Assessing the Dominican Republic's Readiness to Play a Greater Role in the Global Semiconductor and PCB Value Chains

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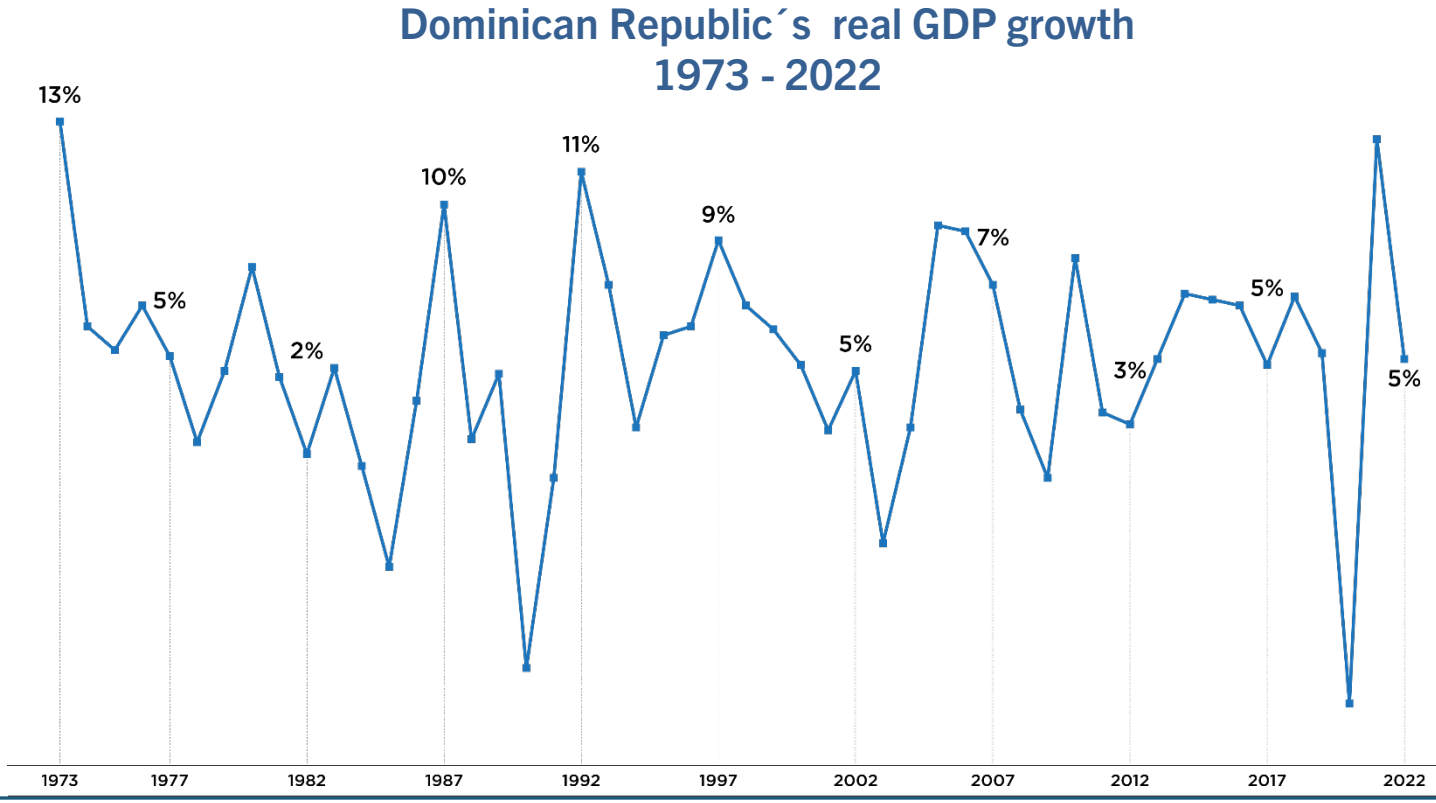
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The Economy of the Dominican Republic



- Latin America's seventh-largest economy.
- Has achieved 5% annual growth for the past 50 years.



Source: Central Bank of the Dominican Republic.

The Economy of the Dominican Republic



- Has demonstrated the fastest income convergence toward the U.S. level of any Latin American nation.
- Attracted $27.7 billion in FDI from 2013 to 2022.
- Characterized by a stable political economy and business friendly investment environment.



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Assessing the Dominican Republic's Readiness to Play a Greater Role in Global Semiconductor and PCB Value Chains

STEPHEN EZELL I JANUARY 2024

The Dominican Republic is one of the world's fastest-growing economies, offers perhaps the most attractive business environment in Latin America, and is a leading candidate for nearshored investments in advanced manufacturing activity—particularly for electronics such as printed circuit boards (PCBs) and the assembly, test, and packaging (ATP) of semiconductors.

