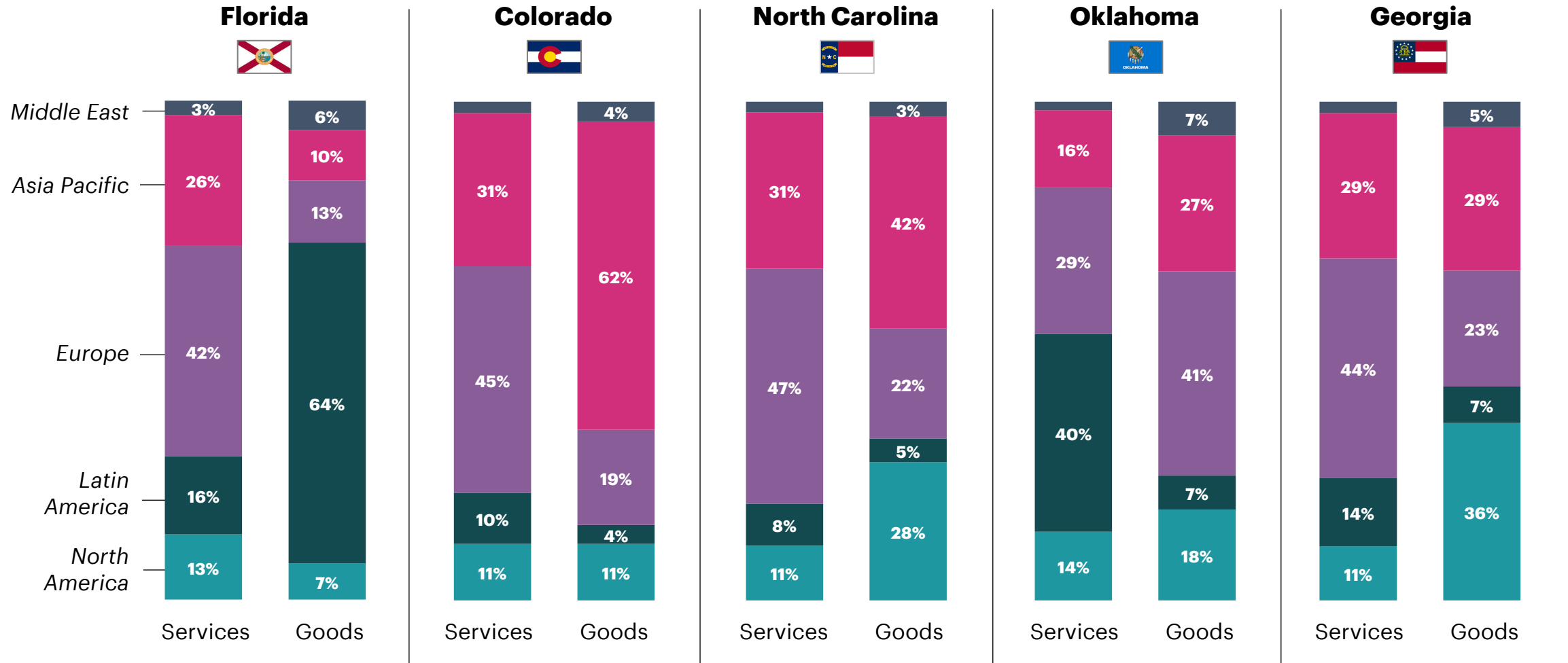
IT export destinations for structural and emerging peers appear to be largely shaped by geographic proximity

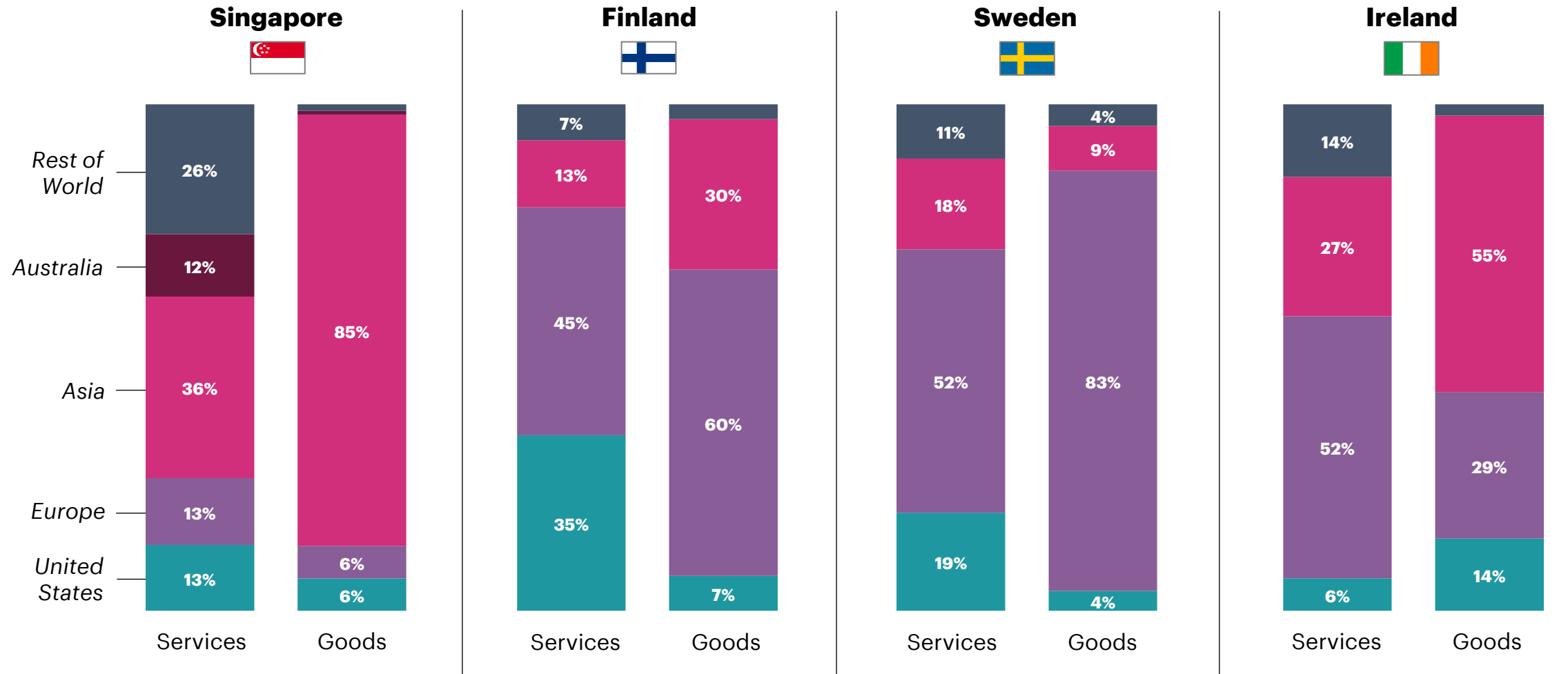## IT goods and services export markets for structural and emerging peers

Costa Rica

	Services	Goods
Rest of World	15%	11%
Europe	5%	
		24%
Latin America	20%	
United States	60%	65%

Cyprus

	Services	Goods
	22%	5%
		44%
	44%	
		49%
	33%	

Malta

	Services	Goods
	10%	
		65%
	83%	
		23%
		8%

Czechia

	Services	Goods
	6%	7%
	6%	
	65%	90%
	24%	

Asia

US state peers have considerably more diversified IT export markets than Puerto Rico

IT goods and services export markets for US state peers

Florida

	Services	Goods
Middle East	3%	6%
Asia Pacific	26%	10%
		13%
Europe	42%	64%
Latin America	16%	
North America	13%	7%

Colorado

	Services	Goods
Middle East		4%
Asia Pacific	31%	62%
Europe	45%	19%
Latin America	10%	4%
North America	11%	11%

North Carolina

	Services	Goods
Middle East		3%
Asia Pacific	31%	42%
Europe	47%	22%
Latin America	8%	5%
North America	11%	28%

Oklahoma

	Services	Goods
Middle East		7%
Asia Pacific	16%	27%
Europe	29%	41%
Latin America	40%	7%
North America	14%	18%

Georgia

	Services	Goods
Middle East		5%
Asia Pacific	29%	29%
Europe	44%	23%
Latin America	14%	7%
North America	11%	36%

Source: U.S. Chamber of Commerce

Aspirational IT peers are less focused on US market, potentially giving room for Puerto Rico to consolidate its US market presence

IT goods and services export markets for aspirational peers

Singapore

	Services	Goods
Rest of World	26%	
Australia	12%	85%
Asia	36%	
Europe	13%	6%
United States	13%	6%

Finland

	Services	Goods
	7%	
	13%	30%
	45%	60%
	35%	7%

Sweden

	Services	Goods
	11%	4%
	18%	9%
	52%	83%
	19%	4%

Ireland

	Services	Goods
	14%	
	27%	55%
	52%	29%
	6%	14%

Source: Eurostat, UNCTAD

Summary of Puerto Rico and comparators' IT market presence by region

Relative value of IT exports across regions

Export Value | <$100M | $100M-$500M | $500M-$5B | $5B+

Group	Jurisdiction	North America	Central & South America	Europe	Asia	Middle East & Africa	Australia & New Zealand
	Puerto Rico	▓▓▓░	▓░░░	▓░░░	▓░░░	░░░░	░░░░
Structural Peers	**Malta**	▓░░░	▓░░░	▓▓░░	▓░░░	▓░░░	▓░░░
	Cyprus	▓░░░	▓▓░░	▓▓░░	▓░░░	▓░░░	▓░░░
	Costa Rica	▓▓░░	▓▓░░	▓▓░░	▓▓░░	░░░░	░░░░
US States	**Florida**	▓▓▓░	▓▓▓▓	▓▓▓░	▓▓▓░	▓▓▓░	▓▓▓░
	North Carolina	▓▓▓░	▓▓░░	▓▓░░	▓▓░░	▓▓░░	▓▓▓░
	Colorado	▓▓▓░	▓▓░░	▓▓░░	▓▓░░	▓▓░░	▓▓░░
	Oklahoma	▓▓░░	▓▓░░	▓▓░░	▓▓░░	▓░░░	▓▓░░
	Georgia	▓▓▓░	▓▓▓░	▓▓░░	▓▓░░	▓▓░░	▓▓░░
Growing Hubs	**Mexico**	▓▓▓░	▓▓░░	▓▓░░	▓▓▓░	▓░░░	▓▓░░
	Czech Republic	▓▓░░	▓▓░░	▓▓▓░	▓▓▓░	▓▓░░	▓▓░░
Aspirational Targets	**Ireland**	▓▓▓░	▓▓░░	▓▓▓▓	▓▓▓▓	▓░░░	▓▓░░
	Finland	▓▓░░	▓▓░░	▓▓▓░	▓▓▓░	▓░░░	▓▓░░
	Sweden	▓▓░░	▓▓░░	▓▓▓░	▓▓▓░	▓▓░░	▓▓░░

Note: data captured based on information availability for ICT goods and services exports
Source: UNCTAD, Eurostat, US Camber of Commerce, International Trade Administration, Accenture Strategy Analysis

Key highlights and takeaways

1 Increasing IT Service & Cybersecurity offerings in the mainland US is one of the more promising and frictionless avenues for Puerto Rico's IT growth in the near term. Target demand segments include mainland US companies in Financial Services, Comms and Media and Healthcare, as well as the US federal government for cybersecurity.

