

Unlocking Central America's Export Potential

4. Infrastructure for unlocking exports: SEZs, innovation and quality systems

Finance and Private Sector Development Department

Central America Country Management Unit

Latin America and the Caribbean Region

The World Bank



October 2012

Acknowledgements

SEZs: Thomas Farole (International Trade Department), with contributions from Martin Gustavo Ibarra Pardo and guidance from Thomas Haven. Innovation and quality: Sunita Varada with contributions from Daniel Ortiz (innovation) and guidance from Thomas Haven. We gratefully acknowledge financial support from the Trade Facilitation for Regional Integration in Central America Trust Fund and the Spanish Trust Fund for Latin America and the Caribbean.

Acronyms

ADAPCCA	Program of Support for the Design and Application of Central American Common Policies
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CACM	Central American Common Market
CCA	Central American Council for Accreditation of Higher Education
CIPM-MRA	International Committee for Weights and Measures Mutual Recognition Arrangement
CMC	Calibration and Measurement Capability
CMP	Common Market Protocol
CPA	Certified Public Accountant
CTCAP	Commission for Scientific and Technological Development in Central America, Panama, and the Dominican Republic
CYTED	Ibero-American Program for Science, Technology, and Development
DR-CAFTA	Dominican Republic and Central America Free Trade Agreement
EAC	East African Community
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
EIT	European Institute of Innovation and Technology
FDI	Foreign Direct Investment
FOCA	Central American Forum for Accreditation
GATT	General Agreement on Tariffs and Trade
IAAC	Inter-American Accreditation Cooperation
IADB	Inter-American Development Bank
IAF	International Accreditation Forum
ICT	Information and communication technologies
ILAC MRA	International Laboratory Accreditation Cooperation Mutual Recognition Agreement
ISO	International Standards Organization
KICs	Knowledge and Innovation Communities
MERCOSUR	Southern Common Market (<i>Mercado Común del Sur</i>)
MRA	Mutual Recognition Agreement
MSMEs	Micro, Small, and Medium Enterprises
NAFTA	North American Free Trade Agreement
NMI	National Metrology Institute

ODECA	Charter of the Organization of Central American States
PTB	Germany's National Metrology Institute
R&D	Research and Development
RTA	Regional Trade Agreement
SICA	Central American Integration System
SIECA	Central American Economic Integration Secretariat
SMEs	Small and Medium Enterprises
WTO	World Trade Organization

Contents

Summary	2
1. Special Economic Zones	3
1.1 Growth patterns of SEZs in Central America	6
1.2 SEZs and the challenge of diversification	11
1.3 SEZs and the challenge of FDI-local economy linkages	20
1.4 SEZs and regional integration	28
1.5 SEZ Summary and conclusions	35
2. Science, Technology, and Innovation Systems	37
2.1 Regional Initiatives	38
2.2 International Experience: EU's Knowledge and Innovation Communities	40
2.3 Recommendations	41
3. Quality Systems	43
3.1 Quality Systems in Central America	44
3.2 Recommendations	48
Innovation and Quality Conclusions	50
References	51

Summary

This section looks at select areas of supporting “infrastructure” identified as important in the preceding sections of the report. The export performance assessment found that special economic zones (SEZs) play a critical role in the region’s exports. They can also potentially help offset the region’s decreasing export sophistication. Among other things, the analysis explores how SEZs can contribute to export diversification and upgrading, what type of policies can help increase linkages between foreign firms operating in SEZs and the local economy, and progress in complying with new WTO regulations.

Functioning innovation and quality¹ systems are critical for helping firms develop new, higher quality, and more sophisticated products, all shortcomings identified in the export performance and sectoral / value chain sections. The analysis in this section focuses on how Central American countries can increase intra-regional collaboration to improve the effectiveness of these systems. Examples of findings include:

- In innovation, the region could benefit from building collaborative knowledge and technology transfer networks focused on specific subjects / sectors, with hubs in regional centers of excellence, e.g. INCAE (Costa Rica) and Zamorano (Honduras).
- In metrology, each country should build capacity in a basic basket of services, while more sophisticated services could be shared through a distributed network across the region.

More traditional types of infrastructure, such as roads, ports, airports, and energy, are not covered in this section since they are included in complementary World Bank analyses.²

¹ Quality systems include institutions and country capacity related to metrology, accreditation, certification, standards, calibration laboratories, etc.

² For example, World Bank (2012), *Logistics in Central America: The Path to Competitiveness* (2012) and Cayo (2010), *Power Integration in Central America: From Hope to Mirage?*

1. Special Economic Zones

Special Economic Zones (SEZs) are demarcated geographical areas within a country’s national boundaries where the rules of business are different – generally more liberal – from those that prevail in the national territory. Economic zones are designed as a tool of trade, investment, and spatial industrial policy, aiming to overcome barriers that hinder investment in the wider economy, including restrictive policies, poor governance, inadequate infrastructure, and problematic access to land. Specifically, most economic zones offer export-oriented investors three main advantages relative to the domestic investment environment: 1) a *special customs environment* including efficient customs administration and (usually) access to imported inputs free of tariffs and duties; 2) infrastructure (including serviced land, factory shells, and utilities) that is easier to access and more reliable than is normally available domestically; and 3) a range of *fiscal incentives*, including corporate tax holidays and reductions, along with an *improved administrative environment*.

Economic zones take on many different forms, depending on their purpose. Table 1 summarizes the most basic and common forms of these regimes (note that “industrial parks” are included for perspective; these are, however, not normally considered as an economic zone as, in their own right, they operate without any “special” customs, regulatory, or fiscal regime)

Table 1: Summary of forms of economic zones

Type	Objective	Typical Size	Location	Eligible Activities	Markets	Example
Industrial parks	Manufacturing	< 100 hectares	Various	Mostly manufacturing	Domestic, export	Exist in most countries
Commercial free zone	Support trade	< 50 hectares	Ports, airports	Trade-related processing and services	Re-export, domestic	Colon Free Zone, Panama
Export processing zone (EPZ)	Export manufacturing	< 200 hectares	Ports, airports	Mostly manufacturing	Export	Masan, Korea; Athi River, Kenya
Free enterprise zones (“single factory” zones)	Export manufacturing	As little as 1 hectare (one factory)	Various	Mostly manufacturing	Export	Mauritius, Mexico
Wide-area SEZs and freeports	Integrated development	> 100 km ²	Mixed	Multi-use	Domestic, internal, export	Shenzhen, China; Aqaba, Jordan

Source: Derived from FIAS (2008). Special Economic Zones: Performance, Lessons Learned, and Implications for Zone Development. Washington, DC: World Bank.

Economic zones have a long-established role in international trade. Since the mid 1980s, the number of newly-established zones has grown rapidly in almost all regions. In 1986, the ILO

reported 176 zones in 47 countries; by 2006 this rose to 3,500 zones in 130 countries³. Despite the continued proliferation of zones around the world, they have had a mixed record of success. There exist a number of examples of zones playing a catalytic role in processes of economic growth and adjustment processes, particularly in the East Asian “tiger economies” during the 1980s and in China since the early 1990s, but also in Mauritius and some Latin American countries. On the other hand, zones have been expensive failures in many cases, and have been rightfully criticized on grounds of rent transfer, failure to contribute to building local economies, and on social and labor grounds. Many economists view them as “second best” at best.

In this report, we use the term SEZ as a generic term to encompass the range of special regimes designed to attract investment in export-oriented activities. These include free trade zones, export processing zones, and in some other forms of special economic zones. Note that this report focuses primarily on spatially delimited regimes, but also includes discussion of the maquila factories (in-bond manufacturing) that are common throughout the region.

SEZs in Central America

SEZs are not a new phenomenon in Central America. All countries put programs in place during the 1970s or earlier (see Table 2), with the objectives of generating employment, attracting foreign direct investment (FDI), diversifying the export basket, and acquiring new technologies. In most cases, these initial programs were government-led and designed as traditional free trade zones. Only later – mainly in the late 1980s – did the programs evolve to the design most maintain today: with the EPZ model, delivered with significant participation of the private sector, through mainly small and mid-sized industrial parks and individually-licensed free zone companies. Virtually all investment in the zones is export oriented, most of it is from foreign investors, and most (indeed almost all, until very recently) is in manufacturing. In fact, the large majority of manufacturing exports from the region – most notably apparel, ignition wire harnesses, and medical equipment – are produced by FDI firms operating within these regimes.

³ Boyenge, J. P. S. (2007). *ILO Database on Export Processing Zones, Revised*. Geneva: International Labour Organization

Table 2: Introduction to SEZ programs in the region

	Year first zone program established	Year of primary current zone regime	Number of operating free zones ⁴
El Salvador	1974	1998	16
Guatemala	1973	1989	24
Honduras	1977	1987	24
Nicaragua	1976	2005	35
Costa Rica	1978	1990	23
Dominican Republic⁵	1969	1990	51
Panama	1948 (Zona Libre de Colón)	1992 (Zonas Francas)	14

Source: Authors

Three different models of free trade zones can be said to exist in the region:

- Model 1.* **Costa Rica and the Dominican Republic** represents the first model, which is based on a significant move toward industrial diversification and an increase in the added value of goods and services produced in the SEZs. Like the Model 2 countries, these countries depended almost exclusively on the textile & apparel manufacturing in the early days of their SEZ regimes. However, beginning in the early 2000s (Costa Rica) and after 2005 (Dominican Republic), there has been a focus on diversification. Today, the SEZs in these countries are characterized by exports of high technology products, including electronics, as well as medical devices and pharmaceuticals.
- Model 2.* **El Salvador, Honduras, Guatemala and Nicaragua** represents the second model, which is characterized by continued high dependence on the textile & apparel manufacturing. Although there are some initial signs of diversification in these countries, strong clusters in apparel manufacturing dominate and investment is still strongly linked to this sector and to the dynamics of the DR-CAFTA trade agreement.
- Model 3.* **Panama** represents the third model. The Colon Free Trade Zone has specialized in logistical services, merchandise distribution and services in general to take full advantage of the Panama Canal (which has no doubt predisposed this country to a preference for logistical services). In fact, the situation in Panama's zones bears little resemblance to that of the rest of the region.

⁴ Note that most countries also allow for licensing of individual firms as free zone entities – these number 100-300 in most countries.

⁵ Note that the Dominican Republic is included in this note although not in Central America, because of its relevance in the context of the DR-CAFTA agreement, which plays a fundamental role in shaping trade and investment patterns in the region.

Over the past thirty years, the region's SEZ programs have played an important role in facilitating the diversification and structural transformation of the regional economy, from one that was reliant on commodity agricultural exports, to one in which manufacturing plays an important role. This brought with it significant employment creation, critically for low-skilled mainly female workers. On the other hand, the zones are far from being viewed as an unmitigated success story. Serious concerns have long been raised about the labor and social practices in the zones. Moreover, there are legitimate questions that must be asked about the overall cost-benefit equation of the zones and their implications for government finances, particularly given the generous fiscal incentives on offer.

But leaving these issues aside for the time being, important questions can also be raised about the sustainability of the SEZ models being pursued in the region, and specifically whether the SEZ remains an effective instrument to take the region to the next stage of development or, in fact, risks holding back the development process. This note focuses on the challenges to ongoing structural transformation in the region's export sector and the role of SEZs in the context of these challenges. Specifically, the note addresses four key challenges:

1. *Maintaining growth, including in the context of WTO compliance*
2. *Diversification of exports*
3. *Linking FDI and local suppliers*
4. *Deepening regional integration*

As part of answering question #1, the next section of this note explores the relative importance of SEZs in the region today and asks: *are SEZs as important today as they were a decade ago?*

The remainder of this note excludes Panama, given the very different context of its economy and, particularly, its economic zones. It does, however, include the Dominican Republic, given the similarity of its SEZ exports and the fact that it has faced earlier many of the same challenges that are being faced today by the "Model 2" countries.

1.1 Growth patterns of SEZs in Central America

How important are SEZs in the region and how is this evolving over time?

Before discussing the challenges facing the region's SEZs, it is important to put into perspective how important SEZs are in the region, and the degree to which they are becoming more or less important over time. Table 3 provides a summary of the extent and relative importance of SEZs in each country, from the perspective of exports, investment, and employment. What is clear is that while SEZs are of relatively minor importance in terms of employment and FDI, they are hugely important for the export sector. Across all countries, around 50 percent of all exports are accounted for by firms based in SEZs or licensed as maquila factories. Given that there are some

important differences between these regimes (the maquila regime allows for duty-free access to imports for in-bond processing as well as income tax exemptions, but does not include all the same fiscal incentives or infrastructure that is offered in the SEZs), it is important to note that in some cases, it is the maquila and not the SEZs that drive exports. In Guatemala, for example, actual SEZ exports are only around US\$350m, while the maquilas account for more than US\$2.5 billion.

Table 3: The importance of SEZs in Central America

	SEZ exports (US\$'000)	share of national exports	SEZ employment	share of active labor force	SEZ investment (US\$m)	share of FDI stock
El Salvador*	1,900,000	42%	70,321	4.4%	369	4.8%
Guatemala*	2,900,000	37%	67,000	1.7%	251	3.9%
Honduras	3,932,000	68%	120,000	6.5%	688	2.7%
Nicaragua	1,200,000	65%	99,506	6.7%	67	1.4%
Costa Rica	4,833,000	52%	58,012	4.2%	470	3.5%
Dominican Republic	4,080,000	62%	121,000	4.2%	2098	14.2%

Source: Merchandise exports from World Bank data; Labor force from ILO KILM database; FDI stock from UNCTAD; data on SEZs in each country are author estimates from various sources.