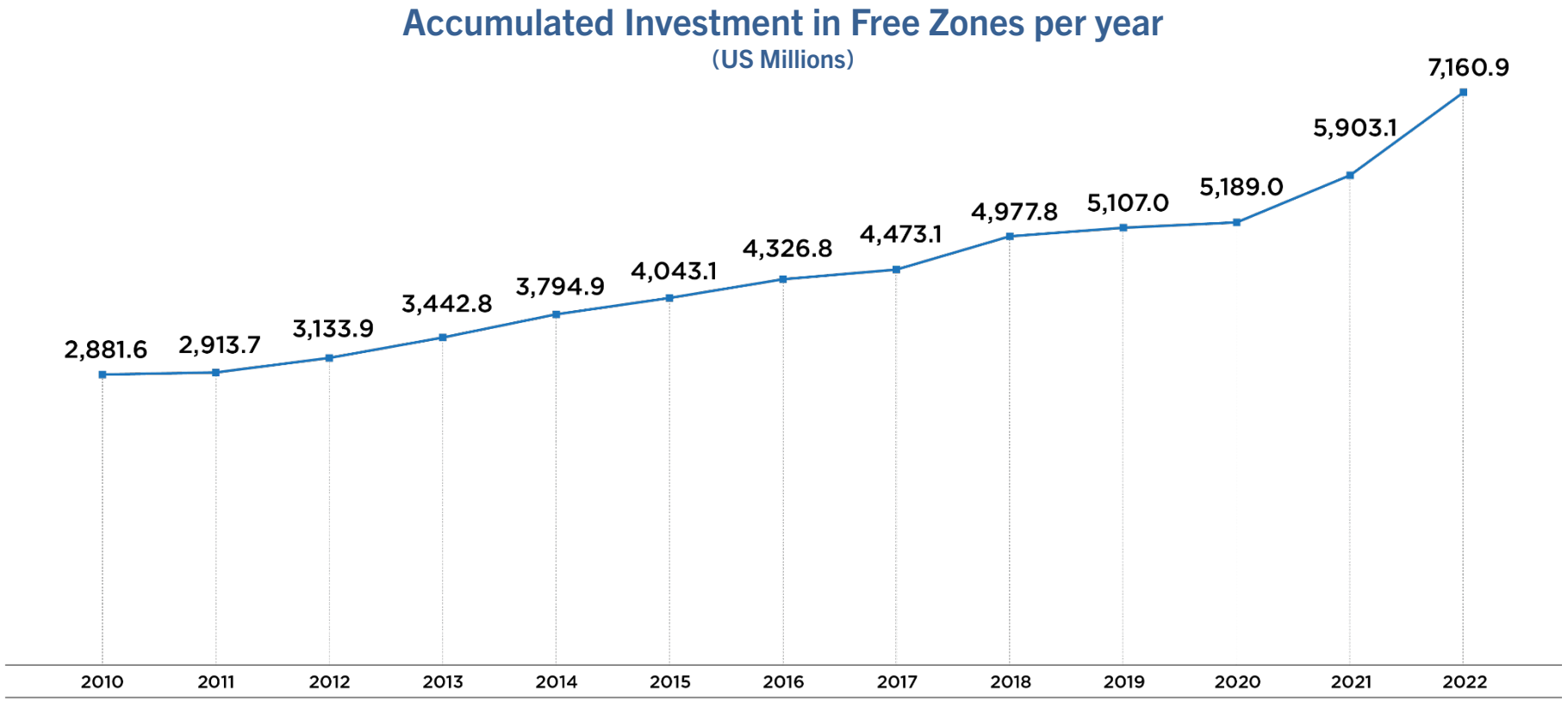
KEY TAKEAWAYS

- Geopolitical tensions, supply chain disruptions, and rising Asian production costs are driving a reorganization of global value chains in high-technology industries, with the Dominican Republic well positioned to attract such nearshored investment.
- The Dominican Republic has grown at an almost 5 percent annual rate over the past half century, transforming it into Latin America's eighth-largest economy and positioning it to graduate from middle-income to advanced-economy status by 2060.
- The Dominican Republic's 86 free zones (FZs), which exempt exporters from paying 100 percent of income tax (and a range of other taxes), make the country a regional powerhouse in the production and export of electronics and medical devices.
- The 25 leading electronics manufacturers operating in the Dominican Republic's FZs provide a well-developed advanced electronics manufacturing base to serve as a springboard for the country getting into semiconductor ATP and PCB manufacturing.
- The Dominican Republic's "Bureaucracy Zero" program, which seeks to enhance public administration efficiency through clear and appropriate regulatory frameworks, has recently streamlined 315 procedures operated by 63 government institutions.
- The Dominican Republic's flagship workforce training program, the National Institute of Professional Technical Training, or "INFOTEP," equips the country with the mechanism needed to train a larger workforce to support advanced electronics manufacturing.

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The Economy of the Dominican Republic