2 In the medium-term, expansion into new geographic markets could become more feasible, particularly Latin America, as Puerto Rico benchmarks favorably to other regional peers servicing this market and offers companies direct access to the US market.

3 Puerto Rico cannot control its own trade and labor policies due to its status as a U.S. Territory. Growing global barriers to digital services trade could therefore hinder some of these market expansion opportunities.
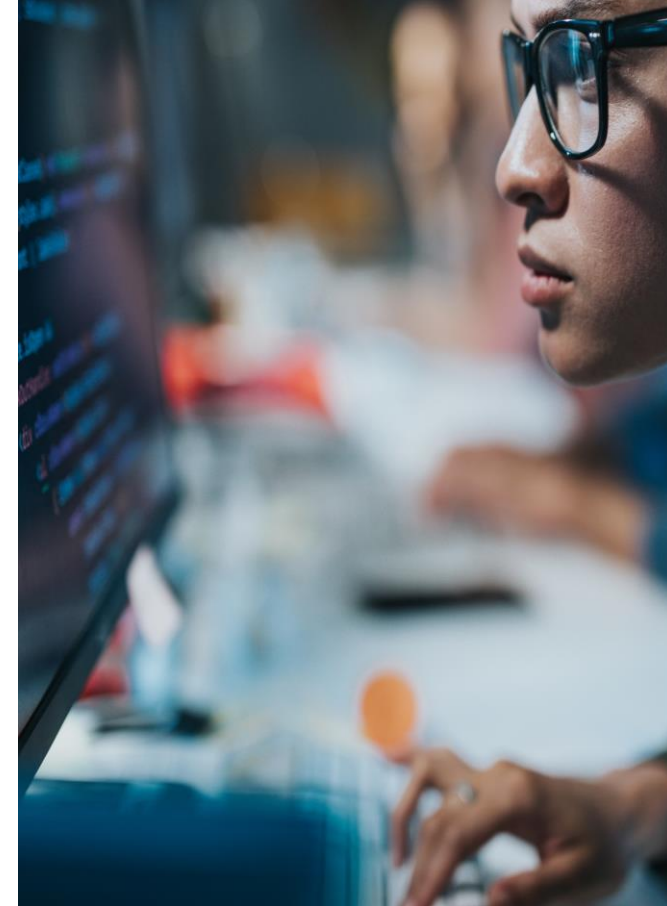
Mainland US companies in Healthcare, Banking, Government and Comms & Media are key sources of current and future IT demand

US enterprise IT Spend by Sector

Note: bubble size represents 2022 IT spend (USD billion)

X-axis: Recent growth (2017 - 2022 % CAGR)
Y-axis: Expected future growth (2022 - 2027 % CAGR)

Sectors shown: Healthcare and Life Sciences, Banking and Investment Services, Education, Power and Utilities, Insurance, Government, Manufacturing and Natural Resources, Oil and Gas, Retail, Communications, Media and Services, Transportation, Wholesale Trade

Commentary

- IT demand among US companies has grown at a **5.1% CAGR from 2017-2022** and is **expected to grow at a 7.7% CAGR** over the next 5 years.

- **Six sectors** project growth higher than the average rate

- **Digital transformation** in various end-user industries has reshaped companies' approach to customers' digitization levels

- **Key market drivers** include:
  - Growing adoption of cloud computing
  - Increasing deployment of database management systems
  - Favorable payment plans for companies to pay as per their need in cloud services

- Acknowledging the importance of Federal IT, the **US government** is:
  - Investing a significant amount to improve cybersecurity
  - Emphasizing on training new and current workforce to address the skill gap among the existing staff

- **Adoption of emerging technologies** such as AI is driving demand in sectors like Banking and Healthcare

Source: Gartner, Accenture Strategy analysis

Puerto Rico's two main IT subsectors face a similar customer market in mainland US, though demand from Government is higher for Software

US IT Services Demand ($B)

2022: 531
- Banking and Investment Services: 22%
- Communications, Media and Services: 18%
- Education: 2%
- Government: 17%
- Healthcare and Life Sciences: 10%
- Insurance: 7%
- Manufacturing and Natural Resources: 10%
- Oil and Gas: 1%
- Power and Utilities: 3%
- Retail: 7%
- Transportation: 2%
- Wholesale Trade: 1%

2027 est: 773
- Banking and Investment Services: 22%
- Communications, Media and Services: 18%
- Education: 3%
- Government: 16%
- Healthcare and Life Sciences: 11%
- Insurance: 7%
- Manufacturing and Natural Resources: 9%
- Oil and Gas: 1%
- Power and Utilities: 4%
- Retail: 7%
- Transportation: 2%
- Wholesale Trade: 1%

US Software Demand ($B)

2022: 421
- Banking and Investment Services: 21%
- Communications, Media and Services: 15%
- Education: 6%
- Government: 22%
- Healthcare and Life Sciences: 8%
- Insurance: 7%
- Manufacturing and Natural Resources: 9%
- Oil and Gas: 1%
- Power and Utilities: 5%
- Retail: 4%
- Transportation: 3%
- Wholesale Trade: 2%

2027 est: 752
- Banking and Investment Services: 22%
- Communications, Media and Services: 14%
- Education: 6%
- Government: 22%
- Healthcare and Life Sciences: 8%
- Insurance: 6%
- Manufacturing and Natural Resources: 8%
- Oil and Gas: 1%
- Power and Utilities: 5%
- Retail: 4%
- Transportation: 2%
- Wholesale Trade: 2%

Legend
- Banking and Investment Services
- Communications, Media and Services
- Education
- Government
- Healthcare and Life Sciences
- Insurance
- Manufacturing and Natural Resources
- Oil and Gas
- Power and Utilities
- Retail
- Transportation
- Wholesale Trade

Commentary

IT services
- **Banking**, **Communications** and **Government** constitutes ~60% of the demand for IT services
- While the segment is expected to grow at a **7.8% CAGR**, Power and Utilities (10.9%), Healthcare (10.6%) and Education (9.1%) are projected to have the highest growth
- **Infrastructure services** have experienced a significant demand growth, largely due to an increased effort from businesses to increase their digital presence, alongside the prevalence of data collection

Software
- **Government**, **Banking** and **Communications** constitutes ~60% of the demand for software
- While the segment growth is projected at **12.3%**, Healthcare (13.9%), Banking (13.6%) and Power and Utilities (13.6%) are projected to have higher growth
- **Rapid increase in the volume of enterprise data** and **the increased automation of business processes** is expected to drive demand across end-use industries such as retail, manufacturing, healthcare, and transportation

Source: Gartner, Accenture Strategy analysis

In non-US markets, Banking sector is a relatively smaller source of IT demand, while Manufacturing and Natural Resources is larger

IT Services Demand by sector, 2022 (Billions USD)

Software Demand by sector, 2022 (Billions USD)

Legend:
- Banking and Investment Services
- Communications, Media and Services
- Education
- Government
- Healthcare and Life Sciences
- Insurance
- Manufacturing and Natural Resources
- Oil and Gas
- Power and Utilities
- Retail
- Transportation
- Wholesale Trade
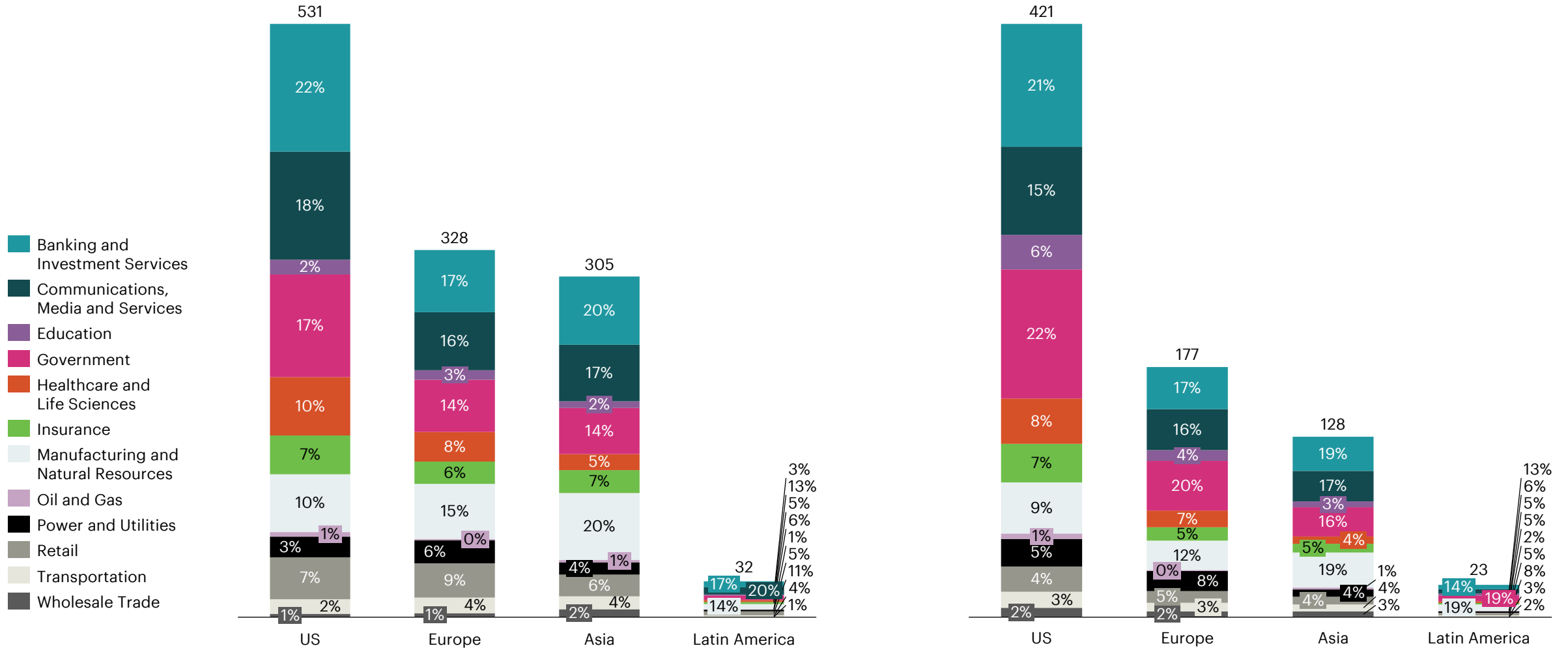
Source: Gartner, Accenture Strategy analysis