** Note: Data for Guatemala and El Salvador includes the free zones as well as factories licensed under the maquila regime.*

For most countries in the region, however, SEZs play a less important role in exports today than they did a decade ago. The main exception here is Nicaragua, which has seen SEZ exports grow dramatically from around one-third of total exports in 2001 to over 60 percent today. Honduras, with the second lowest income level in the region after Nicaragua, has also maintained its share of SEZ exports above 60 percent throughout the decade. For most other countries in the region, however, SEZ exports grew strongly from the early 1990s through the mid 2000s, but have declined in importance since, primarily as a result of declining competitiveness in textile & apparel following the expiration of the Multifibre Arrangement (MFA). For example in El Salvador, SEZs grew from less than 20 percent of exports in 1991 to a peak of 60 percent in 2003, but have since fallen back below 50 percent. In the Dominican Republic (the country with the greatest reliance on SEZs in the Western Hemisphere), export share from SEZs declined from a peak of 81 percent in 2001 to 61 percent in 2010.

From the perspective of employment, it is also important to note that Nicaragua is the only country in the region in which SEZ employment is growing, not just in a relative sense, but even nominally. The challenge to the region's previous competitive position in the textile & apparel sector has resulted in significant job shedding, such that even though most countries continue to see nominal growth in SEZ exports, employment has stagnated or declined. The declining employment reflects the sectoral shift to less labor intensive activities (indeed, even services activities like call centers are less labor intensive than apparel) as well as the drive for improving

productivity *within* the apparel sector, through capital deepening and shifts to higher value activities. Thus, it is not clear that even successful growth of the SEZ sector will be sufficient to generate significant employment in most countries of the region.

What is the progress in complying with WTO requirements?

Under the WTO Agreement on Subsidies and Countervailing Measures (SCM), countries that have reached a minimum income threshold are required to eliminate all export subsidies by 2015. Among the export subsidies that are considered non-compliant are key components of the SEZ programs of all countries in the region. Any subsidy to a firm (e.g. the income tax exemption that all countries offer to SEZ investors) that is designed specifically to promote exports is non-compliant. This is likely to have a significant impact on the nature of the SEZ programs in the region, which are currently designed along the lines of traditional EPZs, with heavy reliance on fiscal incentives and restrictions against SEZ-based firms selling into domestic markets.

One way to comply is to remove the subsidies (in this case, removing tax exemptions and raising them to the levels of the domestic economy). Of course, as these subsidies are perceived to be critical to attracting export-oriented investment, this option is not particularly attractive to many policymakers. A second option is to remove the minimum export obligations of firms in the EPZs and allow them to sell in the domestic market. In this case, the subsidies are no longer linked to exporting and so do not breach the SCM Agreement. But this, too, has significant drawbacks. It will result in unfair competition for domestic producers as EPZ-based firms enjoying fiscal and other subsidies can now compete head-to-head with them. Moreover, domestic producers will of course also seek the same subsidies, and while they may have previously eschewed EPZ status due to the domestic market sales restrictions, they will no longer be held back by this. Thus the fiscal cost of subsidies could rise out of control. Instead, most countries have opted for a third approach, which is to reconfigure the fiscal incentive model in a spatial or sectoral dimension. This allows for compliance and a level playing field, while maintaining some control over the scale of subsidy costs while linking the subsidies to targeted policy objectives.

It is worth noting that removing the export requirement, as well as tax exemptions, of EPZ firms is in any case part of the more modern SEZ models that are now becoming the norm. Here, the traditional approach of setting up enclaves and giving them strong fiscal incentives is giving way to a more open model where SEZs provide a world-class infrastructure and business environment, and fiscal incentives are de-emphasized. This has the added benefit of facilitating greater integration and linkages between the zones and the domestic economy.

The section provides a brief status update on the progress of the region's countries in coming into compliance with the 2015 requirements.

The countries can be classified into three categories:

*1. Countries that have aligned their legislation: **Costa Rica***

Costa Rica's National Development Plan of 2006 established a new mechanism to attract investment that meets WTO's requirements for subsidies. Among the reforms to the Free Zone Law that went into effect in January 2010, were:

- Establishing a new category of processing companies that does not require the minimum (75%) export requirement
- Shifting incentives to spatial approach – making subsidies available to investors that locate in “lesser developed” regions outside the Greater, Expanded Metropolitan Area (GAMA)
- Establishing a new 10% fiscal credit for new processing companies to: i) reinvest earnings; or ii) cover expenses of training for staff of SME suppliers (to promote linkages).

*2. Countries that are in the process of adapting their norms: **Guatemala, El Salvador, and the Dominican Republic***

These three countries have made progress in terms of drawing up the respective bills to eliminate export performance requirements for goods; changing incentives that promote exports for others that drive job creation, regional development, reinvestment and productive chains.

To date, **El Salvador** has not notified the WTO Subsidy Committee about its current legislation for free trade zones. At the end of 2011, this Government and representatives of the private sector were preparing a proposal for a new law for free trade zones, which will be set to go into effect in 2015. According to the individuals that are writing up the new law, tax exemptions will be subject to progressive periods that are linked to the productive performance of beneficiary companies in the free trade zones. The bill also stipulates that the companies will not be obligated to pay these taxes during the first 20 years of their existence; after this the tax exemption will fall to 60%.

In **Guatemala's** case, the government notified the WTO on June 30, 2010 of its plan of action to eliminate export subsidies according to paragraph 4 of article 27 of Subsidies and Compensatory Measures. In this plan of action, Guatemala defined three actions that it would take and their respective timeframes to eliminate export subsidies before December 31, 2015: i) an analysis of the Working Group of the Ministry of Economy of Guatemala to identify and delineate the legislative actions needed to correctly modify the regime, ii) hiring an expert on subsidies to be in charge of reviewing and validating the work conducted by the

Working Group and iii) the discussion and validation by the Inter-Institutional Group of the Ministry of Economy and the Expert.

The **Dominican Republic**, through Law 139 of 2011, eliminated restrictions on sales from SEZ based firms to the local markets; it also eliminated local content requirements. Further amendments to the subsidy regime are, however, still required to comply with WTO's requirements for 2015.

3. Countries that are not yet required to eliminate subsidies: Nicaragua and Honduras

Article 27.4 of the Agreement of Subsidies and Countervailing Measures includes a temporary exception to the countries of low income and periods of elimination of the subsidies for the countries with average income. Countries are excluded from the prohibition against subsidies as long as their GDP per capita does not rise above US\$1,000 (in 1990 dollars) for three consecutive years. Both Nicaragua and Honduras remain under this provision. Thus, at the moment both are not required to eliminate existing subsidies linked to exports. However, under their DR-CAFTA obligations, neither country may adopt new subsidies or expand existing ones conditional on exports.

Are there prospects for future growth?

The strong link between the textile & apparels sector and the region's SEZs (also discussed further below), and the region's struggle to maintain competitiveness in the sector over the past decade, suggests a bleak future for the SEZs, all the more so in the context of tightening WTO rules. This is borne out by the recent stagnation in growth and employment. Even the positive story of Nicaragua can be seen in another light – as the poorest country in the region, it has a clear advantage in having the lowest labor costs in Central America. Such an advantage, however, cannot be both exploited and sustainable, at least for a country with a relatively limited labor pool.

On the other hand, several trends and opportunities exist for the region's SEZs to regain the strong growth path they achieved in the early 2000s. First, changing strategies in the management of global value chains, combined with rising costs in Asia, may contribute to drive renewed investment in the region's SEZs in traditional apparel and light manufacturing sectors. The 2009 global economic crisis, and more recent events like the flooding in Thailand have triggered a rethink in the management of far-flung global production networks. As a result, many firms, in sectors like automotive, apparel, and electronics, are shifting resources in the direction of tighter production networks operating at the regional level. For US based producers and buyers, Central America offers the possibility of much faster lead times that can be achieved through Asian supply chains, not only allowing for faster response to customer needs, but for greater flexibility and security in managing the production process.

Closely linked to this is the rising cost of production in Asia, particularly in China. The combination of substantial wage increases in the factories of coastal China (15-20 percent annual rises in recent years) and an appreciation of the Renminbi has narrowed substantially the gap in landed cost in the output of a factory located in China versus one in Central America. According to a study by the Boston Consulting Group⁶, this will contribute to approximately US\$100 billion relocating from China to other countries in the coming years. There is already evidence of this trend in Nicaragua, where several of the recently established investments (including Adidas and Nike) are firms relocating production from China to the region.

Second, there is the prospect of new sets of activities becoming more compatible with the SEZ environment, or more importantly with offshoring in general. This is a function both of the demand and supply sides. On the demand side, as ICT continues to improve and production activities in some sectors become increasingly routinized, the scope for offshoring naturally increases. This is already being seen in the growing offshoring of production like precision medical equipment, pharmaceuticals, and electronic components, as well as in the ongoing expansion of business process outsourcing (BPO) services. On the supply side, these more diversified sectors also tend to require higher level skills and a more predictable business and transport environment.

1.2 SEZs and the challenge of diversification

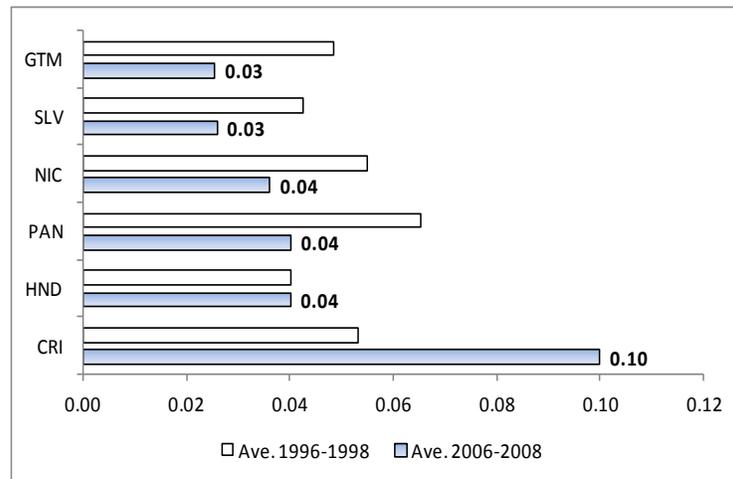
As the previous section shows, the non-commodity export sector in Central America is largely based in the SEZs. In most countries, this manufacturing export activity has been led and dominated by textiles. While this sector has been a very important generator of jobs, there has been concern for some time over an excessive reliance on the sector, a concern that was highlighted in 2005 when the expiration of the Multifibre Arrangement brought heavy competition from Asian producers, and again during the recent global economic crisis. In this section, we review the situation with regard to diversification of SEZ exports in Central America, with a focus on understanding how the SEZ environment mediates outcomes on diversification and what can be done to improve diversification prospects in SEZs.

Before discussing what can be done about diversification in the SEZ context, we should first be clear on whether diversification is, in fact, a problem. Figure 1 shows that, with the exception of Costa Rica⁷, all countries in the region have become less concentrated in their export basket over the past decade. This is actually a two-fold story of diversification, both related to the SEZs.

⁶ BCG (2012). "Made in America Again: Why Manufacturing will Return to the US". The Boston Consulting Group.

⁷ This is a function of the large scale of the Intel investment in the country.

Figure 1: Herfindahl Index of product concentration in merchandise exports



Source: COMTRADE

First, going back to the mid 1990s, most countries in the region were still in the early days of development of the SEZ-based textile & apparel sector, so over this decade we see a steady shift away from reliance on agricultural exports toward manufactures. Second, particularly in more recent years, there is clear evidence – to different degrees but in all countries – of diversification *within* the SEZs, from virtually exclusive reliance on textiles & apparel to a growth of a range of other activities, in particular automotive, medical supplies and pharmaceuticals, electronics, and services. This second wave of diversification will be discussed in more detail in this section.

Table 4 summarizes the main industries in each country’s free trade zone. From this it is clear that the textiles & apparel sector and agri-industry continue to be highly important in the majority of the SEZs of almost all countries. It also shows, however, that there is at least some diversification in most countries, both in manufacturing and services sectors.

Table 4: Main sectors in SEZs

	Agri-industry	Textiles & Apparel	Medical Equipment	Pharmaceutical	Electronics	Automotive wire harness	Call centers	BPO
El Salvador	✓	✓			✓		✓	✓
Guatemala	✓	✓		✓			✓	✓
Honduras	✓	✓				✓		
Nicaragua	✓	✓				✓	✓	
Costa Rica	✓		✓	✓	✓			✓
Dominican Republic	✓	✓	✓	✓			✓	✓

Source: Authors

What Table 4 does not show, however, is the relative importance of the apparel sector versus other sectors across these countries. Here, the evidence suggests that apparel is still dominant, at least for the four core countries of focus in this study. On the other hand, all countries are showing some progress toward attracting more diversified investment into the SEZs. Clearly Costa Rica stands out from the rest of the region in terms of no longer relying on the apparel sector; on the other hand, while Costa Rica has attracted more sophisticated investment into its SEZs, it remains (as noted above) more concentrated sector-wise than any other country in the region. The Dominican Republic is perhaps a more realistic benchmark for the rest of the region. Having struggled to reduce its dependence on apparel for more than a decade, it has recently managed to achieve substantial diversification.