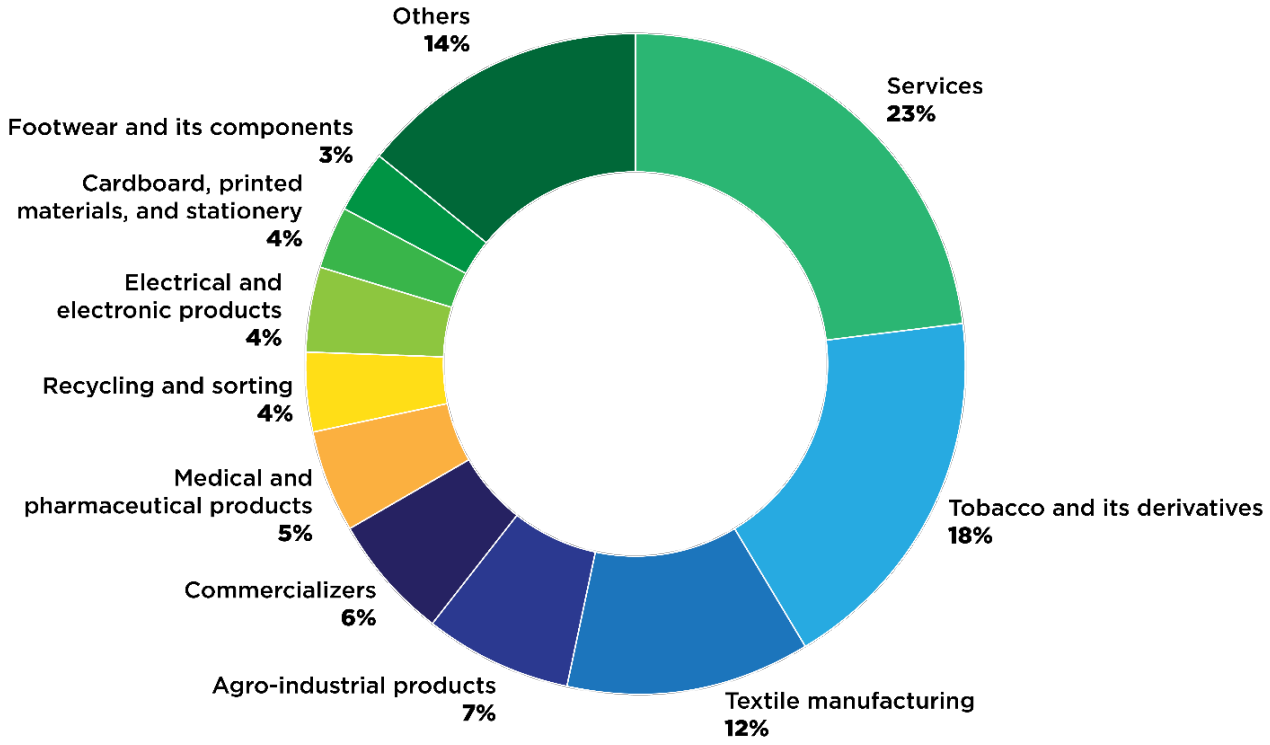
Source: National Free Zones Council.

The Dominican Republic's Free Zones



- The DR hosts 87 free zones (FZ) industrial parks, supporting 820 companies in operation.

Free Zones Companies Distributed by Economic Activity (2023)

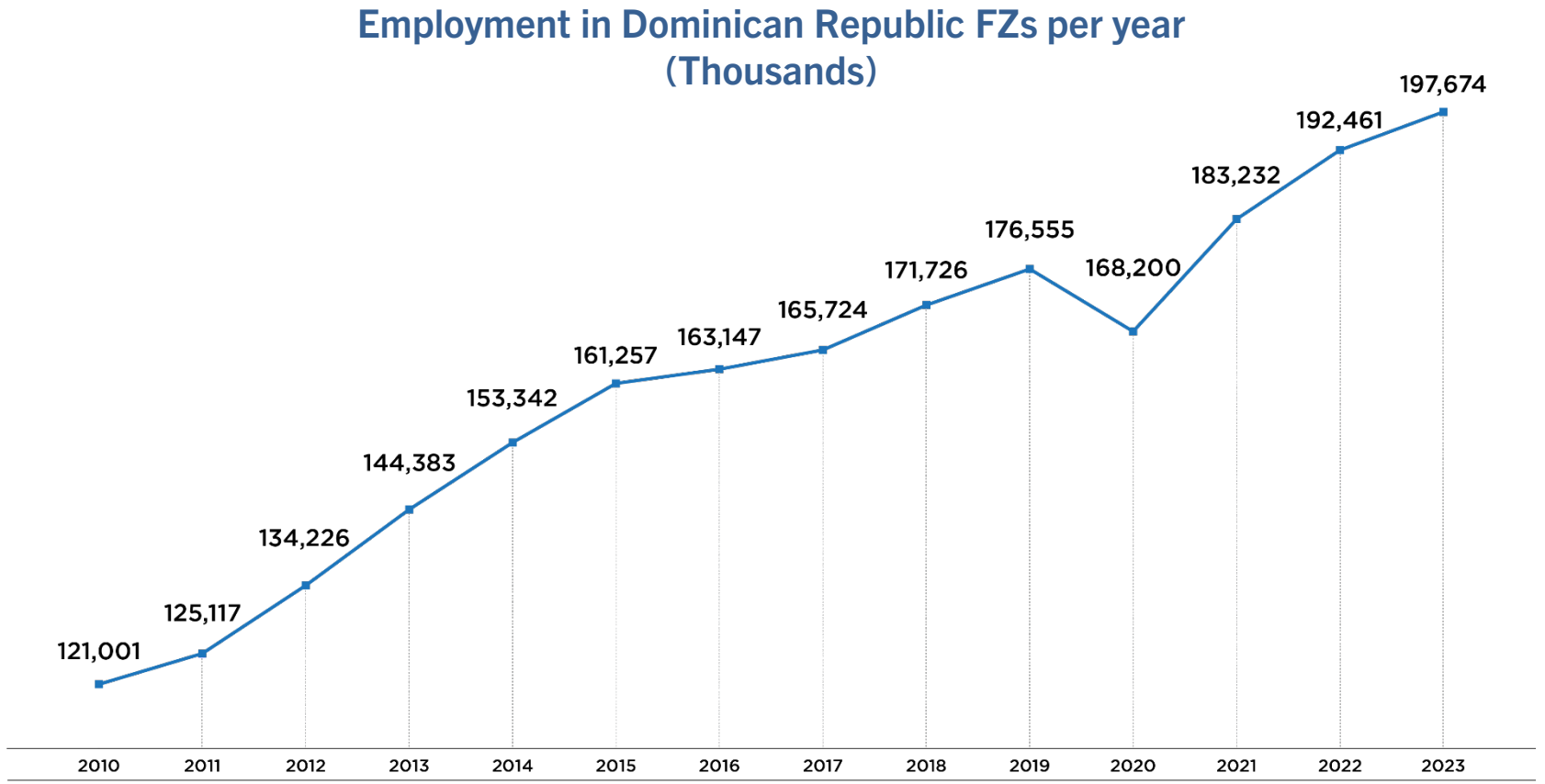


Source: National Free Zones Council.