It is less complex to grow existing markets & offerings than to develop new competencies & markets

IT Growth Opportunity Framework For Puerto Rico

Opportunity Growth Matrix

Geographic presence

Highest medium-term growth opportunity

	Subsectors with strong presence *(Software, IT Services, Cybersecurity)*	Subsectors with limited presence *(Hardware, Telecoms)*
Low-presence markets *(non-US)*	**Core offering expansion**	**New growth frontiers**
High-presence markets *(mainland US)*	**Greater market penetration**	**Subsector diversification**

Highest potential short-term growth opportunity

IT subsector presence

Expected challenges to growth

Low — Medium — High

Commentary

- Concentrating on growth in existing markets with existing competencies reduces risk and minimizes necessary investments. **Puerto Rico has existing competencies in the IT Services, Software, & Cybersecurity subsectors**.

- Developing additional competencies in the telecoms & hardware subsectors requires substantial investments that may not pay off.

- Attempting to enter non-US markets while developing new competencies in the telecoms and hardware & infrastructure subsectors is the most complex approach to growth with the greatest uncertainty.

Key opportunity area #1: Growing US market share in subsectors where Puerto Rico's current presence is strong

IT subsectors	Current PR geographic presence	Key peers active in space	Benchmarking results for PR relative to active peers	Potential Opportunities	Main End User Sectors	Priority for Future Exploration
IT Services	US	US States, Jamaica, Fiji, Costa Rica	• PR has the technical workforce, cheap labor (20-35% less compared to US States) and existing competencies to increase its IT service presence • It also has an advantage over non-US peers by having the same currency, language, time zones, judicial system, overarching regulations, and IP protection	• Reducing executive and legislative volatility would be beneficial • Increasing the supply of technical workers • Puerto Rico can develop its electricity generation capabilities to reduce costs • Puerto Rico could improve its cybersecurity infrastructure	• Banking • Comms, Media • Government • Healthcare	
Software	US	US States, Jamaica, Costa Rica	• Puerto Rico has a weak knowledge & innovation ecosystem, which is particularly important to develop a top-notch software development industry. • Lower salaries are a bane in this case as skilled labor emigrates in search of higher wages. • PR has adequate IT infrastructure to support this sector but would benefit from expanding internet & broadband access & reducing costs on electricity & data	• Improve PR's human capital competencies & its scientific & innovation ecosystem. • PR could leverage lower wage but linguistically constrained S. American labor to become competitive in this subsector • PR can actively market its growing software presence & repatriate expats	• Banking • Comms, Media • Government • Healthcare	
Cyber-security	US	US States, Costa Rica	• PR has the capacity to fulfill background investigation requirements besides having the technical workforce, competitive wages (lower than US States) and existing competencies • PR has the capability to upskill within this segment	• Application security has the potential to become a strong sector for Puerto Rico • PR can develop partnerships to certify IT-professionals as cybersecurity analysts	• Banking • Comms, Media • Government • Healthcare	

Key opportunity area #2: New geographic markets for active subsectors

IT subsectors	Untapped geographies	Projected market demand	Peers active in this market	PR benchmarking results relative to active peers	Potential Opportunities	Main End User Sectors	Priority for Future Exploration
IT Services	Europe	High	Malta, Cyprus, US	• PR has relatively little presence in Asia and Europe • PR will struggle to offer competitively priced IT goods and service to Latam & Asia • PR ranks more highly than its nearby structural peers across benchmarking dimensions	• PR can increase its presence in Europe by leveraging its competitive wages and technical labor. • Puerto Rico has comparatively better IT infrastructure, governance, and economic stability than most South American growing hubs.	• Banking • Comms, Media • Govt. • Manuf. & Nat. Resources • Healthcare	
	Latin America	Medium	Jamaica, Costa Rica, US				
	Asia	High	Fiji, US				
Software	Europe	High	Malta, Cyprus, US	• Puerto Rico has far lower presence across these geographies than its various peers and comparable US States. • If Puerto Rico can grow its software workforce, it can price competitively in parts of Europe & Asia	• Growing Puerto Rico's innovation ecosystem, increasing the total amount of available capital for R&D, and offering higher wages would enable Puerto Rico to compete more actively in these markets. • Increase the relevant workforce and available resources & capital it needs to thrive.	• Banking • Comms, Media • Govt. • Manuf. & Nat. Resources • Healthcare	
	Latin America	Medium	Jamaica, Costa Rica, US				
	Asia	High	US				
Cyber-security	Europe	High	US States	• PR does not have a significant cybersecurity presence when compared to global peers • Other markets have developed and developing innovative solutions for the sector	• Focus on cybersecurity services as a valuable end-market in which to specialize • Develop niche-cybersecurity offerings tied to industry-specific competencies • Upgrade PR's cybersecurity visibility	• Banking • Comms, Media • Govt. • Healthcare	
	Latin America	Medium	US States				
	Asia	High	US States				

Key opportunity area #3: Untapped subsectors in new geographic markets

IT subsectors	Untapped geographies	Projected market demand	Existing players active in this market	Potential Opportunities	Priority for Future Exploration
Hardware and infrastructure	US	Low	Mexico, US, Singapore, Ireland, Israel	• Increasing funds for capital-intensive projects. • Directing Puerto Rico's available workforce to Hardware & Infrastructure manufacturing to increase supply. • Leveraging technology to increase productivity and become competitive in this space. • Increasing space available for manufacturing facilities • Further developing export capacities to service nearby markets.	
	Latin America	Low	US, Mexico, Singapore,		
	Europe	Medium	Czech Republic, US, Singapore, Sweden, Ireland		
	Asia	High	Singapore, US, Ireland, India, Israel		
Telecom services	US	Low	Sweden, Czech Republic	• Developing labor competencies for telecommunications development and service deliveries • Creating advanced innovation & engineering centers of education • Ensure access to large consumer markets • Increase funds to R&D in critical sources of next-generation telecommunication service technology	
	Latin America	Low	Czech Republic, Sweden		
	Europe	Medium	US, Sweden, Finland, Czech Republic		
	Asia	High	Czech Republic, Sweden, Ireland		

Trade restrictions on digital services could make it difficult for Puerto Rico to expand into certain geographic markets

Barriers to Digital Trade

Data localization requirements

Cross-border data flow limitations

Infringement of intellectual property rights

Forced technology transfer

Discrimination against partially foreign-owned firms

Restrictions on government procurement

Regulatory barriers

Addressing Trade Barriers

Multilateral, bilateral and regional trade agreements

Build digital interoperability for the global digital economy

Pursue new digital economy agreements and mechanisms for cooperation

Support data-driven health research via interoperability frameworks

Use cross-border privacy rules to build a global data privacy framework

Most Digitally Restricted Countries

- Generally, emerging economies are more restrictive than developed economies

- The **5 countries with the most restrictive digital trade policies are** all middle-income countries: **China**, **Russia**, **India**, **Indonesia**, **Vietnam**

- In some cases, the restrictions imposed by these and other countries **target American firms exclusively**

- **As a US territory, Puerto is subject to these trade restrictions** and could be at a competitive disadvantage in IT services exports compared to non-US competitors

Most Digitally Open Economies

- The **5 most digitally open economies** include **New Zealand**, **Iceland**, **Norway**, **Ireland** and **Hong Kong**

- Being small, these countries are very dependent on global markets and are more services oriented

- Openness to digital trade is likely a deliberate choice by governments to help businesses and consumers to compensate for the high trade costs the countries otherwise incur when trading in traditional goods markets