Following are more specific details on the extent and evolution of diversification in countries of the region organized according to the “Model 2” countries, followed by the “Model 1” countries:

Levels of concentration and efforts at diversification – “Model 2” countries

With the lowest manufacturing wages in the region, **Nicaragua** has attracted increasing interest from foreign investors in the apparel sector and, as a result, this sector is in the middle of a major growth phase, with most investment taking place in the SEZs. As Table 5 shows, apparel accounts for more than half of all exports originating from SEZs in Nicaragua, up from 44 percent a decade ago. Here we can clearly see the shift over the decade away from agri-food (down from 37 percent of SEZ exports to less than 22 percent) and toward apparel and more recently electronics (from 3.4 percent to 11.2 percent). What is perhaps more striking is the concentration of manufacturing exports within the SEZ. Virtually all apparel exports (93 percent), machinery (94 percent) and transport (96 percent) exports come through firms located in SEZs.

The apparel sector dominates not only in terms of exports but also employment in the SEZs. Close to 60,000 apparel jobs exist in Nicaragua’s SEZs. Beyond apparel, the only real manufacturing sector with an established base in the SEZs is machinery and electronics. And this is essentially one product (automotive ignition wire harnesses) for one major investor (a single firm runs four different plants that operate under the SEZ regime and is the single largest employer in Nicaragua with around 8,000 direct jobs). Other sectors of lesser importance in the SEZs are food processing, animal, and vegetable products. In these sectors, the majority of exports are produced by firms operating outside SEZs. What is clear in the case of Nicaragua is that virtually all export-oriented manufacturing takes place in the SEZs, while the majority of traditional export activities (agriculture and minerals-based) takes place outside the SEZ regime. In fact nine of the top 10 non SEZ exports in Nicaragua are agricultural or fisheries products (the other is gold) – these accounted for two-thirds of all non SEZ exports in 2010.

Perhaps even more than in Nicaragua, textiles and apparel continue to dominate the SEZ sector in **Honduras**, accounting for more than three-quarters of employment and close to 90 percent of goods exports. Like in Nicaragua, the only significant manufacturing activity outside of apparel is in automotive wire harnesses, which employed around 10,000 workers. This sector emerged in the middle of the 2000s, having attracted nearly US\$100m in FDI in 2004 and 2005. However, the sector has failed to take off since, and some operations were shut down during the crisis.

Table 5: Sectoral composition of merchandise exports originated in SEZs, Nicaragua

sector	Average 1996-98		Average 2006-08		Average Annual Growth Rate
	Within	Across	Within	Across	
01-05 Animal	24.5	8.1	28.3	7.5	13.4
06-15 Vegetable	36.1	17.8	31.1	8.3	5.9
16-24 Food products	43.3	11.3	39.9	6.0	7.3
25-27 Minerals	96.9	1.9	92.6	8.7	32.9
28-38 Chemicals	74.7	1.4	45.4	1.0	10.0
39-40 Plastic / Rubber	68.7	0.8	54.6	0.4	4.7
41-43 Hides, Skins	30.7	0.4	24.5	0.2	5.3
44-49 Wood	45.3	1.4	64.0	0.7	6.5
50-63 Textiles, Clothing	97.0	44.2	92.7	53.0	16.4
64-67 Footwear	79.8	0.4	38.8	0.0	-9.0
68-71 Stone / Glass	46.6	5.8	20.4	1.0	-3.8
72-83 Metals	54.7	0.8	51.3	1.0	17.0
84-85 Mach/Elec	86.4	3.4	94.1	11.2	28.9
86-89 Transportation	97.6	1.2	95.8	0.6	6.3
90-97 Miscellaneous	91.2	1.0	78.4	0.5	7.5
Total	54.2	100.0	62.6	100.0	14.3

Note: This table shows the composition of exports from firms located in SEZs in Nicaragua. The within sectoral composition refers to share of exports from SEZ firms in total sectoral exports. The across sectoral composition indicates the relative importance of each sector in overall SEZ exports. In order to compute exports originated in SEZs, we take advantage of the fact that Nicaragua only reports exports originated outside SEZs to the COMTRADE database. As mirror data includes both SEZs and no-SEZs exports, SEZ exports are computed as the residual between mirror and report data. Source: World Bank (2012). Nicaragua Trade Competitiveness Diagnostic

Table 6: Evolution of sector concentration in Honduras SEZs

Employment by sector in maquila						
	2007		2008		2009	
Textiles, apparel, leather	103,377	77%	97,275	80%	83,712	78%
Electronic components and vehicle parts (harness)	13,609	10%	9,562	8%	9,403	9%
Other activities	7,150	5%	7,336	6%	7,870	7%
Tobacco products	3,427	3%	3,502	3%	2,465	2%
Furniture and wood products	2,852	2%	1,363	1%	971	1%
Services for business	1,880	1%	1,702	1%	425	0%
Trade	1,712	1%	1,540	1%	1,849	2%
Total	134,007		122,280		106,695	
FOB value of processing (maquila) exports (US\$m)						
	2007		2008		2009	
Textiles and clothing	2,758	85%	3,125	88%	2,426	88%
Electronic components and vehicle parts (harness)	410	13%	344	10%	261	9%
Transport equipment	31	1%	41	1%	53	2%
Other	42	1%	50	1%	32	1%
Total	3,241		3,560		2,772	
<i>source: Central Bank of Honduras</i>						

Despite incorporating diversification as a main objective of the SEZ program for a long period, **El Salvador** has also struggled to move away from dependence on textile & apparel. There are 16 SEZs in El Salvador, representing a total of about 200 firms. According to the *Fundación Salvadoreña para el Desarrollo Económico y Social* (FUSADES), roughly 70 percent of companies operating in zones are textile maquilas. Other assembly or manufacture companies are involved in paper (3 percent), plastics (3 percent), electronics (2 percent) and chemicals (2 percent). Exports are even more dominated by textiles & apparel – at 88 percent. Outside this, only electrical appliances (8 percent) have any significant export volumes. There are, however, signs of some nascent investment in more advanced sectors. For example, Motech is a German company that manufactures high-quality anatomical dental models, and *Soluciones Energéticas* is a Salvadorean company that manufactures solar panels for export.

Moreover, El Salvador has made significant progress in the services sector, particularly with call centers and logistics. El Salvador has been able to attract leading international companies such as Sykes, Dell and Stream to open call centers that offer customer and technical support. Sykes, a world leader in business process outsourcing, entered El Salvador in 2003 with an investment of \$8 million. Since then, it has had two expansions to its operations, in 2006 and 2008, representing an additional investment of almost \$1.8 million; it currently employs 1,400 people. The computer manufacturer, Dell, opened a call center in 2005 to cater to the Latin American and the United States markets. Dell’s operations in El Salvador had over 1,500 employees until

October 2008, when Stream Global Services acquired Dell's call center in El Salvador. In total, 35 call centers are currently registered in Salvadorian SEZs⁸.

A specialized type of BPO that has taken hold in El Salvador is that of logistical services. In April 2009, the Swedish company Wallenius Wilhelmsen Logistics, which specializes in automobile, heavy construction and agricultural machinery shipping, invested close to US\$1 million to open a data processing center in the American Industrial Park SEZ. The center keeps track of all shipments traffic between Latin America and the United States and Canada and manages receipts and payables. At the moment, the center employs 30 people, but that number is expected to rise to 50 by the end of the year. There are several other foreign companies offering logistics services from El Salvador's SEZs – some with global scope like the German DHL, and others with a regional span such as CaribEx Worldwide, which specializes in warehousing and distribution. El Salvador has also seen the establishment of the first aircraft maintenance SEZ, which includes three important aircraft companies.

Finally, in contrast to other countries in the region, **Guatemala** was one of the first and most successful in making appreciable progress on diversification. Between 1997 and 2004, 80 percent of all economic activity taking place in the SEZs was in textiles and garments; by the end of the decade this share had fallen to 40 percent⁹. While this is partly a function of significant decline in textiles following the end of the MFA, it also reflects the growth of new investments in sectors like pharmaceuticals, plastics, and BPO and call centers.

The experiences of “Model 1” countries: Costa Rica and the Dominican Republic

The **Dominican Republic** represents a good benchmark for Central American economies, as its income level, its SEZs, and its apparel export sector have a 5-10 year lead time over the core four countries of focus in this report. In 2003, textile & apparel firms accounted for more than 50 percent of all companies operating out of the SEZs in the Dominican Republic. They accounted for an even larger majority of exports and employment. By the end of 2010, textiles & apparel accounted for only 22 percent of SEZ companies, with services (21 percent), tobacco (9 percent), trade (8 percent), agri-industry (7 percent), and pharmaceuticals and electronics (4 percent each) becoming increasingly important.

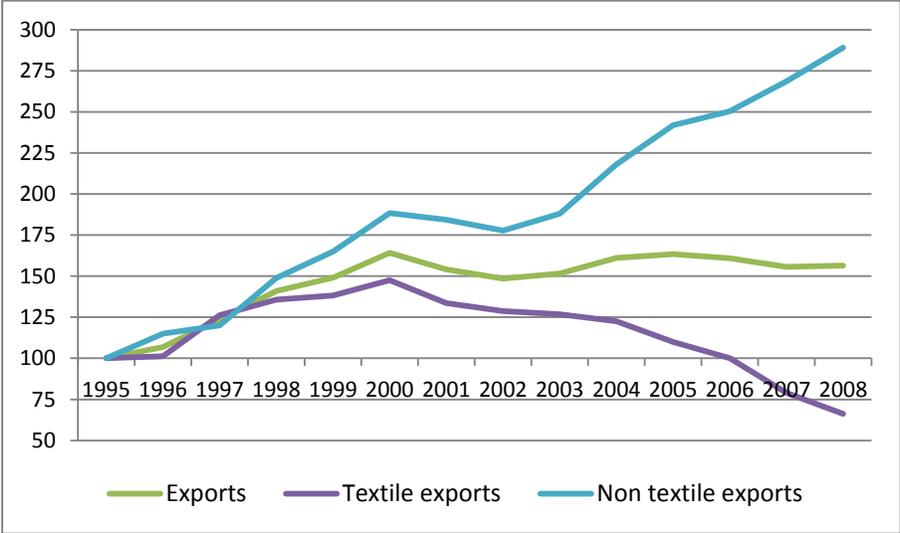
The restructuring of the SEZ sector over this period has been striking. As shown in Figure 2 – which presents the relative growth of textile and non-textile sector exports from 1995 through 2008 – the apparent flat trend SEZ exports masks a major underlying dichotomy. Textile and apparel exports began to decline from 2000 and by the end of 2008 they stood at less than half their 2000 peak. On the other hand, non-textile exports have grown rapidly, largely offsetting the decline in textile exports (but not absorbing the workforce shed from the sector). In the five years

⁸ PROESA, 2009

⁹ UNCTAD (2011). *Investment Policy Review of Guatemala*. New York and Geneva: United Nations.

prior to the crisis, exports of medical equipment and pharmaceuticals increased two and a half times and electronics by 50 percent – these two sectors are now each responsible for almost as many exports as the textile and garments sector. The jewelry and tobacco sectors also grew rapidly in the SEZs during this period. Finally, the services sector is also becoming an important part of the SEZs. The Dominican Republic’s first call center (employing just 100 workers) was established only in 2006; by 2011 call centers based in SEZs employed 12,000 workers¹⁰.

Figure 2: Index of SEZ exports in Dominican Republic: textile v non-textile (1995=100)



Source: Calculations based on data from CNZFE

In **Costa Rica**, the story differs significantly from the rest of the region. Textiles & apparel lost importance almost a decade ago and now accounts for only 2 percent of SEZ exports (see Table 7). Beyond that, however, the well-known Intel story masks the growing importance of SEZ exports in other high technology sectors, most importantly medical equipment and pharmaceuticals (indeed, the very two sectors that are emerging strongly now in the Dominican Republic). Table 7 also depicts a fairly diversified set of activities in the SEZs, suggesting the growing concentration indicated by the HH index may result from the relative growth of the top 5 or 10 export sectors or from a decline in non SEZ exports (e.g. traditional agricultural products) rather than simply dominance of Intel.

Beyond goods, Costa Rica has also been successful in diversifying into services. In 2011, approximately 110 service sector companies based in SEZs generated exports for, US\$1.666 million, which accounted 33 percent of total SEZ exports. Out of 34 new direct foreign

¹⁰ República Dominicana. Laurus internacional inaugura un nuevo call center. <http://www.callcenternews.com.ar/index.php/news/news/865-rd>

investments in 2011, 21 were in services, generating approximately 32,000 direct jobs¹¹. In fact, by the end of 2011, 55 percent of workers based in SEZ firms in Costa Rica were in services sectors.

Table 7: Sectoral composition of SEZ exports in Costa Rica (2007-2011)

Economic activity	2011 (half year)		2009		2007	
	Jan to <u>June</u>		Jan to Dec		Jan to Dec	
	FOB US\$m	%	FOB US\$	%	FOB US\$	%
Electronics	834	34	901	19	1,523	30
Medical Equipment	543	22	974	21	722	14
Pharmaceuticals	170	7	202	4	166	3
Other food	118	5	208	4	165	3
Processed fruits and vegetables	102	4	198	4	197	4
Vegetable oils	86	3	82	2	91	2
Equipment for distribution and control	77	3	82	2	103	2
Rubber products	65	3	94	2	867	2
Apparel	57	2	102	2	181	4
Plastics	47	2	55	1	66	1
Total 10 sectors :	2,098	85	2,899	62	3,301	65
Overall total	2,457	100	4,711	100	5,065	100

Source: Mercosur Online; data available from 01/01/2007 to 30/06/2011

Conclusions – are there specific aspects of SEZs that may aggravate or mitigate the diversification challenges? what can be done to address the challenge in the SEZ context?