The Dominican Republic's Free Zones



- The FZs support 200,000 workers, produce $8B in exports annually, and have invested $7.2B.



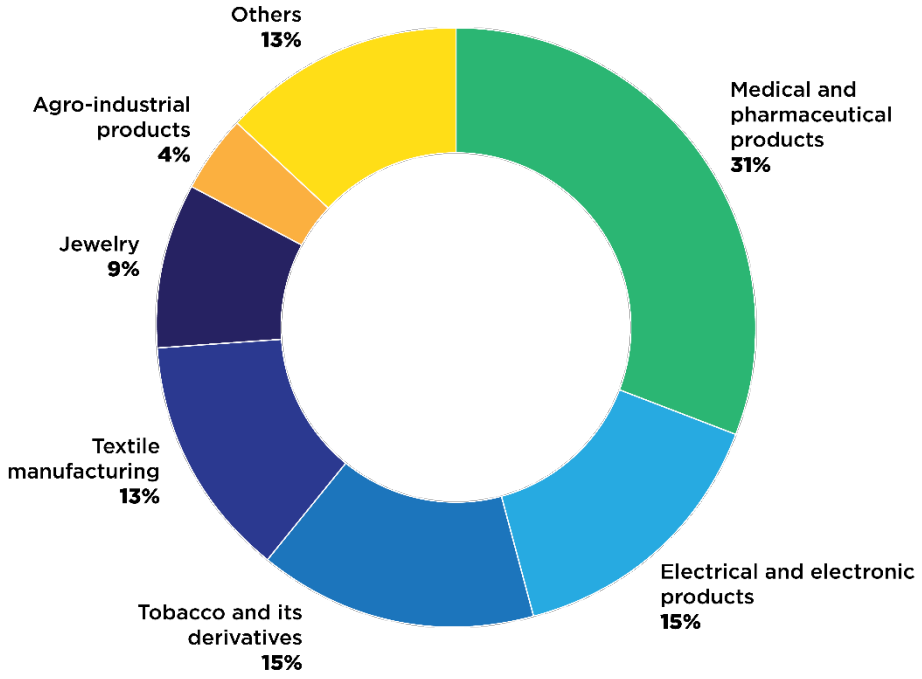
Source: National Free Zones Council.

The Dominican Republic's Free Zones



- 77% of DR FZ exports flow to the United States.
- Medical devices/instruments largest FZ exporter ($2.25B), followed by electronics ($1.2B)