7
Appendix
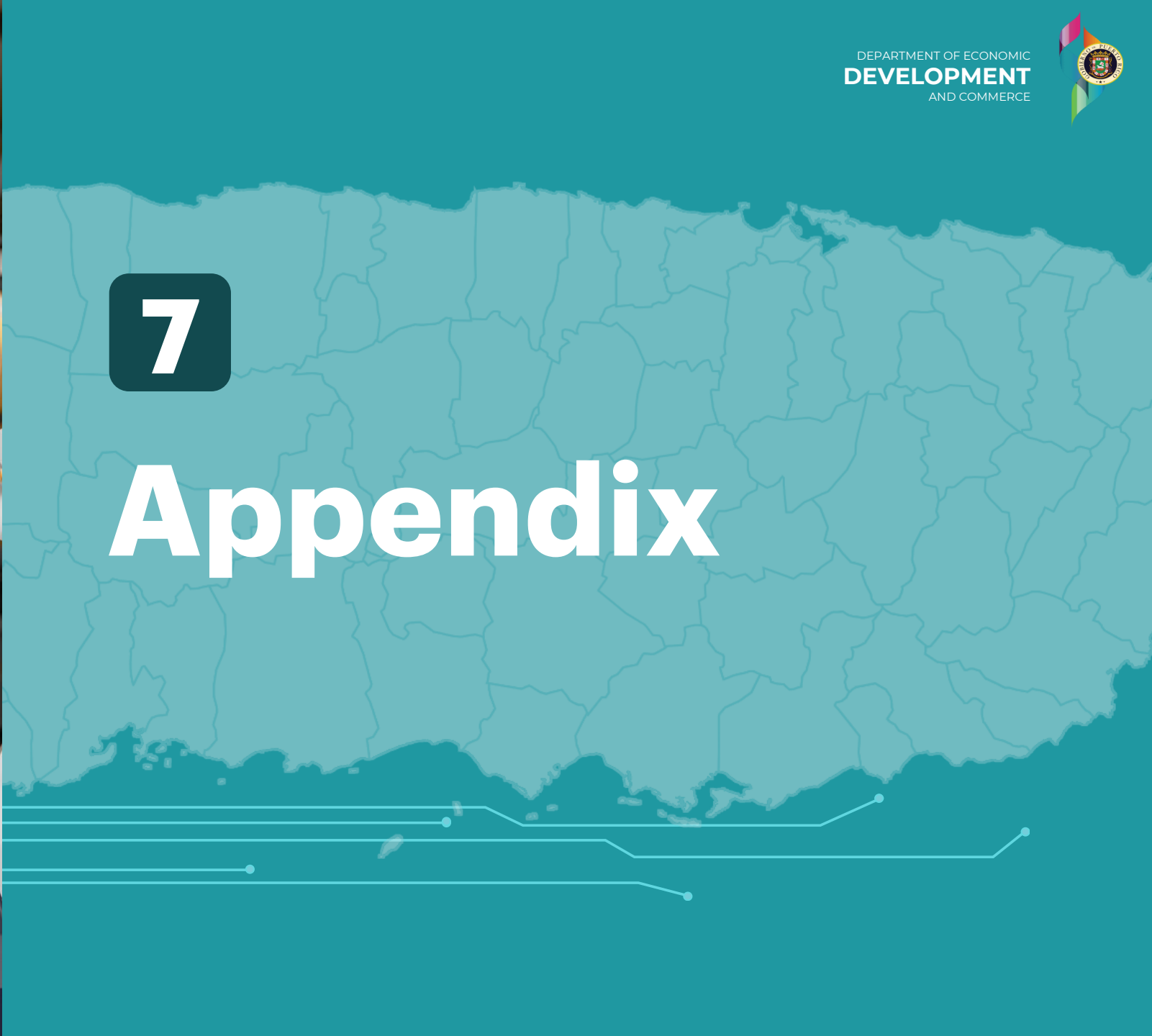
Appendix Sections

A   Project Team

B   Context Slides

C   IT Sector Section Slides

D   IT Ecosystem Section Slides

E   Benchmarking Section Slides

F   Sources List
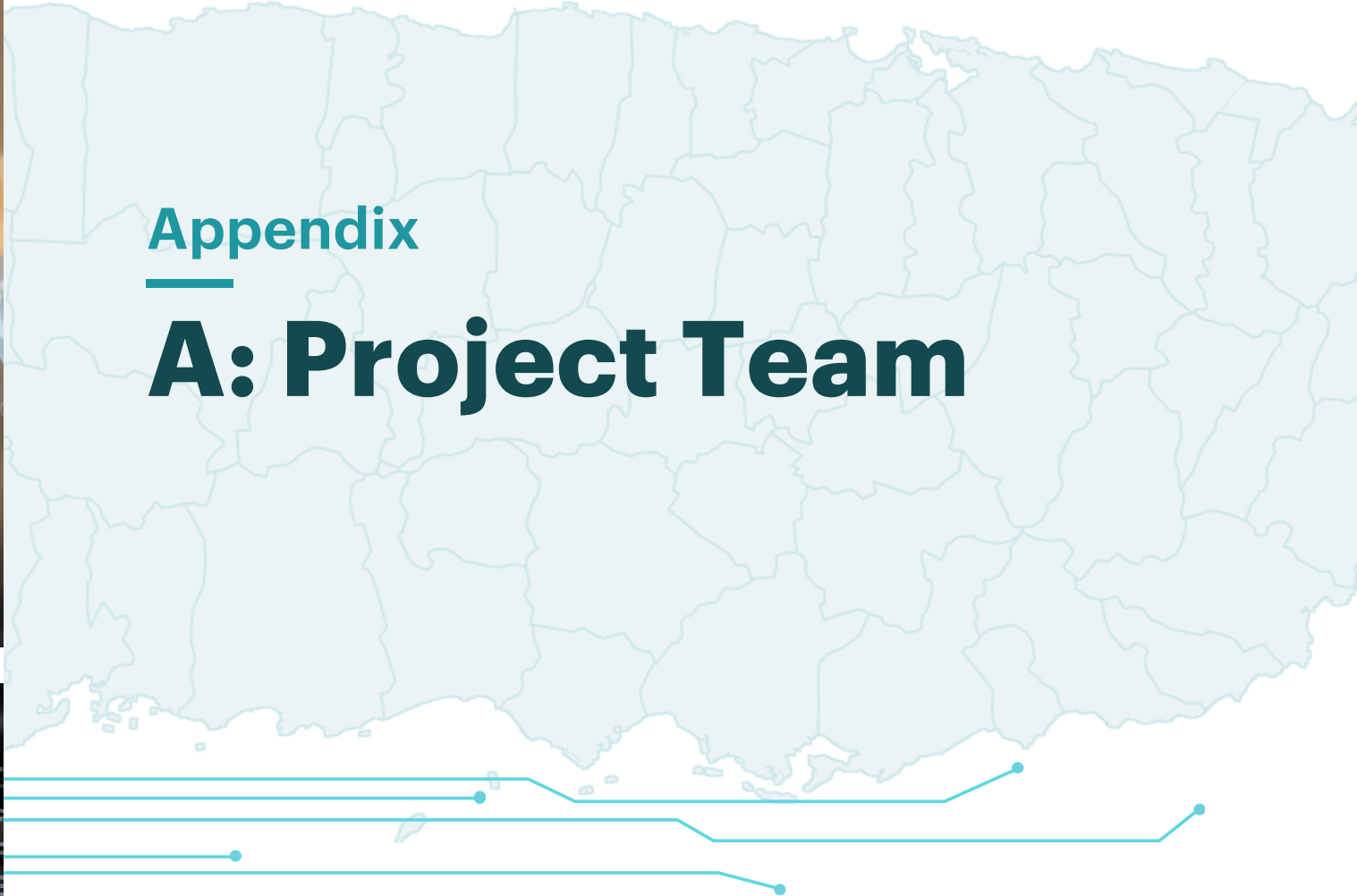
Appendix

A: Project Team

Project Team

Accenture Team

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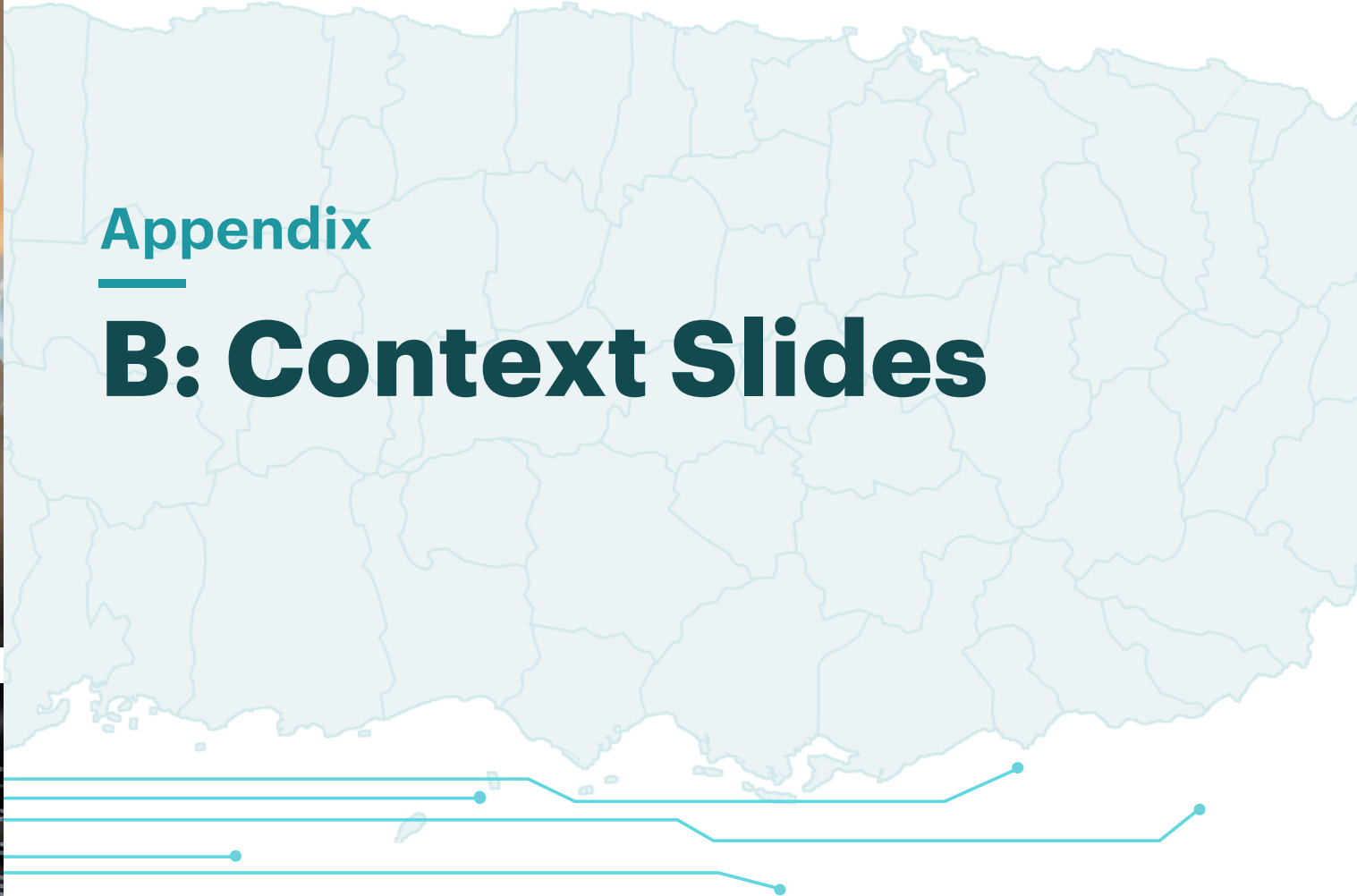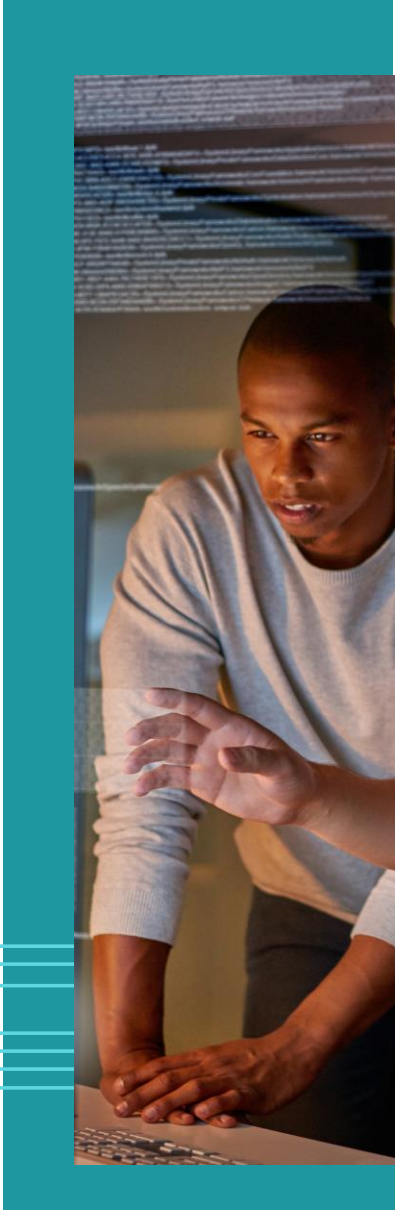
Appendix