Central America’s SEZs evolved to a design that was specifically oriented toward attracting “export platform” FDI, specifically export assembly. This makes sense – for small countries with limited domestic markets, the realistic opportunity for attracting FDI is in assembly for export to the US market. In this context, however, it is not surprising that diversification becomes an issue. International experience shows that textiles & apparel is by far the most common sector in SEZs, followed by electronics – taken together, these two sectors account for the large majority of SEZ activity globally. This is because the specific economics of these sectors (inputs sourced from many global locations, reliance on low skill, labor-intensive activities, relatively low transport costs) make offshoring a valuable strategy. And SEZs specifically deliver an environment that is attractive to offshoring of assembly activity, most importantly efficient, duty-free access to inputs, and flexibility and low risk (by allowing for short-term leases in pre-built factory units). In addition, the fiscal incentives and hassle-free regulatory environment are also attractive to most investors.

¹¹ Revista Summa. <http://www.revistasumma.com/economia/22470-unas-110-empresas-impulsan-al-sector-servicios-en-costa-rica.html>. Febrero de 2012.

One problem that may arise from the fact that the Central American SEZs have traditionally been highly concentrated in textiles is that it can be difficult to attract investors from other sectors into an industrial park that is essentially a large apparel cluster. Thus, strategies of bringing large “anchor investors” (who will rely less on existing clusters) like Intel in Costa Rica, can be important to catalyze new clusters.

Finally, in some sectors, notably those like agriculture (and possibly tourism and mining) that rely on access to local resources, the SEZ industrial park model may be problematic from a location perspective. On the other hand, most if not all Central American countries have flexible SEZ regimes that allow for “single company” zones to be established anywhere in the country.

The real question is whether the sectors that may represent the best opportunities for diversification in these countries would respond positively to the current SEZ regimes, whether the regimes require some changes to meet the needs of these investors, or whether these regimes in fact are needed at all to attract this investment. Evidence from the diversification that is happening suggests that the first stage is a move into activities like automotive wire harnesses, which appear to operate under much the same set of investor demands as the textile & apparel sector, suggesting the importance of the current SEZ model remains. The second wave of newly diversified activities includes higher technology sectors (medical equipment, pharmaceuticals, and electronics) and services (BPO and logistics). For the higher technology sectors, it appears that investors are still looking for similar SEZ benefits (for example, the duty free access to inputs and customs efficiency remains critical), but beyond this worker skills are critical.

For services, however, the requirements may be significantly different. First, there is much less need for access to duty-free inputs. By contrast, firms in these sectors require better access to local markets for supplies and labor, which may in fact be hindered in the current SEZ setup. Second, they require access to high quality, low cost ICT infrastructure and facilities that are conducive and attractive for high-skilled workers. Again, the current industrial parks may be inappropriate, making it, therefore, difficult to simply shift from attracting apparel firms to call centers.

Countries like Costa Rica and the Dominican Republic have developed world-class industrial parks – so-called “five-star free trade zones” – designed to capture this higher quality manufacturing investment as well as the growing opportunities for services offshoring. In the case of Costa Rica, for example, different multi-nationals have opened shared service and operations centers with hemispheric coverage (there are approximately one million square meters of free trade areas in San Jose and its outlying areas; a significant number of multi-nationals have set up their administrative support centers for the hemisphere in these areas). El Salvador and Nicaragua have also evolved along these lines by creating different categories of parks to differentiate between free trade areas for service and similar areas for industrial purposes.

Finally, it is worth noting that diversification in the SEZs may also be vertical in nature, for example within the apparel sector. In Honduras the maquila industry has been moving upstream into fabric and even yarn production and large firms like Grupo M and Bratex having developed full package operations, including pre-production services and sourcing. Such a strategy may also have implications on the specific requirements of investors, which need to be considered from the perspective of SEZs and wider investment policy.

In summary, to attract diversified investment in higher value sectors, building good industrial parks, including ones that take into account the needs of service companies and the potential for vertical diversification, and aggressive investment promotion efforts (including anchor investment strategies) can help. More important are cross-cutting policies outside the realm of SEZs, including education, infrastructure, and the business environment. Unless countries in the region have the skills that are attractive for sectors beyond basic labor activities like apparel (and wire harnesses), there will not be much diversification into higher-value activities, in SEZs or otherwise.

1.3 SEZs and the challenge of FDI-local economy linkages

While FDI offers macro benefits to countries in terms of increased foreign exchange, tax revenue, and employment, it is the micro-level, dynamic benefits that can have the biggest long term impact. These come through technology and knowledge spillovers that allow local producers to build up capabilities, resulting in productivity gains. FDI can lead to technology absorption by transferring knowledge about new technologies – related to products, production, and management and organizational practices – to local firms and workers or simply through the know-how and equipment brought in by foreign investors.

In the case of Central American SEZs, where most investment is of the export-platform variety, the most important channel for spillovers is through supply chain linkages, specifically through backward linkages, which occur when local firms become input or service suppliers of FDI. These offer a platform by which FDI has a direct interest in active support to upgrade local suppliers through transfer of knowledge and technology. For example, local input and service suppliers of FDI may learn to meet international standards and technological efficiency that increases their overall productivity. FDI affiliates might help local producers to upgrade their technological capabilities – directly through sharing production techniques and product design and assisting with technology acquisition, or indirectly through the expectation of high standards and feedback on suppliers' output¹². And of course, supply linkages offer more than just

¹² Paus, E.A. and Gallagher, K. P. (2008). "Missing Links: Foreign Investment and Industrial Development in Costa Rica and Mexico". *Studies of Comparative International Development*. 43.

spillovers, but also directly benefit the local economy through employment creation and the growth of local firms.

Achieving linkages between foreign investors in SEZs and suppliers in the domestic economy has long been a major challenge in zone programs worldwide, particularly those in low-skill, labor-intensive, footloose sectors such as apparel (see Box 1). Empirical evaluations of SEZ programs support this¹³, showing that the contribution of local intermediate inputs to SEZ firms has been limited, leaving employment as the only significant benefit of SEZ investments to their host economies. While no recent comparative data exists in the extent of local economy linkages in Central America's SEZs, it is recognized in all countries that services and goods inputs (excluding labor and utilities) are below expectations. In fact, previous studies have found the rates of locally purchased supplies in the region to be under 10 percent¹⁴.

Is this an SEZ issue?

As with diversification, it is important to first understand what aspects of the challenge are related to SEZs as an instrument and what aspects are related to factors that may be correlated with the presence of SEZs, such as the nature of sectors, of trade policy, and of supply side characteristics. In the case of linkages, all three of these play an important role.

With regard to the first and second factor, the majority of investment in the region's SEZs remains in the textiles & apparel sector, and this investment is driven by the trade preferences to the US market afforded through regional trade agreements. Prior to the Caribbean Basin Initiative (CBI) in 2000, in order to benefit from duty-free access to the US, producers in Central America were *required* to source materials from the US. After the CBI in 2000, the possibility opened up of sourcing inputs from other countries party to the CBI, but in most cases supply links were well established and few regional suppliers existed at the time. More recently, under the DR-CAFTA, provisions allow for sourcing of much fabric from outside the region. Indeed, many of the recent investors have come to the region *expressly* because of these new sourcing provisions. Thus, sectoral and trade policy dynamics create an inbuilt bias against using local supply. Another important sectoral dynamic – which is true not only for apparel but other sectors that operate through global production network models, including electronics, automotive, and services, the other important investors in the region's SEZs – is the fact that sourcing decisions are typically dictated not by local plants but by head offices or directly by the buyers (global brands or retailers). Recent research on SEZs in seven countries found, for example, that the use

¹³ see, for example, Warr, P. (1989). "Export Processing Zones: The Economics of Enclave Manufacturing". *World Bank Research Observer*. 9(1):65-88.

¹⁴ see, for example Jenkins, M., Esquivel, G. and Larraín, F.B. (1998). "Export Processing Zones in Central America". Development Discussion Paper No. 4. Central America Policy Series. Harvard University Institute for International Development.

of inputs from the domestic economy was twice as high for SEZ firms in the food and beverages sectors than for those in apparel¹⁵.

With regard to supply side characteristics, a number of issues that have little to do with SEZs hinder the development of local supply linkages. One obvious issue is the lack of scale of domestic production (e.g. for textile fabrics and yarns), given the small size of most of the region's markets. This small market size also impacts the scope of goods and services available in the local economy. Indeed, most surveys of foreign investors point to the lack of existing local suppliers as the single biggest barrier to local sourcing. Finally, across the region (and indeed globally) local producers often fail to meet required international standards, or are unable to provide the quality, price, and reliability required by international investors.

Box 1: Efforts to improve local economy linkages in the Dominican Republic's SEZs

Almost 20 years ago, it was recognized that apparel manufacturing in the free zones of the Dominican Republic operated as enclaves, with virtually no links to the local economy outside labor and utilities. To address this, with the support of USAID, the Government of the Dominican Republic set up a program in the 1990s to develop backward linkages from the SEZs. Feasibility studies revealed abundant SEZ demand for textiles, precision plastic parts, metal stamping, machine shops, and tool, mould and die making. The research also revealed the main reasons why backward linkages failed to develop – these included: 1) the capital or intermediate goods required by SEZ producers frequently did not exist in the country; 2) some local manufacturers who did produce the goods required often had little interest in supplying SEZs because they were satisfied with current operations and profitability levels of a protected local market; and, most importantly, 3) local producers generally failed to meet market standards for price, quality, and delivery terms. In this context, and with the benefits of duty free import and relatively low transport costs in and out of free zones, SEZ based companies generally had little incentive to purchase local inputs.

Indeed, despite the program a later study carried out in the early 2000s found that local spending from SEZ based firms (encompassing material inputs, capital equipment, water, electricity, and statutory payments of Social Security and training) was only 1.5 percent of the export value of free zone companies¹⁶.

Source: Burgaud, J-M. (2010). Unpublished paper for World Bank.

In summary, the challenge of FDI-local economy linkages is a global one, and one that has strong links to the nature of global value chain, offshoring. This type of investment, of course, tends to cluster in SEZs.

Are there specific aspects of SEZs that may aggravate or mitigate the linkage challenges?

Yet there are facets of the SEZ environment that may make local supply linkages even more difficult to achieve – these are both policy and administrative in nature. From a policy perspective, the trade policy disincentive to local sourcing (discussed above) is aggravated

¹⁵ Farole, T. (2011). *Special Economic Zones in Africa: Comparing Performance and Learning from Global Experience*. Washington, DC: World Bank.

¹⁶ Sanchez-Ancochea, D. (2006). Development Trajectories and New Comparative Advantages: Costa Rica and the Dominican Republic under Globalization. *World Development*. 34(6): 996-1115.

further by the incentive structure of the SEZs, which allow firms to access imports duty free, removing a potentially important source of competitive advantage for local suppliers. This is compounded in some cases by lack of a corresponding tax benefit for local purchases. For example, in Honduras, until recently, SEZ-based firms were required to pay a 12 percent VAT on all purchases from the local market but could access those same goods from international suppliers on a tax- and duty-free basis.

The traditional SEZ model also biases against participation of local firms by (usually) placing tight restrictions on sales to the local market, forcing firms to be export-oriented. Moreover, many zones set a minimum level of investment to qualify for participation in SEZ programs. They also restrict the share of production that SEZ based firms may sell to the domestic market (in the region, this is typically restricted to 20-25 percent, but in Nicaragua 40 percent is allowed and in Honduras, for example, only 5 percent may be sold locally). Thus, local firms are much less likely to be in the zones. This does not necessarily restrict them from supplying zone-based firms but it raises another barrier and limits the kinds of interactions that could contribute to spillovers across firms. Critically, this situation also prevents local firms from accessing the benefits available to zone-based firms (e.g., fiscal and nonfiscal incentives, duty-free access to inputs). Equal footing policies are a start, but in many countries weaknesses in the domestic business environment result in domestic firms that cannot compete with alternative international suppliers.

Even when efforts are made to avoid policies that bias against local supply linkages, administrative issues raise barriers in most SEZ programs. The restrictive extraterritoriality of many zone regimes results in regulations and procedures that restrict sales between firms inside and outside the zones. As a result, SEZ-based firms often find it easier to import goods from abroad than to source from the local market, and local suppliers often find it too difficult to serve SEZ-based customers. For example, many programs allow local producers selling into the SEZs can obtain duty drawback on imported inputs (as indirect exporters), but heavy administrative bureaucracy and huge delays in receiving payback (if ever) undermine this instrument in most developing countries, including most in the region. Second, concerns regarding security and leaks of SEZ products into the local market often result in tight restrictions on the movement of local trucks in and out of customs-controlled zones in the SEZs.

On the positive side, special economic zones are often ideal places to establish formal linkage programs, for several reasons. First, they receive a wide set of special incentives and so obligating them to promote linkages actively can be reasonably expected in return. Second, they tend to have a close relationship with the investment promotion agency, which often takes the lead in running linkage programs. Third, because investors (many from the same sector) are clustered geographically, it is possible to take advantage of scale, making spillovers more likely. Finally, for these same reasons, the demonstration effects of spillovers can be more visible.

Experiences of countries in the region

Some countries in the region have made progress in improving local economy linkages of their SEZ programs. This section briefly discusses some of these efforts:

In **Honduras**, the key impetus for the promotion of backward linkages stemmed from trade and regional agreements with the United States. The original maquila concept was essentially a “job shop” where imported inputs were assembled and stitched together by local labor and then exported to foreign markets. This situation held for Honduras during the early years – during the 1980s and 1990s, less than 10 percent of inputs were produced in Honduras. However, in 2000 the passing of the Caribbean Basin Trade Partnership Act (CBTPA) included new rules of origin provisions, allowing Honduran companies to use more local content in their production (previously they had been forced to source material from the US in order to obtain trade preferences). According to the Maquila Association of Honduras, this shifted the incentive structure from the previously preferred solution of importing all input material from the United States to using locally produced input material. The result was significant Honduran investment in textile mills – today Honduras has 10-12 textile mills, and roughly 60 percent of intermediate inputs into apparel production are sourced from Honduras. It is worth noting, however, that these are not sourced from the domestic market per se; almost all of this production is actually housed within the SEZ environment.