Free Zones Exports by Economic Activity (%) - Year 2023

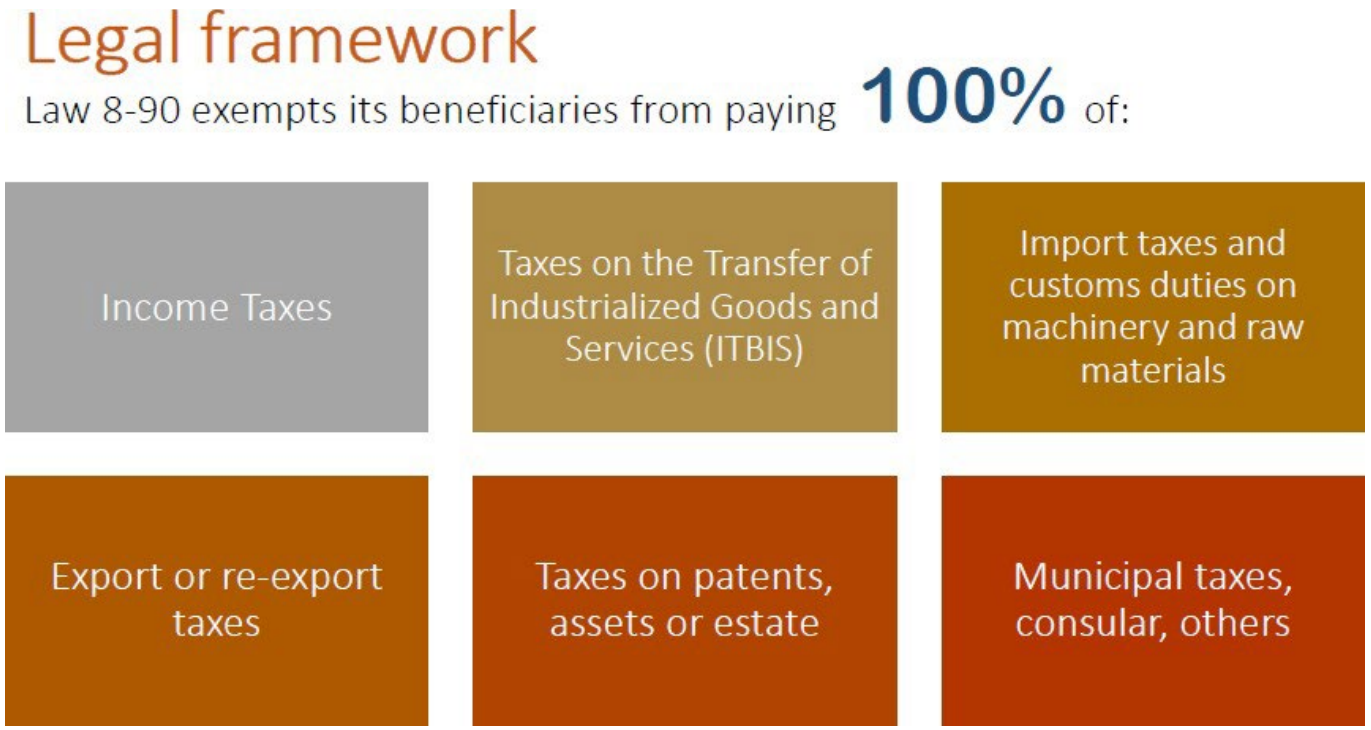


Source: National Free Zones Council, and General Directorate of Customs.

The Dominican Republic's Free Zones



- DR FZs enabled by Law 8-90.



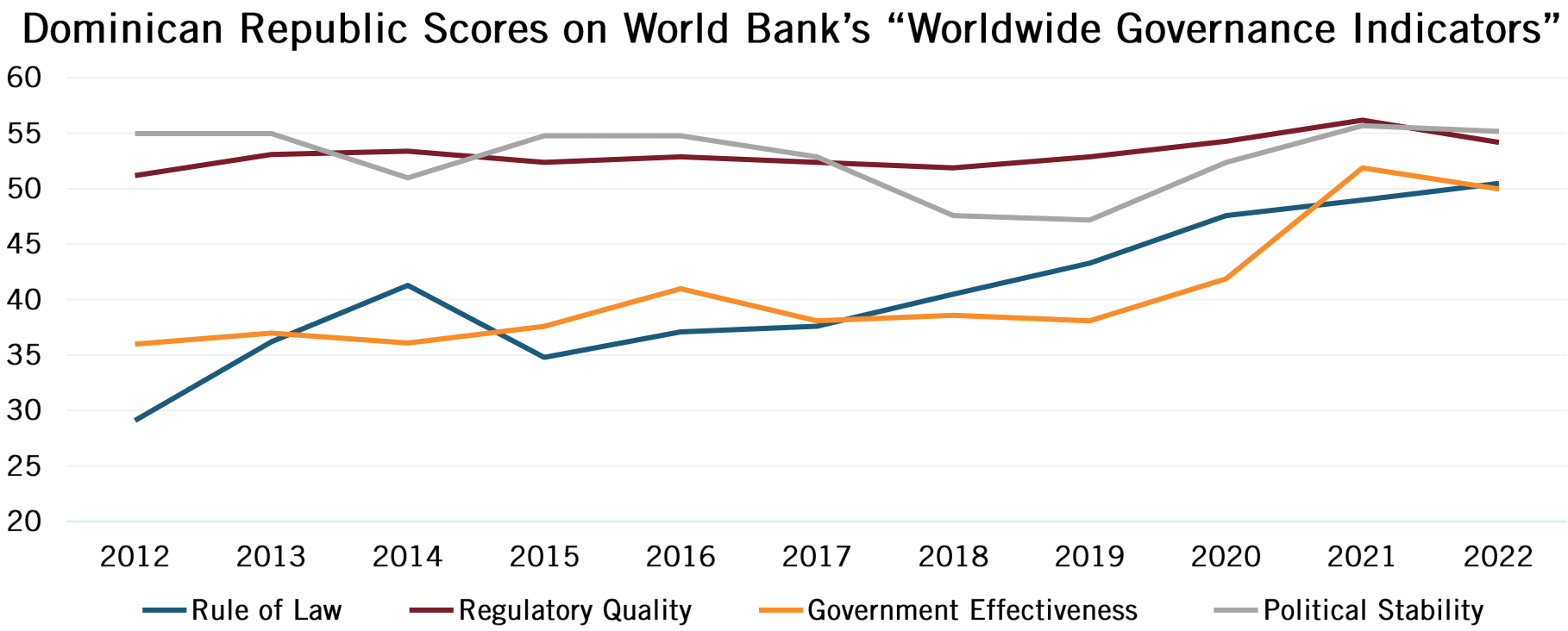
Dominican Republic's Electronics Manufacturing FZ Footprint

- 25 leading electronics manufacturers.
- Highlighted by Eaton and Rockwell.
- Produced $1.2B of exports in 2022.
- Employs 11,200; 6% FZ employment.
- 98.8% of exports go to the U.S.
- Circuit breakers account for 62% exports, then cellular phones/networking gear.



Dominican Republic's "Bureaucracy Zero" Program

- Seeks to enhance public efficiency through clear regulatory frameworks.
- Has streamlined 315 procedures across 63 government institutions.



Dominican Republic's Infrastructure and Customs

- The DR "possesses the top transportation infrastructure in Latin America."
- The DR ranks 2nd in Latin America in international connectivity by air transport, 3rd in terms of maritime services and maritime connectivity.
- NAP del Caribe one of Latin America's most important network access points.
- The DR expects to generate 25% of its electricity from renewables by 2025.
- Dispatch 24 (D24H) seeks to process containers in 24 hours.