B: Context Slides

The IT sector underpins the economy

The IT sector creates the jobs of the future, actively enables economic activity of other sectors, and drives long-term economic growth

Jobs of Tomorrow

- The US IT sector grows 2-3X faster than the broader economy and is expected to grow at 5% CAGR through 2024.

- The US IT workforce growth rate is double those of other sectors.

- Median US hourly wages are over 2X higher for workers with high tech skills.

Economic Dependencies

- Over 10% of US GDP is dependent on the IT sector.

- Nearly 1/5 US jobs are directly or indirectly supported by the IT sector.

- Non-IT US sectors spent over $500 Billion USD in 2021 on IT intermediate goods to enable their activities.

Economic Growth

- Technological changes and innovation drives improvements in productivity – which enables economic growth. There is 70% correlation between productivity growth and digital adoption over the last 30 years.

- Global IT Spending is expected to reach between 4.6-5.9 Trillion USD in 2023.

Sources: CompTIA, Brookings, Gartner, PennWorldTable

Employment in the US IT sector

US Productivity (Units of Real GDP/Person)
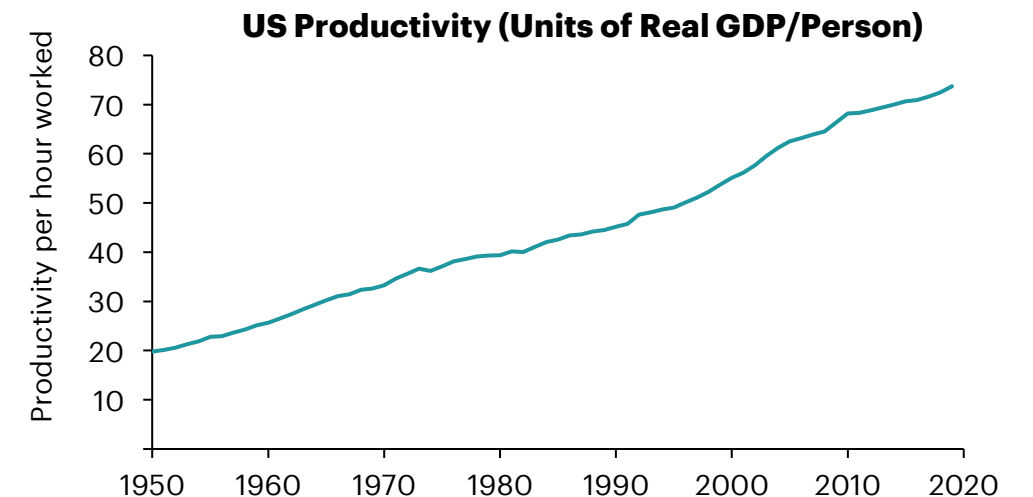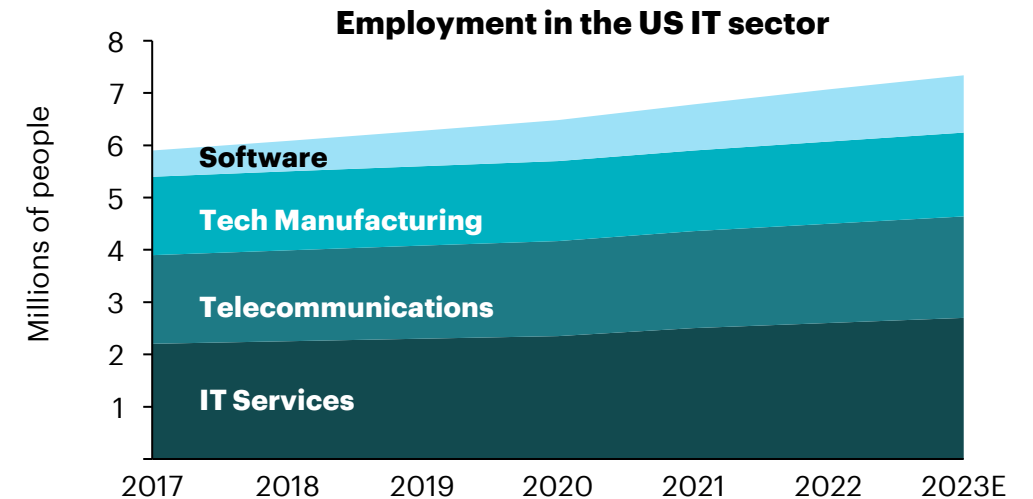
Broad IT Sector Employment

The IT sector has strong economy-wide linkages

Employment multipliers per 100 direct jobs in US

Industry	Value
Agriculture, forestry, & hunting	228
Mining	390
Utilities	958
Construction	226
Durable manufacturing	744
Nondurable manufacturing	514
Wholesale trade	235
Retail trade	122
Transportation & warehousing	276
Information	573
Finance & insurance	364
Real estate & rental leasing	880
Professional & technical services	418
Management of companies	400
Support services & waste management	135
Educational services	194
Health care & social assistance	206
Leisure & entertainment	379
Accommodation & food services	161
Other services	210

Legend: Supplier Jobs, Induced Jobs

The IT sector is the 4th largest generator of indirect jobs in the US economy.

Sources: EPI, ITIF

IT Workforce Dependencies (2020)

US Private Sector Jobs: 133.4M

- Direct IT Jobs: 5.9M
- IT Supplier Jobs: 10.7 M
- IT Induced Jobs 8.7 M
- **Total IT Supported Jobs: 25.3 M (19% of US Workforce)**
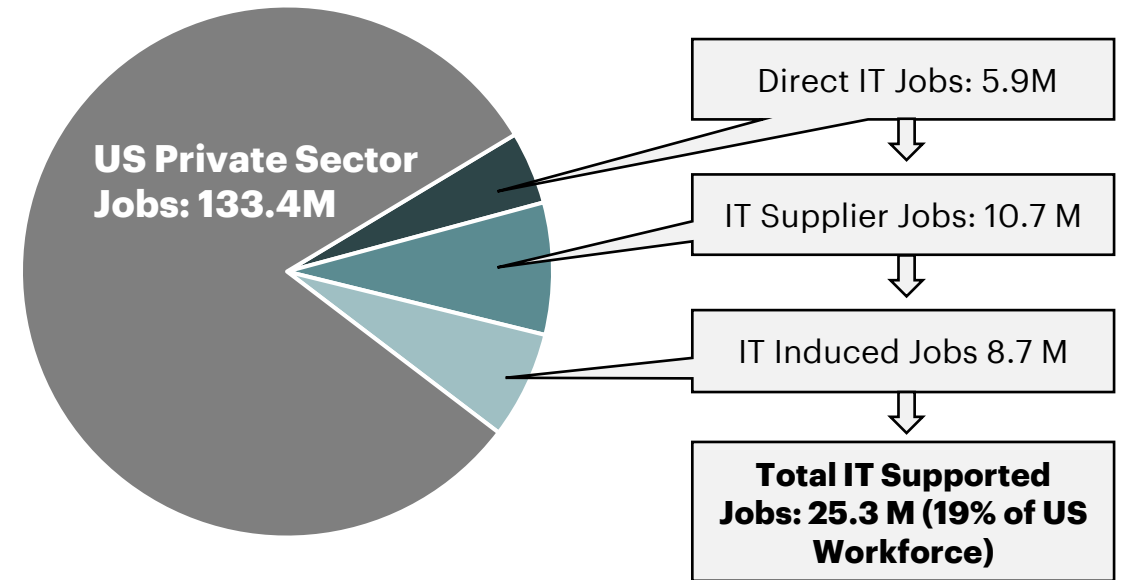
Nearly 1/5 of US total private sector employment is directly or indirectly supported by the IT Sector by purchasing goods and services from other sectors and by spending earnings.