While there are few direct local linkages in **Nicaragua**, the case of a leading footwear sector investor highlights the importance of subcontracting as a channel for establishing linkages, particularly in traditional SEZ sectors like apparel and footwear. The Brazilian company “Schmidt Irmãos” started operations in Nicaragua in 2010, with an initial investment of US\$ 10 million and over 1,400 employees, and 10 production lines. This Brazilian company has developed close relations with local suppliers that can offer tailor-made manufactured products to the company including components for the manufacturing of women's shoes such as heels, soles and insoles and dyeing of raw materials such as leather¹⁷.

In **Costa Rica**, a recent law (Law 8794 of 2010) established the mechanisms need to stimulate productive chains between companies in the free trade zones and local producers. Under this legislation, local suppliers that provide goods and services in free trade zones can benefit from the tax advantages available in the regime for free trade zones if they can prove that at least forty (40 percent) of their sales are made to businesses in these areas. In addition, Costa Rica established a Special Commission to identify strategic sectors seen as having the best potential to create productive chains. Additionally, high technology foreign investors have facilitated

¹⁷ PRLOG. Brazilian Manufacturer Confirms Investment in Nicaragua. March 2010.
<http://www.prlog.org/10561986-brazilian-manufacturer-confirms-investment-in-nicaragua.html>

technological transfer and driven significant development in this industry in the local market. One obvious example of this is Intel, an American company that began its operations in the country in 1998. It started as the only company in the free trade zone but eventually became an industrial park that houses all of its suppliers (including designers, software services and financial services), two manufacturing plants and a distribution center. According to, company Manager of “*Promotora la Sequeira*” productive chains in Costa Rica have grown considerably: “*To date, there are more than 331 national companies, primarily SMEs, which provide goods or services to companies in the free trade zones under the specific tax regime. In 2001, these chains reported US\$0.8 million for first-time businesses; this figure increased to US\$8.2 million in 2010, which represents a 10-fold increase in less than a decade.*” According to research conducted by the Inter-American Development Bank (IDB), productive chains between local suppliers and businesses installed in free trade zones in Costa Rica have accumulated \$840 million in the last 10 years.

In the **Dominican Republic**, recent policy decisions designed primarily to comply with WTO requirements, has facilitated improved linkages between SEZ based firms and the domestic economy. Law 56-07 (May 2007), not only opened up the domestic market fully (100 percent) to SEZ producers of key products – textile, clothing and accessories, hides and skins, footwear and leather articles – but perhaps more importantly, extended the customs and fiscal benefits of free zones to domestic-based producers in these sectors, giving them access to duty-free imports and exemption from corporate and value-added taxes. The legislation is also quite favorable to supporting backward integration of free zones into the local economy. Suppliers from the domestic economy to SEZ companies are exempt from import duties on the raw materials used in this production. This allows them to at least be on equal footing with competitors supplying the zones from outside the country. For a sector that long struggled to source more than a few percent of material inputs locally, statistics from the National Council of Free Trade Zones, show that free zones now source 13 percent of inputs from local suppliers, and the Dominican Republic is noted as the second most important supply location for companies based in the free zones, with more than 100 companies listing DR as a source for major supplies¹⁸.

Conclusions – policies to facilitate improved linkages

Addressing the challenge of improving spillovers between foreign investors in SEZs and the domestic economy clearly is not something that can be addressed solely within the context of the SEZ instrument. There exists extensive research and policy advice on addressing supply linkages in the sectors that are of most relevance for Central America’s SEZs (apparel and other light manufacturing). Within the SEZ context specifically, three types of interventions can be considered for addressing the linkage challenge: adopting more integrative policies; removing operational and administrative barriers; and making proactive efforts to facilitate linkages.

¹⁸ This compares with more than 350 from the US and 80 from China (Source: CZNFE).

- *Adopting more integrative policies:* One obvious opportunity is to shift from the traditional SEZ model (fenced-in, customs controlled, with restrictions on what types of firms can be based in the zones, and restrictions on SEZ firms selling to the domestic market) to a more open SEZ regime, that allows for participation by local firms, opens up sales to and from the domestic market. An alternative to adopting a full SEZ model, is the introduction of a “hybrid” zone, including both SEZ and non-SEZ licensed firms (see Box 2). Finally, within existing SEZ models, policies to promote local supply into SEZs (which have been adopted by some, but not all, countries in the region) include:
 - Considering sales of goods and services by a domestic enterprise from the national customs territory to SEZ licensed firms are considered exports, which gives local suppliers benefits as indirect exporters.
 - A domestic enterprise is eligible to benefit from the export incentives available to a national exporter and does not require an export license for the sale of any goods and services to SEZ registered firms.
 - An enterprise in an SEZ may purchase goods and services sold by a domestic enterprise with local currency obtained through conversion of foreign currency through a bank or a licensed foreign exchange bureau.

Box 2: The MPIP at Ghana’s Tema Free Zone: a new approach for integrating local firms with FDI

In order to promote the development of local exporters and facilitate improved supply linkages with FDI, Business Focus of Malaysia and the Ghana Free Zones Board (GFZB), with support from the World Bank, decided to open part of the Tema Free Zone to non-export companies. The board set aside about 70 hectares as a Multipurpose Industrial Park (MPIP). The MPIP is designed to support the development of smaller scale domestic industries and create links with major exporters. Although companies within the MPIP will not have access to a special fiscal and customs regime, MPIP focuses on facilitating competitiveness by establishing critical common infrastructure and cluster-based business support services, such as common packaging and labeling facilities, kiln drying, and warehousing.

The creation of the MPIP represents an innovative shift in the enclave model in Ghana into that of a hybrid SEZ that combines free zone and non-free-zone investors in the same location. MPIP should offer a substantial opportunity for local firms to become better integrated into the supply networks of exporters in Tema.

Source: Farole, T. (2011). Special Economic Zones in Africa: Comparing Performance and Learning from Global Experience. Washington, DC: World Bank.

- *Removing operational and administrative barriers:* As discussed previously in this section, local suppliers often face significant bureaucratic hurdles to enable them to operate on equal footing with foreign suppliers. Chief among these is the duty drawback regime, which is often onerous and, worse, results in long delays in obtaining refunds. The best solution to this is to avoid the requirement of using duty drawback, for instance by allowing for treatment of inputs as in-bond. (Under duty drawback, firms pay the duty and then attempt to later reclaim it. Under an in-bond system, firms do not pay duties, although they could have a bond with the customs authority that can be claimed if necessary. Firms working in SEZs are basically working in an in-bond system.) It is also

important to ensure that the administrative process of clearing goods purchased from the domestic market is as simple as for inputs purchased from abroad.

- *Making proactive efforts to facilitate linkages:* SEZ programs should encourage local supply linkages through formal linkage efforts. These can start with simple informational support, for example establishing a database of SEZ company supply requirements and of local supplier availability and capabilities, and possibly services to match suppliers with buyers. But to be effective, they should also focus on building the competitiveness of potential local suppliers. Box 3 gives an example of a supplier development program that was implemented in Costa Rica.

Box 3: Costa Rica Provee Supplier Development Program

Background

Up until the mid 1990s, Costa Rica's economy was highly concentrated in the natural resources sector (mainly traditional agriculture). However, with the attraction of FDI, and of Intel in particular, in the 1990s, its export and economic structure changed dramatically. Recognizing that sustainability of growth would require the development of more innovative and value-adding domestic firms, the country's government embarked on a program designed to develop enhanced linkages between local SMEs and multinational (MNC) foreign investors. The aim was to support the growth of local SMEs and promote technology transfer to facilitate upgrading.

Description of the program

The *Supplier Development Project for High-Technology Multinational Companies*, a program inspired by Singapore's Local Industry Upgrading Program, was established in 1999. Its aim was to enhance domestic value added in high-technology MNCs' production and improve domestic SMEs' competitiveness. This project had three key components: Pilot Procurement Program; Comprehensive Information System, and the creation of a domestic supplier development office ("Costa Rica Provee".) From 2003 on, Costa Rica Provee operated out of the Foreign Trade Promotion Agency (*Promotora de Comercio Exterior de Costa Rica*, PROCOMER) and in 2005 it became a management unit of PROCOMER.

Costa Rica Provee engages in detecting the needs of multinational companies, identifying business opportunities, and recommending registered suppliers who meet the production, technical, and quality specifications and characteristics required by the business at hand. The work of Provee with domestic suppliers focuses on ensuring their strategic role as MNCs suppliers. For local suppliers benefits include:

- Being part of a highly-qualified supplier network for MNCs.
- Support from a team of professionals from different fields including chemistry, electronics, materials, marketing, and business management.
- No investment required.
- Permanent project follow-up by Costa Rica Provee's staff that ensures fulfillment of MNCs' requirements.

Specific support provided by Provee includes: i) *Technical Support:* This focuses on analyzing goods to be offered to multinational companies. This task is undertaken by Provee's staff, made up of professionals with relevant experience in business development, engineering, industrial chemistry, and business management; and ii) *Diagnosis:* Costa Rica Provee applies evaluation tools aiming at ensuring long-term business relationships, including comprehensive diagnostics in finance, production, marketing, business management, and environmental and quality systems, among others. The aim is to facilitate business deals between multinational companies and domestic suppliers, thus enhancing value-added from Costa Rican industries, as well as the country's global competitiveness.

Results

Between the 2001 and 2006, the number of backward linkages (business transactions) registered by Costa Rica Provee increased from 1 to nearly 140 (from US\$0.8 million to US\$3.2 million). In the medium term, Costa Rica Provee expects that at least 25% of MNCs' goods and services needs would be supplied by domestic companies..

Source: Spar, D.L. 1998. Attracting High Technology Investment: Intel's Costa Rica Plant, FIAS Occasional Paper 11; <http://www.procomer.com/contenido/>.

1.4 SEZs and regional integration

Introduction: SEZs and regional integration – key challenges¹⁹

Both special economic zones and regional trade agreements (RTAs) are policy tools that are meant to promote trade and investment. When the two initiatives exist simultaneously, they have the potential to generate significant synergies. Specifically, by lowering barriers to regional trade and facilitating the potential for realizing scale economies in regional production, RTAs stimulate investment by both domestic and foreign firms. Meanwhile, by providing serviced land, infrastructure, and an improved regulatory environment, SEZs lower the cost and risk to firms in undertaking such investments. In addition, the growth of intra-regional trade may create opportunities for specialized zones, for example, focusing on logistics or cross-border trade.

But while SEZs have this potential to facilitate regional synergies, RTAs often face challenges in incorporating zone regimes into their regulatory frameworks. This stems from the fact that while RTAs represent bilateral or multilateral instruments, SEZs are, in all cases to date, instruments by which an individual country promotes investment and exports, the former at least potentially in competition with their RTA partners. In particular, when SEZ programs provide enterprises with tariff-related incentives, they trigger various issues in the context of RTAs. For example, they may create an incentive for “tariff-jumping” – i.e. when a foreign firm decides to jump over the tariff wall in order to avoid trade costs (tariffs). This might happen through investment of a physical presence in a member country (the traditional definition of tariff-jumping), although in this case the investment would be in an SEZ and not necessarily within the member country's customs territory. But it might also happen without any physical presence at all, by using the SEZ as a means to enter the customs territory.

Specifically, as many SEZs allow duty-free entrance of inputs imported from outside of territory, foreign (extra-RTA) goods could potentially enter the RTA free of duty through an SEZ, and then leak into the customs territory of other RTA member states with little or no value-added

¹⁹ This section is derived from Koyama, N. (2011) “Special Economic Zones in the Context of Regional Integration: Creating Synergies for Trade and Investment” in Farole, T. and Akinci, G. (eds) *Special Economic Zones: Progress, Challenges, and Future Directions*. Washington, DC: World Bank.

taking place within the bloc. This so-called “trade triangulation” would infringe on the tariff collection policies of RTA members, and potentially erode the RTA’s bloc against extra-territory countries²⁰. A second problem with trade triangulation from the perspective of RTA member governments is that it has the potential to undermine foreign direct investment opportunities in the territory. If an RTA prohibits the duty-free entry of SEZ-processed products, foreign suppliers of inputs to SEZ operators may consider setting up an operation in the territory so that their customers and thus they themselves can take advantage of the expanded market access resulting from the RTA. But when duty-free entry is possible through an SEZ, foreign suppliers may have less incentive to invest in a new operation in the territory.

However, if a newly established RTA disallows exports from an SEZ of a member country to the territory of other RTA member countries, the operation of existing SEZ investors may be affected substantially. Consequently, it may necessitate a reform of SEZ programs in member countries in order to prevent a large loss of investment. Furthermore, excluding SEZ investors from taking advantage of the RTA prevents member countries from realizing the full potential of these two trade and investment-generating instruments and achieving effective regional integration.

Overview of current situation – is there any evidence of regional value chain integration in Central American SEZs?