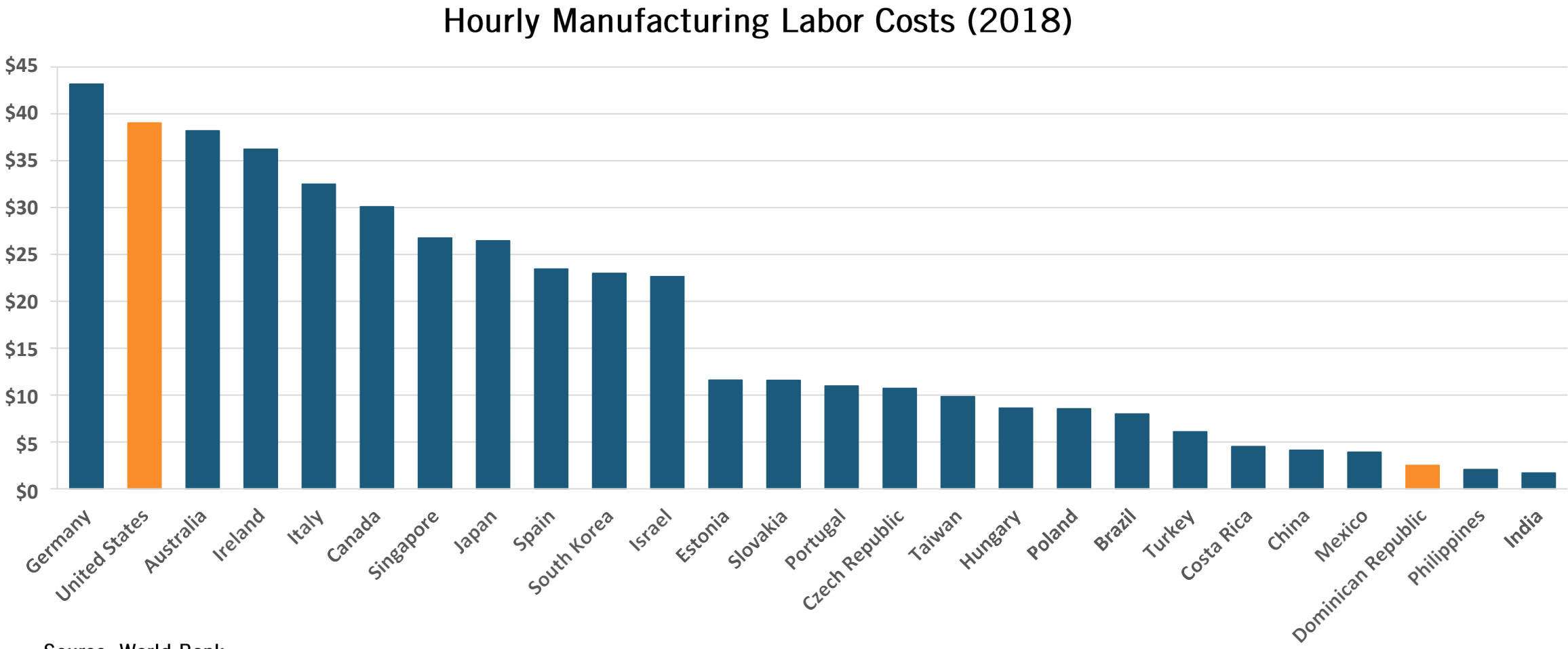


National Institute of Professional Technical Training (INFOTEP)

- The DR's national vocational/workforce training program.
- Companies fund INFOTEP by contributing 1% of monthly payrolls.
- Most FZs have an INFOTEP on-site, creating customized training programs.
- Offers 920 technical courses, including 86 in electricity & electronics, 36 in ICT, and 104 in electronics manufacturing.
- Has trained over 700,000 individuals at 245 centers across the country.