DEPARTMENT OF ECONOMIC
DEVELOPMENT
AND COMMERCE

IT talent & skills are spread across sectors
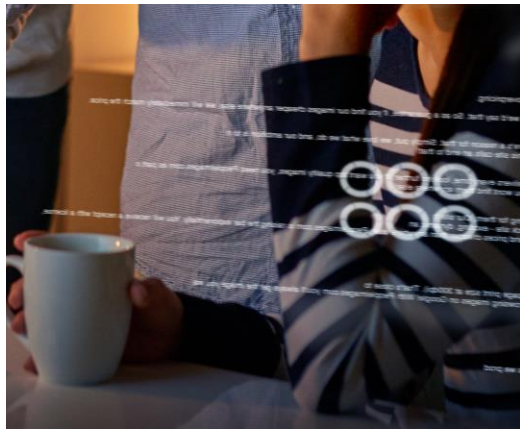
Digital skills are found across the economy; over 70% of US jobs require digital skills

Share of US Jobs in low, medium, and high digital skill occupations

55%
51%
48%
40%   **Medium digital skills**

41%   **High digital skills**

30%

23%

8%   Low digital skills

5%

2002   2014   2030
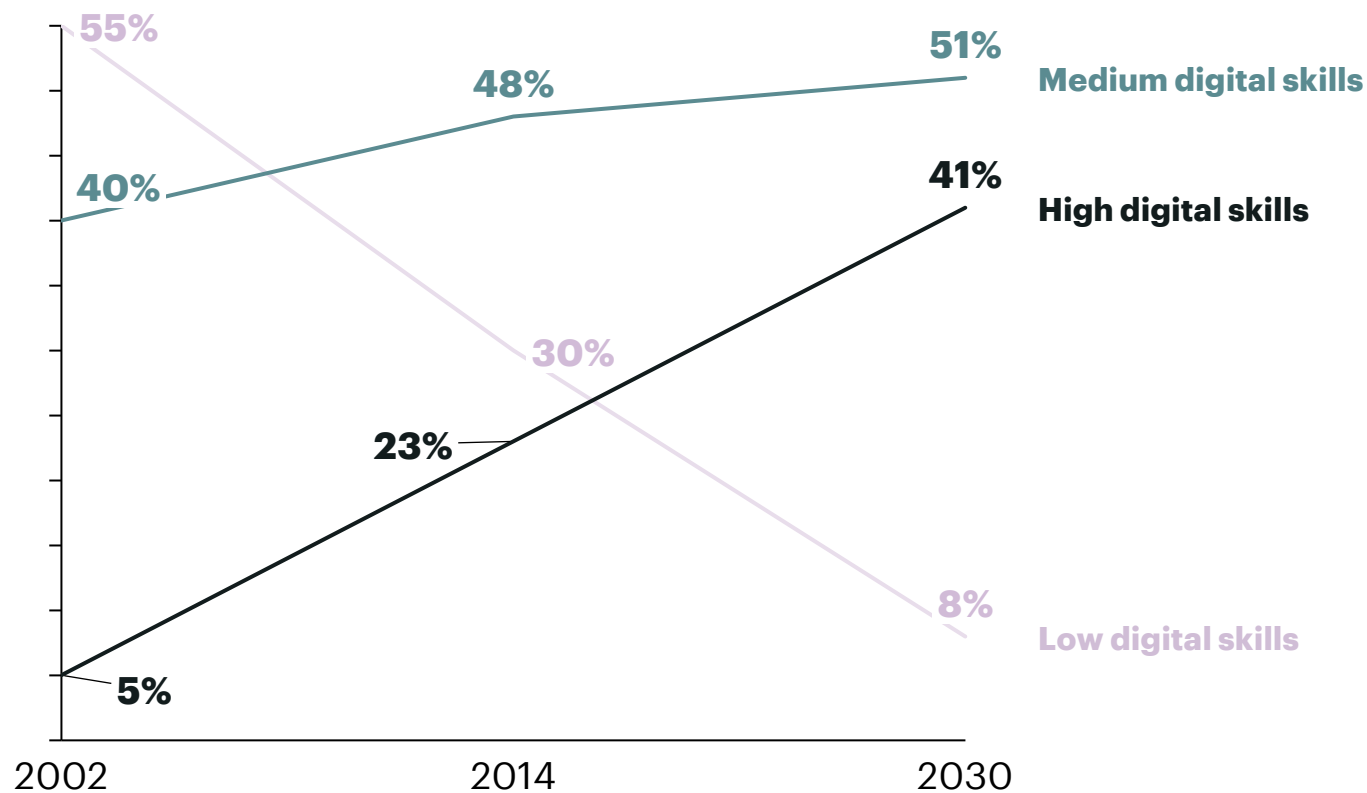
Percentage of US workers & current level of digital skills by selected sector

Sector	No Digital Skills	Limited Digital Skills	High Digital Skills
Construction, transportation, & storage	22%	28%	50%
Retail & Wholesale	14%	23%	63%
Hospitality	18%	18%	64%
Manufacturing	16%	19%	65%
Administrative Services; Arts & Leisure	13%	22%	65%
Health & Social Work	12%	21%	67%
Finance & Real Estate	6%	14%	80%
Education	5%	11%	84%

Sources: OECD Survey of Adult Skills, Brookings, ITIF
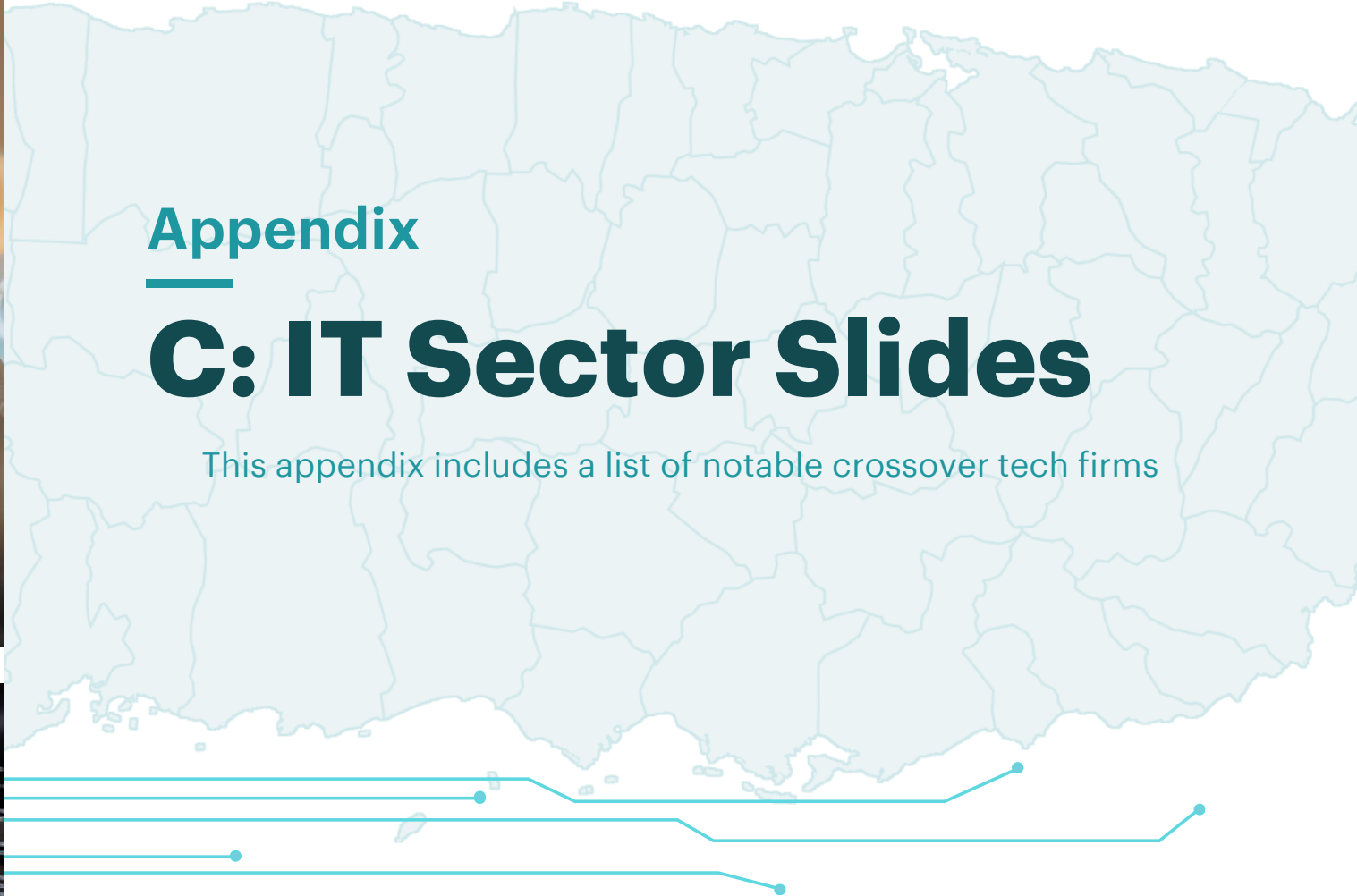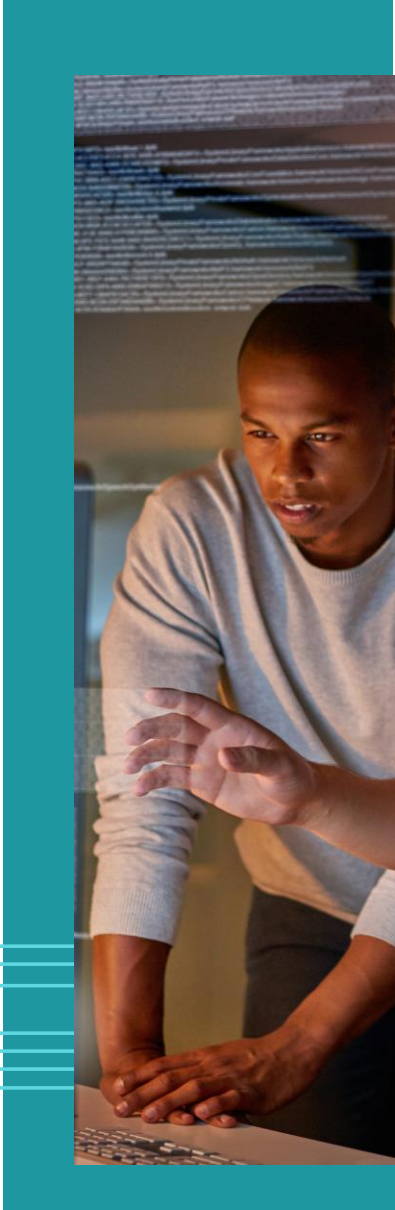
Appendix

C: IT Sector Slides

This appendix includes a list of notable crossover tech firms

Deeper dive in cross-over tech space of Puerto Rico (1/2)