In the context of the typical challenges identified above, the trade policy environment in the region is well set up to facilitate the emergence of production chains across SEZs in various countries. First, as the countries of Central America and the Dominican Republic negotiated the free trade agreement with the US as a bloc, they were able to achieve rules of origin that allow for cumulative origin status – i.e. all value addition that takes place in the region. Second, DR-CAFTA recognized SEZs and free trade zones as part of the countries that are party to the agreement, so that every product manufactured in these zones will be considered as originating from the country in which the zone is established²¹, and will obtain all the benefits of the agreement. Third, the agreement also contributed to facilitating more common and integrated customs procedures, allowing for more efficient trade in parts and components across the region. Finally, at the end of 2011, Mexico signed a free trade agreement with CAFTA countries. Given the critical role Mexico plays in production chains to the US (particularly in automotive, electronics, and other sectors outside Central America’s traditional textile & apparel sector), this offers an important link to facilitate potential production chains in the region.

²⁰ While erosion of the bloc constitutes one of the major reasons why RTAs take measures against allowing duty-free entry of EPZ-processed goods, it is important to note that liberal trade policy argues against generally raising trade barriers against countries outside the bloc, as this would result in trade diversion.

²¹ The free trade zones in Costa Rica used to be considered a third country. But under DR-CAFTA and also the recent free trade agreement with China, the free trade zones have been integrated with the national territory in the treaties.

At the moment, there are still relatively few examples of production chains operating across the region's SEZs. However there are expectations that it will develop, especially in the textile & apparel sector. In **Guatemala**, for example, there are already around 20 textile firms operating under the maquila regime, which are primarily supplying inputs to downstream producers in the country and throughout the region. It is estimated that up to 20% of the country's textile & apparel exports are now going as inputs to other regional producers. Large multinational producers such as Hanes Brands and Gildan have established manufacturing facilities all around Central America and the Caribbean, and are increasingly generating linkages between the different free trade zones. Gildan for example, has a textile manufacturing plant for underwear and active wear in an SEZ in the **Dominican Republic**. This plant not only supplies one of their sewing facilities in the Dominican Republic, but also sewing facilities in **Nicaragua** and **Honduras**. Another large multinational, Grupo M, has launched an innovative production-sharing arrangement between the Dominican Republic and Haiti (see Box 5).

Box 5: Grupo M production sharing between SEZs in Dominican Republic and Haiti

Grupo M was created in 1986, became a conglomerate in 1993 and during the 1990s grew at around 12–15 percent per year for several years. With more than 14,000 workers, it became the largest apparel conglomerate in the region, with up to 24 different firms located in the Dominican Republic, Haiti, and the United States. In the early 2000s, its annual sales averaged US\$200 million. It gained the confidence of some of the best known brands like Polo, Ralph Lauren, Liz Claiborne, Tommy Hilfinger, Hugo Boss, Banana Republic, Timberland, and Nike. Grupo M also built joint ventures with major global suppliers of zippers, chemical producers, and other products, and began producing intermediate products such as yarn, certain fabrics, and labels. However, like all companies in the DR it is struggling to survive in the face of rising competition from Asia.

In response to this challenge, Grupo M has pioneered the implementation of a strategy of production sharing with Haiti. This strategy, sometimes referred to as “twin-planting”, “production sharing” or “coproduction”, involves sending the most labor intensive operation (assembly) to Haiti and sending them back to Dominican Republic for finishing (washing and packaging) and export. This is being done in two factories in Haiti – one for Levi's jeans and another for Sara Lee T-shirts. Grupo-M takes advantage of lower wages in Haiti and also of its status of LDC country, which allows Haitian apparel to enter duty free into the USA, even when the fabric is not of US origin. The advantage of purchasing fabrics in Asia rather than the regional market is significant, as the price differential can be as much as 30 percent.

A very important feature of the Grupo M model is CODEVI, a division of the group established in Haiti, which supplies 6.8 million pants, 2.9 million dozen shirts and 2.4 million ladies intimates each year to U.S. leading brands – from concept to retail. The CODEVI free zone, where these activities are carried out was created with the support of IFC on the border with the Dominican Republic. CODEVI is a private zone owned and operated by Grupo M. Exports of the zone were expected reach US\$120m in 2009. The company already employs 4,000, and plans to create 5,000 more jobs in the next five years.

This program not only has an important socio- economic impact, but also has been possible thanks to the rules of origin established in CAFTA – DR that allow partial processing in Haiti, even though this country is not part of the Agreement.

Source: Burgaud, J-M. (2010). Unpublished paper for World Bank.

Integration across SEZs has been more common in the production chains linking firms in Central American SEZs with firms in Mexico (and ultimately to end markets in the US). For example, recent investments in wire harness production in Nicaragua's SEZs are destined for automotive assembly operations in Mexican maquilas. A similar relationship is evident in other products, like integrated circuits from Costa Rica, and apparel from Guatemala²².

The barriers to regional SEZ integration in Central America

The biggest barrier to the emergence of regional production chains taking advantage of the SEZs is the lack of complementarity in the countries' production bases and, more deeply, in their endowments. With the notable exception of Costa Rica (which, because of dominance of Intel, is somewhat disconnected from the regional production chain), the rest of the region produces mainly agricultural products and, inside their SEZs, apparel and miscellaneous light manufacturing. More importantly for these SEZ produced goods, the nature of production in all countries is low-skill assembly. Indeed, the specific good is somewhat irrelevant – essentially what is being exported is low wage labor. This places a serious limitation on the prospects for regional integration of production, as this relies mainly on *vertical* integration of the production chain, which in turn relies on either: 1) countries having specializations relevant at different stages of production (as already discussed above); or 2) countries having specialized endowments (inputs).

Regarding the second point on endowments, the sectoral specialization of SEZs in the region represents a potential barrier to regional integration of SEZs, as the focus on apparel, automotive, and other GVC-linked light manufacturing takes no advantage of regional resources endowments or production capacities. The story might be somewhat different if there was greater production in agri-processing activities.

This lack of complementarity contributes to a second barrier to integration linked to the SEZ regimes – the “race to the bottom” competition for attracting FDI. Table 8 summarizes the incentives offered to investors in SEZs – as is clear these are not only highly generous, but also highly standardized across countries. Indeed, only Nicaragua and Costa Rica have time limits on the corporate tax exemption. Using such blunt (and generous) instruments of investment attraction inevitably contributes to all countries seeking the same set of investors carrying out the same set of activities. This situation is somewhat mitigated in the region by the strong role of the private sector in developing and operating the SEZ industrial parks. This opens up the potential for the development of facilities and infrastructure designed to capture different types and levels of foreign investors. As discussed previously, this has already contributed to the establishment of “higher value added” industrial parks in Costa Rica and the Dominican Republic, as well as

²² Hornbeck, J.F. (2012). The Dominican Republic-Central America United States Free Trade Agreement (CAFTADR): Developments in Trade and Investment. <http://www.fas.org/sgp/crs/row/R42468.pdf>

parks designed specifically for BPO activities, again in these two countries as well as El Salvador.

Table 8: Tax exemptions available to SEZ firms

	Import taxes	VAT	Municipal taxes	Income tax	Other taxes
El Salvador	✓	✓	✓	✓ - no time limit	
Guatemala	✓	✓		✓ - no time limit	✓ ¹
Honduras	✓	✓	✓	✓ - no time limit	✓ ²
Nicaragua	✓	✓	✓	✓ - limited	✓ ³
Costa Rica	✓	✓	✓	✓ - limited	✓ ⁴
Dominican Republic	✓	✓	✓	✓ - no time limit	✓ ⁵

Source: Developed by the team at Araújo Ibarra y Asociados, 2012.

Explanatory notes:

- 1- Elimination of Sales Taxes and Property Sales Tax on properties located in the zones; elimination of Stamp Duties that apply to documents to transfer properties located in the zones.
- 2- The country has been designated a free trade zone. 100 percent exemption for export taxes, taxes on real estate disposal, exoneration on operating earnings.
- 3- Complete tax exemption for products made in the zone, exemption on export taxes for products made in the zone, exemption on real estate disposal taxes.
- 4- Exemptions on remittances, exemptions on vehicle imports and exemption on taxes to transfer properties and municipal taxes.
- 5- Exemption of the tax to transfer real estate.

A third barrier to integration that is specific to the SEZ regimes is the tendency, as discussed previously, of these regimes to place local suppliers at a disadvantage relative to international suppliers. One of the main solutions to increasing the embeddedness of FDI in the local economy, as well as to addressing WTO incompatibility of SEZ regimes, is to open up SEZ-based firms to sell into domestic markets. However, opening up can have unintended consequences, at least in the short term, on domestic firms. If SEZ-based operators, including those engaged in trading of foreign equipment and inputs are allowed to sell their products to local producers in RTA member countries, they risk crowding out immature local suppliers. Thus, local producers, even with greater access to suppliers in another member country of RTA, may choose to purchase foreign inputs through SEZ-based operators, who may be able to offer both a cost and quality advantage. While on the one hand this should improve the competitiveness of local producers (through their access to higher quality, lower cost inputs) at least in the short term, it may also curtail the effectiveness of the RTA in nurturing local suppliers and promoting local vertical industrial linkages.

Conclusions – achieving greater regional integration through SEZs

In order to take better advantage of the potential of SEZs and regional integration, it is important for countries in the region to take a collaborative approach to harmonize their SEZ programs. There are several potential areas in which the complementarities between SEZ and RTA could be better exploited, including:

- *Harmonizing SEZ regulations*: More attractive regulations, infrastructure, or incentives may help a country to win an investment over its neighbors, but harmonized SEZ regulations and integrated procedures (most importantly customs) across an RTA may be a powerful tool through which to compete against other regions. Perhaps most importantly, such a harmonized approach then allows SEZs in each member country to compete for incoming investment based on their own sources of comparative advantage. And by harmonizing under the framework of a regional arrangement, individual governments are also less likely to change their regulations, improving predictability for investors. Harmonizing regulations is, of course, more easily said than done. Even when some member countries are ready to simplify and harmonize the regional rules, others, especially those that are economically lagging, may see offering more favorable / liberal SEZ rules as a potential means of attracting investment and “catching up” to their neighbors. One potential solution is to set a transitional period to allow each member to discuss with existing investors and adjust their national SEZ policies.

Box 6: Harmonizing SEZ programs in the East African Community

As a rare example, the East African Community (EAC) customs union composed an extensive annex to establish a common regulatory framework on export processing zones (SEZs) in the member countries. As Article 2 of the regulations state, they were created to ensure that the process regarding SEZs is “*transparent, accountable, fair and predictable*”. They first define the terminologies related to SEZs, including “SEZ” itself, “export”, and “duties and taxes”, so that these words are used by all member countries in consistent meaning. They also set out permitted activities in SEZs, the establishment and function of competent authorities, and stipulate how SEZ-processed goods are treated when entering into the territory and how complaints are to be resolved.

The Investment Climate Advisory Services (CIC) of the World Bank Group is engaged by a multi-donor facility to work with EAC to promote its regional trade in the region, and part of work covers the advisory for SEZ programs. As of April 2009, the Global SEZ team of CIC has assessed the current SEZ programs in the region and made some preliminary recommendations on harmonization to the EAC and host governments. In terms of spatial mapping, most of the region’s zones are located close to the major transport corridors. Given the considerable upgrading of these infrastructure networks that facilitates smooth and cost-effective transport among SEZs, the CIC team suggested the EAC countries to consider developing regional linkages since current manufacturers in SEZ have very limited transactions among them and their capacity for specialization is limited. Other recommendations include the joint marketing of SEZs for priority sectors such as ICTs considering the importance of sectors for all member countries as well as the small size and resources of each single country. These are preliminary recommendations, and EAC member countries have not yet taken any significant steps to implement them. Yet, they have made first steps to unify the regulatory framework and establish competent authorities who are to have similar powers across member countries. How effectively the EAC member states build on this common ground and integrate their SEZ program is likely to play an important role in ensuring that they take full advantage of the new customs union and transport facilities to achieve greater regional integration, more effective trade and investment, and ultimately more rapid and sustainable growth.

Source: Koyama, N. (2011) “Special Economic Zones in the Context of Regional Integration: Creating Synergies for Trade and Investment” in Farole, T. and Akinci, G. (eds) Special Economic Zones: Progress, Challenges, and Future Directions. Washington, DC: World Bank.

- *Harmonizing financial incentives:* As discussed above, “race to the bottom” fiscal competition is already a significant problem in the region, which risks eroding tax bases without necessarily attracting more investment than they otherwise would – in effect, transferring rents directly to (usually multinational) investors. As is the case with regulatory harmonization, removing or unifying financial incentives among member countries takes time, especially if some member countries have established SEZ programs in which many investors are already granted with permanent exemption or reduction of tariffs or other taxes. Discussions with authorities in the region indicate that while they are individually not opposed to standardizing the fiscal incentive regimes (indeed, it is an optimum time for many of them given the requirements to comply with WTO prohibitions on subsidies), they do not see it as viable, primarily as certain countries in the region (Nicaragua and Honduras) are not yet obligated by the WTO to adjust their programs.
- *Harmonizing the strategic framework:* Ideally, an regional arrangement would establish an integrated strategic framework for SEZ programs of member countries, not only establishing rules of the game with respect to financial incentives, but more broadly, enabling them to complement each other’s resources and capacities and cooperate to achieve shared goals. An integrated strategic framework can take several forms. One such form is to develop regional manufacturing or service linkages, using the SEZs as hubs. By combining and coordinating their efforts to strategically foster SEZ-based clusters that take advantage of complementary endowments of different member countries, member countries can assist sectors to leverage SEZ infrastructure and RTA depth to overcome limitation of scale and specialization. This might facilitate improved backward linkages in critical sectors like garments. Such integration of regional value chains within SEZs might also represent an important test case toward deeper regional economic integration. Cooperation on a strategic framework can also take a form of co-branding and co-marketing of SEZs in the region. Members of an RTA typically promote investment by advertising the potential to access the wide regional market. In this context, it would be natural (and certainly cost effective, particularly for small countries with limited investment promotion budgets) to also consider advertising the region’s SEZs collectively as investment destinations.