The Dominican Republic Offers Competitive Mfg. Labor Costs



Source: World Bank

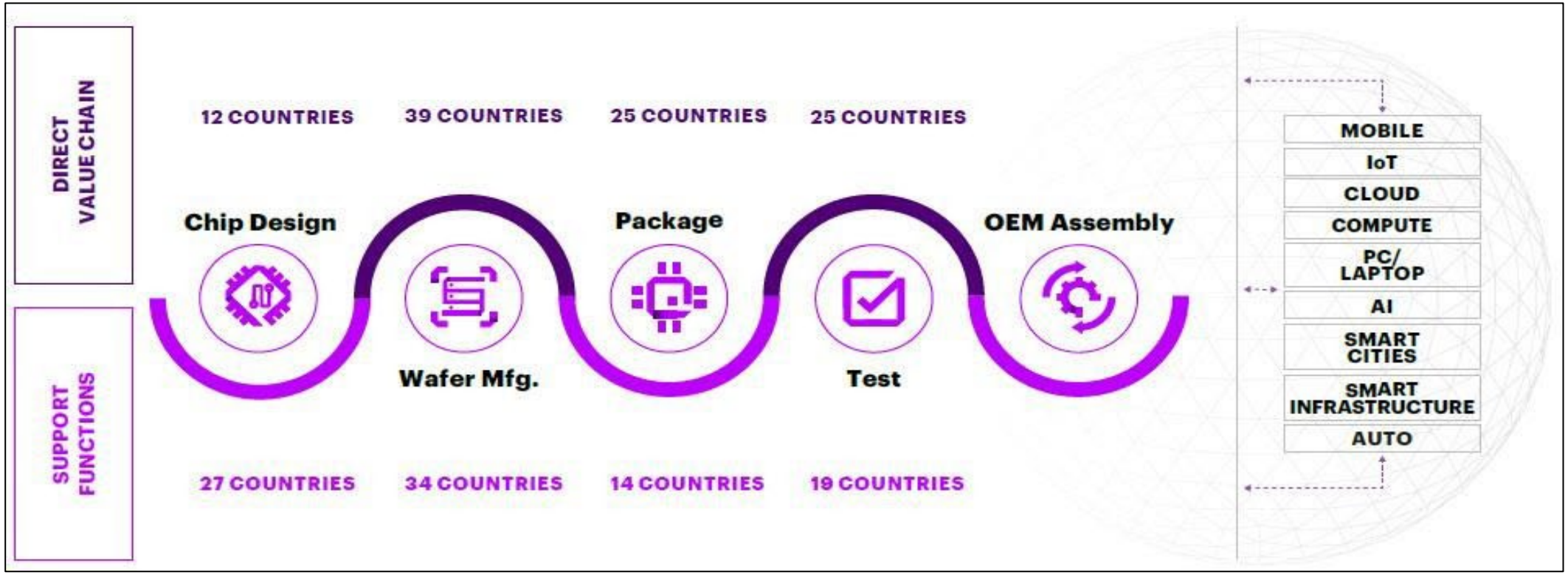
The "Reglobalization" Moment

- Kearney: 80% of companies across all industries now on a path to reshore.
- UBS: 71% of U.S. companies with manufacturing in China are either in the process of or planning to shift operations to other countries.
- BCG: 90% of North American manufacturing executives "have moved some of their production and sourcing to different countries" over last 5 years.
- This presents nations with an opportunity to present their unique value propositions to a global economy reorganizing in real time.
- $52B CHIPS Act will significantly expand North America's semiconductor manufacturing footprint.



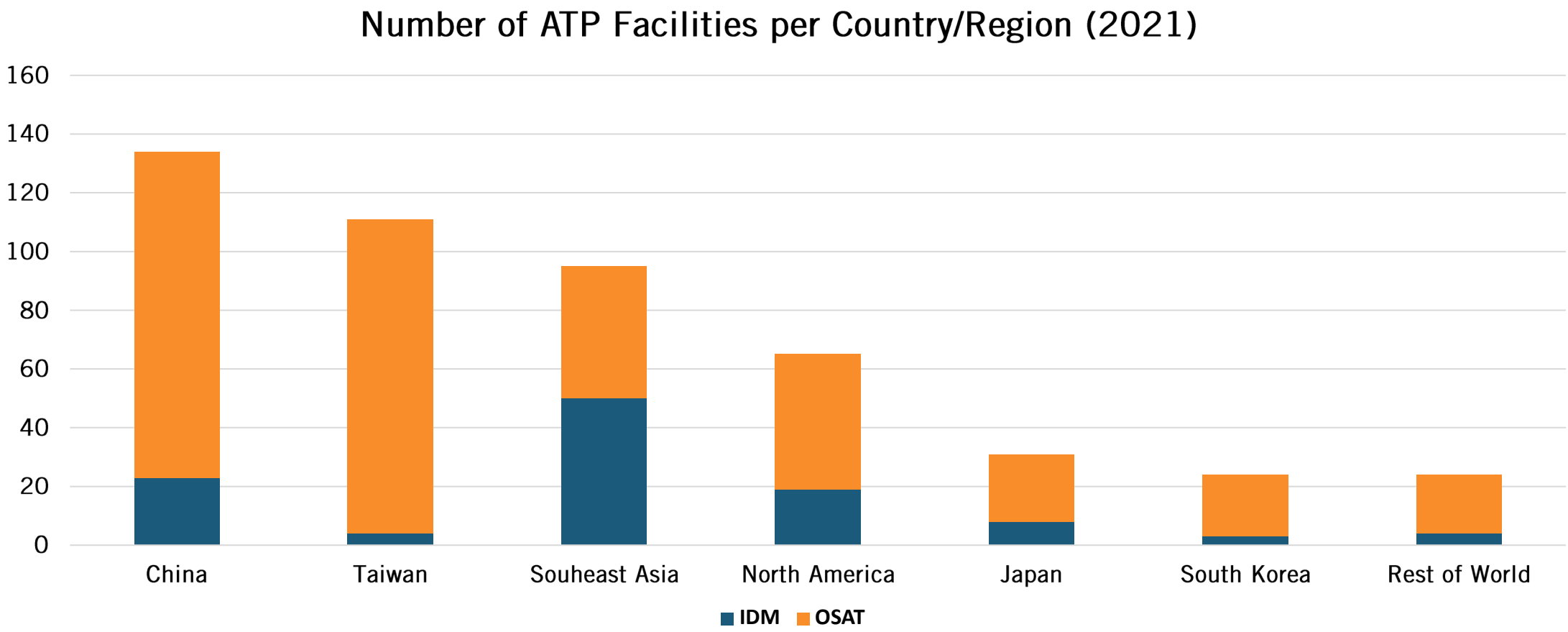
Semiconductor Industry Global Value Chains (GVCs)

- Each segment of semi GVCs has enterprises from 25 countries involved in the direct supply chain and 23 involved in support functions (on average).