Company	Founding year	Employees	Crossover Tech Space	Part of Core IT Sector	Description
Fusion Farms	2018	11 to 50	Agtech	Yes	Fusion Farms is a capital-efficient Controlled Environment Aquaponics facility.
Growing Puerto Rico	2019	1 to 10	Agtech	Yes	Growing Puerto Rico operates hydroponic greenhouses producing fresh, locally grown, pesticide-free produce and microgreens.
Semillero Partners	2015	1 to 10	Agtech	No	Semillero Partners is a growth stage VC fund focused on food, beverage, and food tech.
PRatian	2016	1 to 10	Agtech	No	PRatian develops astronautic technologies directed towards space.
Trito Agro-Industrial Services	2006	501 to 1000	Agtech	No, Closed	Trito Agro-Industrial Services, Inc. is a Puerto Rican corporation dedicated to providing integrated systems for recycling, water treatment, composting and the creation of soil conditioners for a clean, resilient, efficient and sustainable agriculture.
Abarca Health	2005	101 to 250	MedTech	Yes	Abarca Health is an information technology company that offers healthcare IT services
Abartys Health	2015	11 to 50	MedTech	Yes	Abartys Health is a developer of a centralized communication platform designed to solve the global healthcare crisis.
Evertec	2004	1001 to 5000	Fintech	Yes	Financial Item Processing, Systems Development and Maintenance, Technology, merchant acquiring, payment processing, and business solutions.
Softek, Inc.	1991	51 to 200	Fintech	Yes	Design, development and implementation of high-end information systems for Government, Education, Manufacturing, Telecom, Banking and Pharmaceutical industries and provides consulting and training services.
Zenus Bank	2019	51 to 100	Fintech	Yes	The US bank account for anyone, anywhere. Our mission is to take banking beyond borders. Operating in over 150 countries, we enable people and businesses to open a US bank account online, without the need to be a US citizen, resident, or company registered in the US.

Deeper dive in cross-over tech space of Puerto Rico (2/2)

Company	Founding year	Employees	Crossover Tech Space	Part of Core IT Sector	Description
Pantek Partners	2007	11 to 50	Fintech	Yes	Pantek is a boutique investment banking firm focused on the deep tech and hard tech sectors with long backgrounds as operators and financiers.
Scoreinc.com	2010	11 to 50	Fintech	Yes	Developer of business productivity software intended to serve the credit repair industry. The company's software offers an analytics dashboard, dispute engine, social media marketing system and automation for sales pipeline as well as client workflow, helping clients streamline business process cost-efficiently.
Sol Partners	2012	11 to 50	Fintech	Yes	Sol Partners provides business strategy, fintech, relationship management, software design, customer acquisition, compliance management, new product development, back office servicing platforms, predictive risk, fraud modeling, and outsourcing of customer service to the online financial services sector.
FV Bank	2019	11 to 50	Fintech	Yes	FV Bank provides business and individual accounts, supports multiple currencies, international payments, and investment accounts.
Raincoat	2020	11 to 50	Fintech	Yes	Raincoat develops highly scalable embedded climate insurance products and the automated infrastructure that powers them. They work with insurers, governments, and financial institutions to unlock new markets and enable climate resilience at scale.
Digital Markets	2020	11 to 50	Fintech	No	Digital Markets connect issuers to exchanges via API, allowing them to provide a trading engine on their web and mobile apps
Producers Token	2017	11 to 50	Fintech	Yes	Producers Token is structured as an asset-backed security token to align with the values of decentralization by connecting its venture with a global community of added-value investors.
Hyperion	2021	1 to 10	Fintech	Yes	Hyperion is an all-in-one finance app that integrates essential financial services for small businesses through a mobile application.
FairBank	2017	1 to 10	Fintech	Yes	FairBank is a digital banking service that bridges the gap between traditional financial services and a new generation of services built around digital assets and direct p2p operations.
Symbiotic.com	2016	1 to 10	Fintech	Yes	Symbiotic is a pioneer and leader of TapOnPhone technology,
Coral	2021	1 to 10	Fintech	Yes	Coral DeFi is an Investment platform focused on digital assets and financial applications. Coral DeFI investment vehicle offer investors thoughtful exposure for a variety of duration and return profiles.
Forq Ventures	2019	1 to 10	Fintech	No	Forq Ventures is an incubator of Insurtech, Fintech, SaaS, Digital Marketing, Blockchain, and Cryptocurrency companies.
Condor Trading	2015	1 to 10	Fintech	No	Cross-border Arbitrage trading experts in Latin American and United States capital markets.
InvesTechs	2016	1 to 10	Fintech	Yes	InvesTechs is a digital marketing agency that specializes in raising investment capital for established real estate investment funds.
Qondado, LLC - Digital Debit Group	2015	1 to 10	Fintech	Yes	Qondado is a software company. Our latest focus is Digital Debit: A p2p transaction app and ecosystem currently utilizing the Coinbase API for instant, low cost, off blockchain bitcoin transactions with up to second local currency value translations.
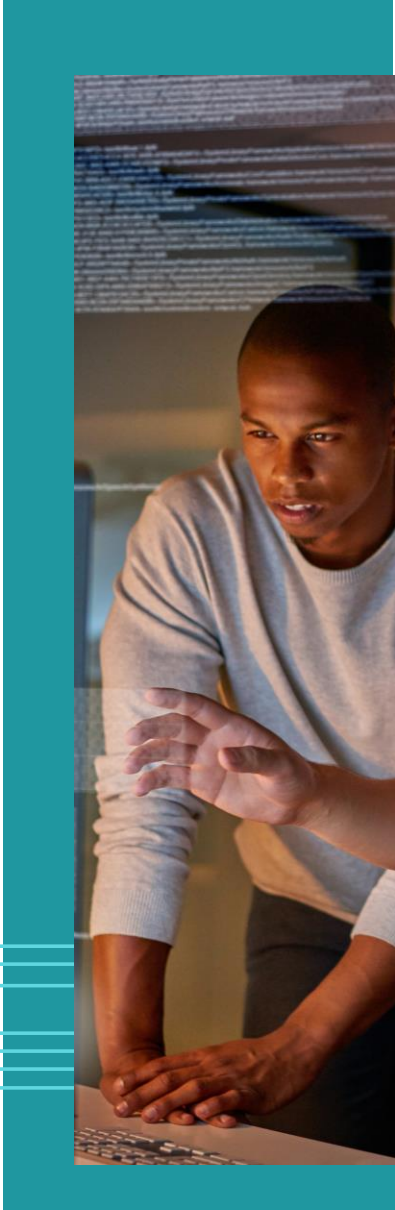
Appendix

D: IT Ecosystem Section Slides

This appendix includes an extended list of organizations within Puerto Rico's IT Sector Ecosystem (not exhaustive)

IT Sector Ecosystem Players (1 of 4)

Note: Representative sampling, not exhaustive

Entrepreneurship Support

Organizations with Entrepreneurship Support Programs

IT Sector Ecosystem Players (2 of 4)

Note: Representative sampling, not exhaustive

IT Community

IT Sector Ecosystem Players (3 of 4)

Note: Representative sampling, not exhaustive

Strategy & Policy

Research & Innovation

INTECO Programs

Higher Education Research Centers and Partnerships

Knowledge and Skill Development
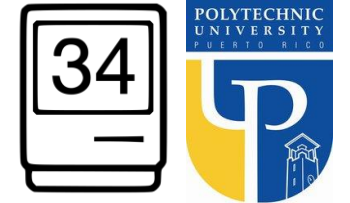
K – 12 Schools, Community Colleges, Other Private Universities, Other Skills Development Institutions

IT Sector Ecosystem Players (4 of 4)

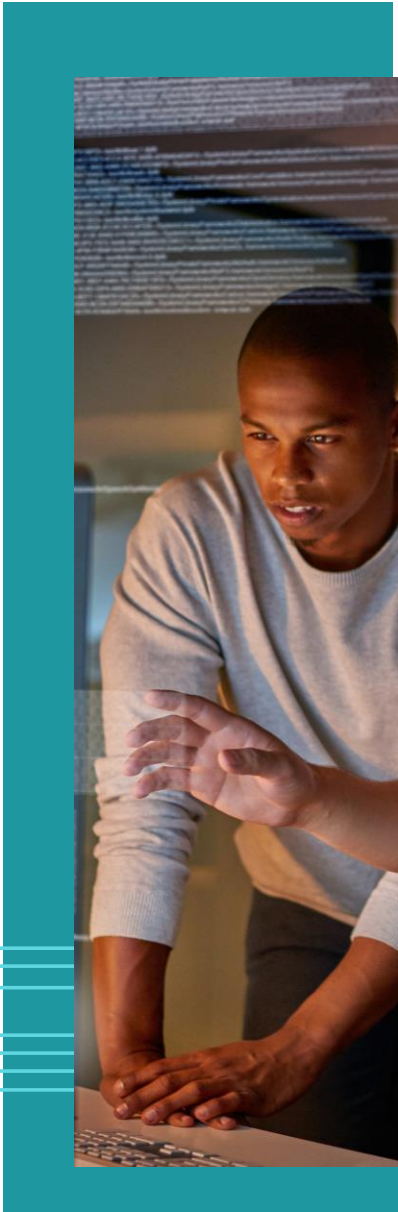**Note: Representative sampling, not exhaustive**