Box 7: Growth triangles in East Asia

In 1993, Indonesia, Malaysia, and Thailand launched the sub-regional growth triangle – the “transnational export processing zone” – in order to accelerate their sub-region’s economic growth and industrial transformation. As growth triangles create greater economies of scale and allow firms to exploit complementarities and comparative advantages of member countries in various production factors such as natural resources, low labor costs, and technology, they may offer greater potential to attract investments than standalone SEZ programs. In addition to the coordinated investment in infrastructure and human resources, the governments of these three countries are trying to harmonize regulations governing investment, tax, land, labor and immigration, and customs to market this sub-region effectively to investors. This growth triangle is fostering economic expansion of participating regions through industrial linkages and by positioning the area as an integrated manufacturing base of various high value-added products. These linkages have contributed to developing advanced manufacturing as well as research and development capacity across the region. Many other sub-regions followed similar triangle initiative, including the SIJORI growth triangle between Singapore, Johor in Malaysia and Riau Island in Indonesia.

Source: Koyama, N. (2011) “Special Economic Zones in the Context of Regional Integration: Creating Synergies for Trade and Investment” in Farole, T. and Akinci, G. (eds) Special Economic Zones: Progress, Challenges, and Future Directions. Washington, DC: World Bank.

1.5 SEZ Summary and conclusions

The section provided a summary of the role, progress, and challenges of special economic zones in Central America. Several main messages and conclusions emerge:

1. SEZs are somewhat less important than they have been in the past, but they still play a critical role for the region, particularly for the export sector.
2. Despite a continued reliance on the textiles & apparel sector (particularly for the lower income countries in the region), the SEZs are beginning to diversify, and regional production chains are beginning to emerge.
3. However, traditional export processing activities are not likely to remain sustainable as a driver of investment and exports from the zones. While this type of activity played an important role in the structural transformation of the region over the past several decades, it is now running up against its limits.
4. In considering the challenges the region faces in terms of export concentration, low value added and weak linkages between FDI and local suppliers, it is important not to overstate the role of SEZs – they are not the main culprit, but nor are they main solution. Indeed, traditional export processing zones rarely resolve the root causes of competitiveness. While they streamline company establishment, facilitate customs procedures, and provide some improved infrastructure, SEZ-based firms still face many of the same barriers to competitiveness that hinder firms in the domestic economy, including transport, communications, skills, and governance issues. In some ways the generous tax incentives offered through the SEZs provide an illusion of competitiveness, while taking off the pressure to directly and forcefully address the competitiveness issues.

5. This suggests that more attention, effort, and resources need to go into addressing the supply side challenges to competitiveness in the region. Most important among these is sustained investment in building skills, including through vocational training as well as basic and higher education. This is obviously an expensive and long term endeavor. In this context it is important that the SEZs do not act as a barrier (either from the perspective of resource utilization or political economy) to wider competitiveness reforms.
6. But given that FDI remains critically important to the region in developing non-traditional sectors, zones may still have an important role to play, particularly given the fact that they are already well-entrenched as primary instruments of trade and investment in all countries.
7. In this context, a number of steps could be taken to improve the overall effectiveness and efficiency of the special economic zones regimes in the region. These include:
 - a. Shifting away from the traditional EPZ models (including the common practice of individual firm free zone licenses) to more flexible, multi-purpose SEZs, which provide secured land, world class infrastructure and logistics, services, and the advantages of clustering.
 - b. In parallel with the above, bring together the wide range of current zone legal categories and incentive schemes under the framework of SEZs; in doing so reduce and simplify the fiscal incentives.
 - c. Given the particular importance of and opportunities to develop services exports, more serious attention should be paid to ensuring that the regulatory regime, infrastructure, and services available in the SEZs are effective to facilitate competitive BPO and other services activities.
 - d. Put in place active SEZ-local supplier linkage programs and consider the feasibility of operating such a program at the regional level to take better advantage of scale and scope of supply as well as to promote integrated regional production chains.
 - e. Invest further in training of workers within the SEZs, in line with the standards and skills required by companies in the SEZs. This could be achieved through a skills levy on SEZ firms, for example.

2. Science, Technology, and Innovation Systems

In general, Central America ranks behind the rest of the region in its performance in science, technology, and innovation. The World Economic Forum’s Global Competitiveness Report ranks Central American countries behind most of the region in most of its measures related to innovation (See Table 9). The rankings listed in the table are based on the results of surveys of business executives in each country. Costa Rica performs well and could potentially be a regional leader in this field. It is important to note that Guatemala and Panama have decent rankings in some of the measures.

Table 9: Innovation Indicators in Central America (Rankings out of 142 Countries)

	El Salvador	Guatemala	Honduras	Nicaragua	Costa Rica	Panama
Overall Innovation	127	91	101	130	35	72
Capacity for Innovation	115	69	88	111	40	98
Quality of Scientific Research Institutions	133	103	111	131	31	70
Company Spending on R&D	122	63	82	123	35	69
University/Industry Research Collaboration	112	55	85	121	35	66

Source: World Economic Forum, Global Competitiveness Report 2011-2012

However, given the low levels of income in many Central American countries, some of these measures may not be the most appropriate to consider. For example, the “Capacity for Innovation” measure assigns a low value to licensing and imitating foreign companies and a high value to conducting research and pioneering new products. A recent study suggests that focusing on less sophisticated measures of innovation, such as technology adoption and knowledge transfer, may be more appropriate to the context.²³ For example, the World Economic Forum ranks Costa Rica and Panama in the top five of 142 countries for attracting FDI as a mechanism for bringing in new technology.

Knowledge and technology transfer can also occur through collaboration with universities and research centers. As the World Economic Forum rankings suggest, most countries in Central America do not have much collaboration between universities and firms. Linkages are necessary to facilitate the transfer of knowledge from the universities and research centers (the supply) to the private enterprises that apply the knowledge (the demand). Such linkage mechanisms spread the costs and risks and help to develop networks of knowledge. National innovation systems should facilitate this transfer of knowledge and interaction among stakeholders.²⁴

²³ Guasch, José Luis, Liliana Rojas-Suarez, and Veronica Gonzales. “Competitiveness in Central America: The Road to Sustained Growth and Poverty Reduction.” Center for Global Development. 2012.

²⁴ Ibid.

Also, given the size of the economies, coordination of efforts across countries, particularly the governments' roles in addressing market failures in technology adoption, could be advantageous. Some efforts are underway for this type of coordination, but little visible progress has been made. The next section reviews regional initiatives in science, technology, and innovation. It then describes initiatives in the European Union that could provide important lessons for Central America. The section concludes with recommendations for increasing integration of science, technology, and innovation initiatives in Central America.

2.1 Regional Initiatives

Commission for Scientific and Technological Development in Central America, Panama, and the Dominican Republic (CTCAP). This initiative was started under the SICA umbrella. The objective of the commission is to integrate, coordinate and strengthen the regional system in science and technology through the formulation and implementation of policies and strategies as well as the coordination of the execution, follow-up, and harmonization of the policies approved by other authorities. The Commission involves the relevant government agencies from each country, including:

- The Ministry of Science and Technology of Costa Rica;
- The National Council of Science and Technology of El Salvador;
- The National Council of Science and Technology of Guatemala;
- The Science and Technology Council of Honduras;
- The Science and Technology Council of Nicaragua; and
- The Ministry of Science, Technology, and Innovation of Panama

The CTCAP has developed the Central American Strategic Plan on Science, Technology, and Innovation (2008 -2018) to promote cooperation among the National Systems and to link the productive sector, universities, and government institutions. The Plan identifies six key programs that should contribute to regional development of science, technology, and innovation.

1. *Knowledge Management and Innovation Regional Program*: The objective of this program is to create teams of promoters of knowledge and innovation in universities, research centers, companies, production associations and government entities with the capacity to plan, conduct and disseminate activities that show the impacts of innovation in society, and promote partnerships among all stakeholders.
2. *Regional Networks of "Centers of Excellence"*: The objective of this program is to create networks of universities, research and technology development centers, establishing partnerships with productive sectors in order to implement advanced strategies for research and human capital formation, and high connectivity to global networks of R&D and innovation.
3. *Innovation Culture Promotion in Productive Sectors*: The objective of this program is to stimulate a culture of technological innovation and R&D in productive sectors, aiming at increasing the region's competitiveness to improve its share in the global market.

4. *Technology-based Entrepreneurship Program*: The objective of this program is to encourage technology-based firms' creation and incubation in order to contribute to the transformation of the productive sectors and to promote the skills of entrepreneurship in the region.
5. *Science, technology, and innovation empowerment in local communities*: The objective of this program is to create awareness of the importance of knowledge as a mechanism of human development and to promote science and technology in local communities through the implementation of different activities in schools and universities.
6. *Regional System of Science, Technology, and Innovation Funding*: The objective of this program is to integrate a regional funding system in order to increase the amount of resources available for financing R&D and innovative practices.

In each of the above-mentioned programs, the plan describes activities, entities involved, and indicators. For example, for the Innovation Culture Promotion program, activities planned include the creation of a regional prize for technological innovation for firms and the establishment of innovation networks and technological parks. Participants listed include universities, private chambers, and firms. Donors and multilateral institutions, such as the European Union and the Inter-American Development Bank, are expected to be involved in these programs. However, none of the publicly available information indicates if there are specific actions planned for any of the listed activities or if there are estimated budgets. Although some progress has been made to advance this agenda, few of these efforts have been publicized.

The Ibero-American Program for Science, Technology, and Development (CYTED).²⁵ The CYTED Program is an intergovernmental multilateral Science and Technology cooperation program, which aims to combine different perspectives and visions to promote cooperation in research and innovation for the development of the Latin America region. Almost all of the science and technology institutes in the region are members of this program, including the institutes of the six Central American countries.

The principal objective of the CYTED Program is to contribute to the harmonious development of the region through cooperation in science, technology, and innovation. The program promotes integration of the scientific communities by encouraging shared priorities. CYTED promotes research and innovation as essential tools for social and technological development, as well as for productive modernization and greater competitiveness for economic development. It encourages technology and knowledge transfer by establishing mechanisms for cooperation between research groups of universities, R&D centers and innovative companies in Latin American countries. The program also works with the European Union to encourage interregional cooperation.

²⁵ CYTED website. <http://www.cyted.org/index.php?lang=en>

The CYTED Program has created 210 Thematic Networks, 197 Coordination Activities, and 4 Consortium Research Projects. The program also implements a successful innovation project called IBEROEKA. The project is designed to bring close collaboration between companies and research centers and to increase the productivity and competitiveness of the national industries and economies. With this project, companies generate ideas, choose partners, and decide on their plan for collaboration. Financing for each project comes from the individual countries' science and technology institutes, but the program provides access to all of CYTED's knowledge and networks, including the possibility of greater financing. Thus far, there have been 633 IBEROEKA Innovation Projects, involving the participation of over 10,000 Latin American scientists and technicians. In one example, a Costa Rican firm has partnered with a Spanish firm to obtain almost US\$800,000 to refine a process to minimize sugar loss during honey production, which is expected to increase yields and prices.

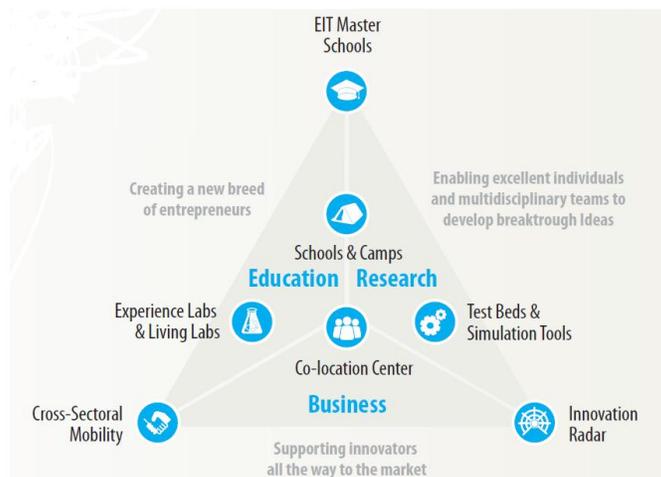
2.2 International Experience: EU's Knowledge and Innovation Communities²⁶

Despite being at different levels of development and sophistication, experience from the EU is relevant to Central America because although specific activities may be very different, EU innovation programs serve as models for collaboration that are applicable elsewhere. The European Institute of Innovation and Technology (EIT), an entity of the European Union, has created Knowledge and Innovation Communities (KICs) to facilitate technology adoption and knowledge transfer. KICs are highly integrated partnerships that bring together the fields of education, technology, research, business and entrepreneurship, in order to produce new innovations and new innovation models. Partner organizations must be established in at least three different EU Member States and must include at least one higher education partner and one private company. Key actors include: businesses (including SMEs); entrepreneurs; research and technology organizations; higher education institutions; investment communities (private investors and venture capital); research funders, including charities and foundations; local, regional and national governments.

The EIT has thus far established three KICs covering the following topics: 1) Climate change mitigation; 2) Information and communication technologies (known as ICT Labs); and 3) Sustainable energy. The ICT Labs KIC members include some of Europe's leading universities, research institutes, and companies in the field. The objective of the program is to make Europe a global leader in ICT innovation. The EIT ICT Labs program works with co-location centers in the participating organizations and finances activities to catalyze innovation and new business creation. The program works with the different arms of innovation – education, research and business (see Figure 3). The model recognizes that strong collaboration among these different arms is necessary to push innovation. Catalyst programs can be applied to “carrier” activities that are usually co-funded projects in all three arms.