Source: Accenture and Global Semiconductor Alliance, "Globality and Complexity of the Semiconductor Ecosystem"

The "Reglobalization" Moment



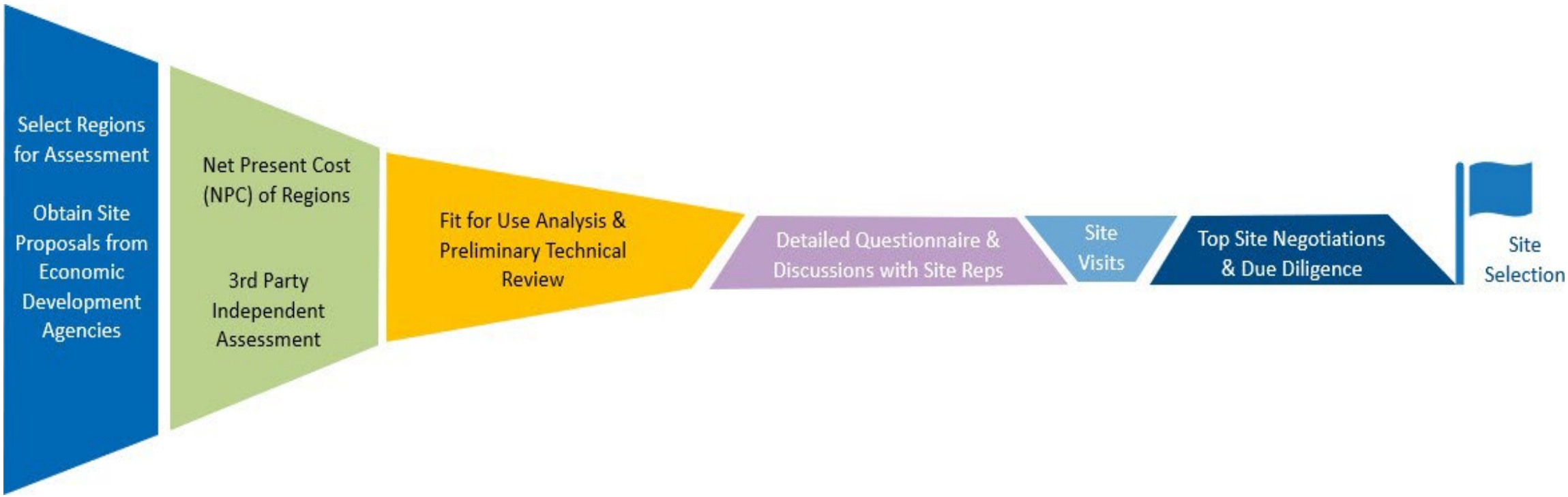
Source: Akhil Thadani and Gregory C. Allen, CSIS, "Mapping the Semiconductor Supply Chain"

Why Should the Dominican Republic Target Semis/PCBs?

- Advanced electronics industries significant economic and employment multiplier effects.
- Semiconductor manufacturing can produce tremendous spillover and "learning by doing" effects across the rest of the DR's high-tech economy.
- Expands the "product space" to compete in adjacent sectors.
- Creates knowledge spillovers in the policymaking space as well.
- Moves the DR up both the economic and geopolitical value chain.



Stylized Semiconductor Mfg. Facility Selection Process



Semiconductor Investors Consider Numerous Factors



Assessment of Region

- Initial state tax and incentives proposal
- Labor, utility, construction costs
- Semiconductor presence in state
- Pro-business environment
- Regulatory process
- Cost of living index
- Talent availability
- Ease of construction



Fit For Use Analysis and Technical Review

- Plot shape and size comparison with site master plan overlay
- Proximity to airport runways and railroads
- Wetlands contained in plot
- Power and utility lines through plot
- Roads through plot
- Proximity to residential neighborhoods
- Proximity to talent
- Site natural disaster risk
- Weather conditions



Detailed Questionaaire and Site Rep Talks

- Localized tax and incentives analysis
- Political influence
- Utility infrastructure
- SMP/construction
- CS operations
- EHS / environmental
- HR / labor
- Supply chain logistics
- Supply chain operations
- Safety and security
- Government and public affairs
- Legal and land use



Technical Site Visits

- Site walk
- Assessment of viability for construction
- Viability of surrounding area for supporting construction materials and trades
- Meetings with economic development office and utility providers
- Meet with local authorities
- Livability assessment
- Factory operations assessment



Pre-Announcement Due Diligence

- Memorandum of understanding signed with local entities
- Site master plan developed
- Incentives structures agreed upon
- Vibration, sound and EMI testing
- Soil reports
- Confirmation of ability to provide utilities
- Broker analysis of land
- Title reports
- Re-zoning processes
- Environmental impact assessments

Summary

- The Dominican Republic offers a stable and predictable investment climate, and one of the most attractive FDI environments in the Americas.
- The Dominican Republic possesses an extant electronics manufacturing base that can serve as a springboard for migrating up the electronics value chain.
- The Dominican Republic offers a cost-competitive manufacturing environment.
- The Dominican Republic possesses an enviable geographic location and very strong logistics and infrastructure environment
- Between INFOTEP, ITLA, INTEC, etc. the Dominican Republican has the resources needed to train a skilled microelectronics workforce at scale.

Policy Recommendations

- The DR should be considered a leading candidate to be designated an ITSI partner.
- The DR should launch an awareness campaign reaching out to global investors in advanced electronics industries, highlighting favorable free zone tax policies.
- The DR should develop a formal national semiconductor value proposition/strategy.
- The DR should expand the availability of electrical engineering and computer science degrees and deepen relationships with U.S. universities.
- The DR should increase the number of individuals holding IPC 610 certifications.
- The DR Should develop a “one-stop-shop” handling regulatory/permitting duties.
- The DR should join the ITA-2 and WTO E-commerce Joint Statement Initiative.

Thank You!

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