Funding Institutions

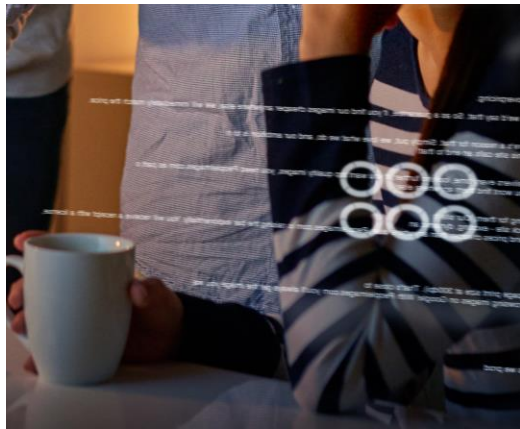### Funding Institutions with Relevant Programs
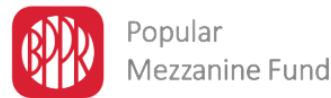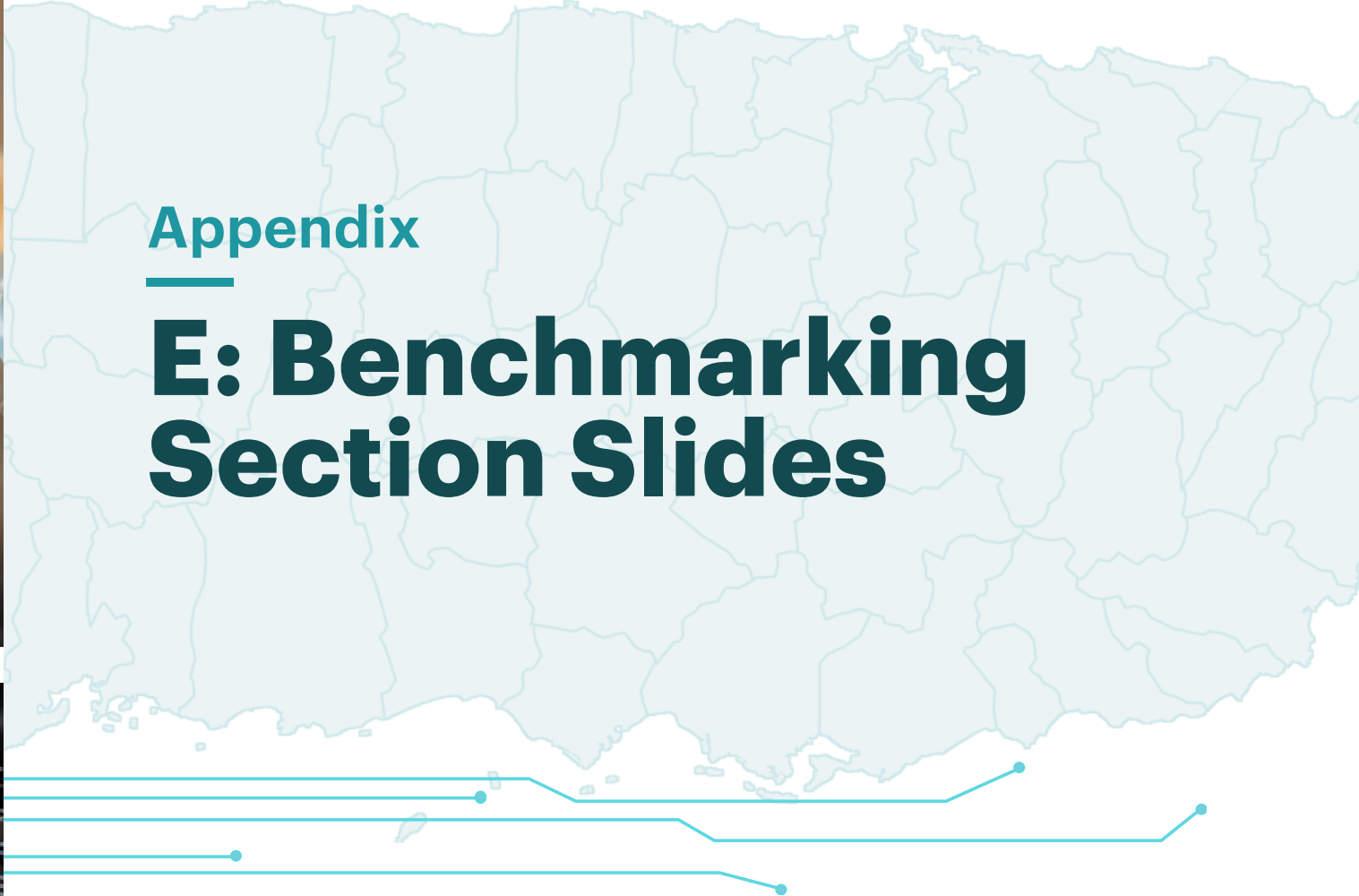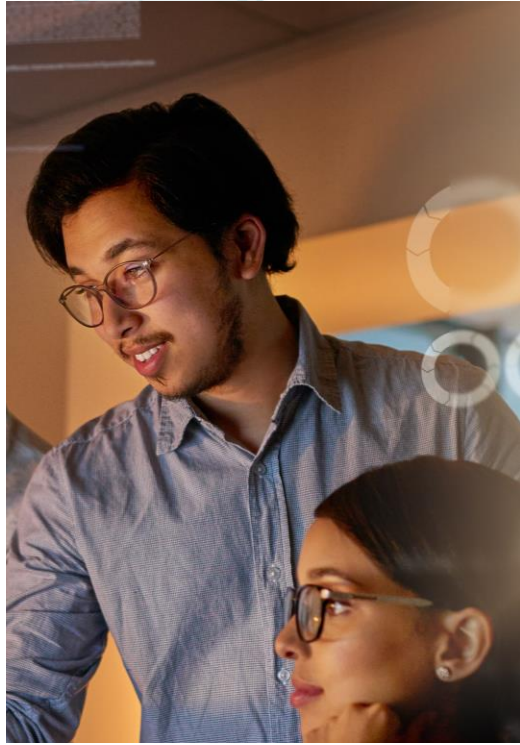
Appendix

E: Benchmarking Section Slides

Comparator Selection

Comparators were chosen to represent a range of IT-sector outcomes spanning from manufacturing to high-value service exports.

Bucket	Country	IT Development	Formal IT Strategy	GDP per Capita	IT Service Exports	IT Goods Exports
Structural Peers	Jamaica	Nascent	Vision 2030 Jamaica	$ 5,980.00	4.30%	0.50%
	Fiji	Nascent	Digital Fiji	$ 5,870.00	4.40%	6%
	Malta	Nascent	Digital Malta	$ 33,486.67	0.50%	13.60%
	Cyprus	Developing	National Digital Strategy	$ 31,551.82	22.90%	1.80%
	Costa Rica	Developing	Multiple Initiatives	$ 12,472.44	16.50%	0.80%
US States	Florida	Mature	Economic Plan	$ 63,081.00	N/A	N/A
	North Carolina	Mature	IT Strategic Plan	$ 48,496.00	N/A	N/A
	Colorado	Mature	by department – for instance	$ 63,776.00	N/A	N/A
	Oklahoma	Developing	IT Strategy FY23-FY25	$ 50,876.00	N/A	N/A
	Georgia	Mature	IT Strategic Plan 2025	$ 64,039.00	N/A	N/A
	USA	Mature	National Strategy for Manufacturing	$ 70,248.63	7.50%	9.70%
Growing Hubs	Colombia	Developing	Plan TIC; Plan Vive Digital	$ 6,104.00	8.20%	0.40%
	Mexico	Developing	Estrategia Nacional 2021-2024; see also	$ 10,045.00	0.20%	15.40%
	Czechia	Developing	Digital Czech Republic	$ 26,821.25	20.80%	17.90%
	India	Developing	India 5 Year Tech Strategic Plan	$ 2,256.60	49.70%	2.10%
	Argentina	Developing	Argentina AI Strategy	$ 10,636.12	25.10%	0.10%
Aspirational Targets	Singapore	Mature	Digital Economy	$ 72,794.00	8.10%	33.70%
	Ireland	Mature	Technology Ireland	$ 100,172.08	58.90%	8.50%
	Japan	Mature	Integrated Innovation Strategy	$ 39,312.60	6.10%	8.90%
	Israel	Mature	National Digital Program	$ 51,170.70	55.90%	14%
	Germany	Mature	Digital Strategy Germany	$ 51,203.60	10.60%	5.10%
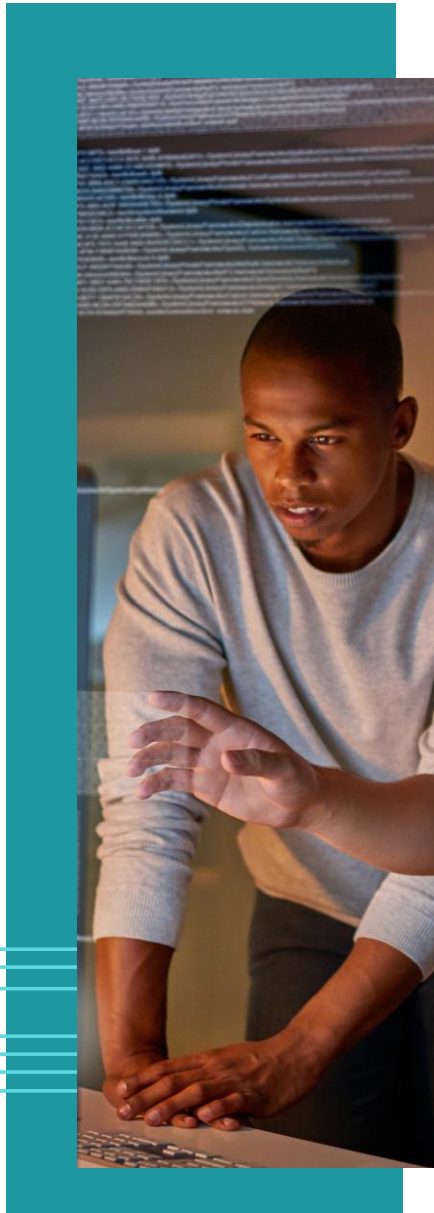
Appendix

F: Sources List

Sources list

Government & International Governmental Organization Sources

- U.S. Census
- U.S. Department of Labor
- U.S. Department of Education
- United Nations Conference on Trade and Development
- United Nations Development Program
- U.S. Patents and Trademark Office
- World Bank
- International Monetary Fund
- Organization for Economic Co-operation and Development
- U.S. Bureau of Economic Analysis
- U.S. Chamber of Commerce
- U.S Bureau of Labor Statistics (incl. QCEW & OEWS)
- Puerto Rico Department of State
- Federal Communication Commission
- National Science Foundation
- EuroStat
- International Trade Administration
- El Instituto de Estadísticas de Puerto Rico
- Banco Central de Costa Rica

Third Party Sources

- National Skills Coalition
- CompTIA
- Economic Policy Institute
- Pitchbook
- Crunchbase
- Gartner
- Information Technology & Innovation Foundation
- Brookings Institute
- EMIS
- Accenture Tech Vision
- PennWorldTable
- Haver Analytics
- Indeed
- IndexMundi
- Institute for Scientific Information
- Network Readiness Index
- International Institute for Management Development
- World Economic Forum
- BSA Global Software Survey
- Fair Internet Report
- Times Higher Education