²⁶ European Institute of Innovation and Technology. <http://eit.europa.eu/kics/>

Figure 3: EIT ICT Labs Model



Source: EIT, <http://eit.europa.eu/kics/>

Co-location centers are also used for the sustainable energy program – KIC InnoEnergy. KIC InnoEnergy is a consortium consisting of 30+ shareholders and additional 50+ partners - companies, research institutes, universities and business schools covering the whole energy mix. They are organized around six regional Co-Location Centers, and each one coordinates one important energy topic, such as sustainable renewable energy and energy-efficient buildings and cities.

Achievements include:

- i) In education, 146 students in their Masters Programs, 28 engineers in their PhD schools, 21 professionals in their executive programs;
- ii) In technology, 33 new patents and products and services;
- iii) In business creation services, 52 new ventures nurtured in their incubators for entrepreneurs in sustainable energy.

2.3 Recommendations

From an integration perspective, regional initiatives should focus on facilitating knowledge transfer and linkages. The region has the basic structure to build and expand upon existing programs and to implement some new ones, based on successful examples.

For example, the CTCAP could play a stronger leadership role in coordinating and harmonizing innovation policies across the countries. It could work directly to encourage inter-country collaboration among firms, universities, governments, and other research institutions. CYTED provides some models for how to develop these networks. The CTCAP could also take a

leadership role in developing regional hubs for disseminating technical knowledge, similar to the European Union's KICs program.

As the KICs program recognizes, collaboration among education, business, and research not only develops smart innovations, it also promotes a culture of innovation. There are several public and private institutions with a strong presence in the region such as the INCAE's Research Center in Costa Rica, the Zamorano R&D Agro-industrial Plant (Planta Agroindustrial de Investigación y Desarrollo²⁷) in Honduras, and the Center for the Development of the Packaging Industry in El Salvador. These institutions could play a key role in promoting collaborative networks and in doing so, expanding their knowledge and services throughout the region. Linking these institutions with others in Latin America or other regions could also assist the development of knowledge networks.

In addition, Central America has strong countries such as Costa Rica and Panama that could be champions in the implementation of integration initiatives. Costa Rica during the last years has made significant progress increasing its investment in R&D, innovation, and technology development. Considering that the proposed integration initiatives include the attraction of stakeholders from universities, research institutions, and businesses and that Panama and Costa have experience with these types of programs, they could potentially take on a leadership role for regional efforts.²⁸

²⁷ <http://www.zamorano.edu/dagi/infraestructura/parque-agroindustrial/planta-agroindustrial-de-investigacion-y-desarrollo-paid/>

²⁸ Panama has an international Technopark called the City of Knowledge. It is a government-sponsored cluster developed to promote and facilitate collaboration between universities, research centers, businesses, and international organizations.

3. Quality Systems

As the pace of global trade increases, the quality of goods has become a more important factor for export success. Quality services are necessary to prove that products and services meet certain standards and requirements. Governments play an important role in facilitating increasing the quality of products by developing sound national quality systems. A national quality system consists of the public and private entities required to establish and implement standardization, metrology, inspection, testing, certification, and accreditation. In most countries, the main public institutions involved in quality services are a national metrology laboratory, an accreditation agency, and a standards body. Box 8 defines the entities involved in a national quality system.

Box 8: Components of a National Quality System

Inspection bodies and testing laboratories. Inspection and testing help show that a product or process satisfies technical requirements – determining its features and performance. A firm can contract independent testing laboratories or inspection bodies to prove that a product or process conforms to certain characteristics.

Certification bodies. Third-party certification is assurance by an independent certification body that a product, service, system, process, or material conforms to standards or specifications. Manufacturers and service providers can have their products or management systems certified to certain standards to distinguish themselves from less reputable suppliers.

Calibration laboratories. Calibration involves determining the relationship between an instrument's input and the magnitude or response of its output. Calibration laboratories can be internal, serving only the needs of a firm, or commercial. In commercial labs, calibration serves industrial producers, testing laboratories, inspection bodies, research laboratories, universities, and other final users.

National standards bodies. National standards bodies bring together public and private stakeholders to develop official national standards. Standards bodies usually adopt standards through consensus and publish them to make them available to industry, public institutions, and consumers.

National accreditation bodies. Accreditation is the procedure by which an authoritative body gives formal recognition that an organization is competent to conduct specific tasks. Conformity assessment bodies – such as certification bodies, inspection bodies, and testing and calibration laboratories – can seek accreditation on a voluntary basis as proof of competence in a given area. The accreditation body evaluates the personnel and management of candidates for accreditation and can request practical tests for laboratories when relevant. Most countries have a single national accreditation body responsible for all areas of accreditation.

National metrology institutes. A national metrology institute establishes the national measurement system used to maintain, develop, and diffuse measurement standards for basic units and to diffuse metrological expertise throughout the economy. These institutes operate in the primary calibration market: they disseminate measurement standards by providing calibration services to independent calibration laboratories and other organizations responsible for regulations and standards. Countries often have a single national metrology institute. But when there are several each is responsible for distinct measurement areas.

Source: Racine, Jean-Louis, ed. *Harnessing Quality for Global Competitiveness in Eastern Europe and Central Asia*. World Bank. 2011.

For Central America, Guasch et al.²⁹ cite two important reasons for why these countries need fully-functional quality systems. The first is that recent trade agreements, particularly DR-CAFTA, give Central American countries increased opportunities to sell their products internationally. Export goods must meet international consumer expectations and international legal, health, safety, and environmental requirements. Also, with the increased availability of high-quality imports, domestic consumers are becoming more quality conscious. The second reason is that local access to quality infrastructure is important to help SMEs meet international quality standards. SMEs need access to national, regional, and international standards and technical regulations; internationally recognized calibration of measuring instruments and testing; and certification of products and management systems.

Overall, the quality systems in Central America are not able to fully meet the needs of firms. Given the small size of the Central American countries, the demand for quality services may never be very high. Although basic local services are important, more sophisticated needs could be coordinated at a regional level. The following section provides more detail about each country’s system and regional efforts at coordination. This part concludes with recommendations for improving each country’s systems and for improving regional cooperation.

3.1 Quality Systems in Central America

All of the Central American countries have the basic public structures necessary to further develop their incipient quality systems. Each country has a national metrology institute, an accreditation body, and a standards body (see Table 10).

Table 10: Quality Infrastructure – Public Entities in Central America

Country	Accreditation Body	Metrology Institute	Standards Body
El Salvador	Consejo Nacional de Ciencia y Tecnología (CONACYT)	Consejo Nacional de Ciencia y Tecnología (CONACYT)	Consejo Nacional de Ciencia y Tecnología (CONACYT)
Guatemala	Oficina Guatemalteca de Acreditación (OGA)	Centro Nacional de Metrología (CENAME)	Comisión Guatemalteca de Normas (COGUANOR)
Honduras	Oficina Hondureña de Acreditación (OHA)	Centro Hondureño de Metrología (CEHM)	Organismo Hondureño de Normalización (OHN)
Nicaragua	Oficina Nacional de Acreditación (ONA)	Laboratorio Nacional de Metrología (LANAMET)	Dirección de Tecnología, Normalización y Metrología (DTNM)
Costa Rica	Ente Costarricense de Acreditación (ECA)	Laboratorio Costarricense de Metrología (LACOMET)	Instituto de Normas Técnicas y Certificación (INTECO)
Panama	Consejo Nacional de Acreditación (CNA)	Centro Nacional de Metrología (CENAMEP)	Comisión Panameña de Normas Industriales y Técnicas (COPANIT)

Source: Author’s elaboration.

²⁹ Guasch, Jose Luis, Liliana Rojas-Suarez, and Veronica Gonzales. “Competitiveness in Central America: The Road to Sustained Growth and Poverty Reduction.” Center for Global Development. 2012.

There is little international recognition of the accreditation public bodies. Mutual recognition agreements (MRA), where two or more accrediting entities agree to provide equal recognition to all programs accredited separately by each one of the entities who are parties to the accord, is generally an indicator of international recognition. One of the more important agreements, with 77 signatory bodies, is the International Laboratory Accreditation Cooperation Mutual Recognition Agreement (ILAC MRA). The purpose behind this program is to facilitate international trade because when labs are accredited by a recognized body, products will not have to be tested again for export. This feeds into the “Tested Once, Accepted Everywhere” concept behind accreditation. Ultimately, when there is confidence in testing and calibration results, this can help reduce some technical barriers to trade. In Central America, only the accreditation bodies in Costa Rica and Guatemala have signed the ILAC MRA in testing and calibration facilities.³⁰

The Inter-American Accreditation Cooperation (IAAC) maintains a Recognition Agreement for the Americas. In this system, Costa Rica, Guatemala, Panama, and Nicaragua are full members, meaning they are “legally established and operating in the nations or bloc of nations of the Americas, that declare in the membership application that they are committed to operate according to the requirements of ISO/IEC standards, guides and the relevant international documents of IAF and ILAC.” Honduras is an associate member since its accreditation body does not yet operate according to ISO/IEC standards.³¹ The IAAC serves an important regional role, but the ILAC is more important for global trading purposes.

In 2006, under the auspices of SICA, a Central American Forum for Accreditation (FOCA) was established. The national accreditation agencies of all six countries signed an agreement to have FOCA function as the “technical mechanism of regional discussion, cooperation, and coordination among the accreditation agencies of Central America.” Its tasks include the increased harmonization of policies and criteria for accrediting entities and promoting awareness of the importance of accreditation.³² FOCA could serve as model for regional coordination in other areas of quality infrastructure.

In standards, countries world-wide are moving toward regional and international integration. The movement toward adopting international standards comes with the increased interest in eliminating trade barriers. Membership in the International Standards Organization (ISO) allows countries to influence the most used international harmonized standards. In Central America, only the standards institutions of Costa Rica and Panama are full members of the ISO. As full

³⁰ <http://www.ilac.org/ilacarrangement.html>

³¹ <http://www.iaac.org.mx/Documents/Controlled/Administrative/AD%20002%20IAAC%20Bylaws.pdf>

³² SICA – FOCA website.

http://www.sica.int/centro_documentacion/inst/sgsica/Foro%20Centroamericano%20de%20Acreditaci%C3%B3n%20de%20Organismos%20de%20Evaluaci%C3%B3n%20de%20la%20Conformidad%2028FOCA%29.pdf

members, they can help develop and influence ISO standards. Guatemala, El Salvador, and Nicaragua are correspondent members, meaning they can observe standard development at policy meetings and have full access to information. Honduras is a subscriber member and cannot attend meetings but can keep up-to-date on the ISO's work.³³

Progress toward harmonizing standards in Central America has advanced more recently. Discussions for establishing a customs union date back to the 1950s and harmonization of norms has been one of the obstacles impeding its establishment.³⁴ SIECA with help from the European Union, established a Program of Support for the Design and Application of Central American Common Policies (ADAPCCA) covering policies, such as norms and standards, related to the customs union. The program, similar to FOCA, provides a mechanism for discussion of harmonizing policies. Progress has been made in harmonizing policies in specific sectors. In one instance, in 2011, the countries harmonized their rules on what constitutes organic agriculture. The rules, based primarily on Costa Rica's requirements, will help the countries meet World Trade Organization (WTO) standards as well.³⁵

In metrology, all of the countries provide some metrological services. Metrology, the science of measurement and its application, is necessary because reliable measurements ensure quality industrial production, trade fairness, and consumer protection among its other benefits. For example, accurate and reliable measurements can determine if water is potable and therefore protect human health. Such precise measurements require expensive equipment in specialized laboratories and trained specialists. The metrological infrastructure is made up of both private and public laboratories. In smaller countries, a national institute may play multiple roles – realizing and maintaining measurements and providing commercial and legal metrology services.³⁶ In most of Central America, the national metrological institutes provide most of the services available in the country.

Germany's national metrology institute, PTB, has studied the availability of metrology services in Central America and where there is unfulfilled market demand for services.³⁷ Table 11 provides a summary of the basic services available from each national metrology institute. However, it is not enough that these institutes provide measurement services. Back-up of measurements occurs through accreditation of services, calibration and measurement capabilities (CMC) recognized in an international MRA, and inter-comparisons. Back-ups are necessary to build confidence in the measurements and encourage international acceptance of the results. As

³³ ISO website. http://www.iso.org/iso/home/about/iso_members.htm

³⁴ Estado de la Region.

³⁵ Barquero, Marvin. "Centroamérica unifica reglas para la agricultura orgánica." La Nación. <http://www.nacion.com/2011-03-14/Economia/NotasSecundarias/Economia2711485.aspx>

³⁶ Racine, Jean-Louis, ed.

³⁷ PTB and others. *Quality Infrastructure for Competitiveness: Plan of Action to Strengthen Basic Capabilities of Metrological Services in Central America and the Dominican Republic*. September 2010.

seen in Table 11, in a basic range of services, besides Costa Rica and Panama, most countries do not have sufficient back-ups of their measurements.

Table 11: Availability of Services from the National Metrology Systems

	El Salvador	Guatemala	Honduras	Nicaragua	Costa Rica	Panama
Balances ³⁸	○	n/a	○	○	○	○
Dimensional (length)	○	n/a	n/a	○	◐	○
Electricity	○	n/a	○	n/a	●	●
Mass ³⁹	◐	◐	◐	○	●	●
Temperature	○	○	○	○	●	●
Volume	○	○	○	○	●	◐

○ Service available, but not sufficiently backed-up with accreditation, CMCs, and inter-comparisons

◐ Has more than 50% of the needed back-up

● Has CMC or accreditation and inter-comparisons happen regularly

Source: Author's elaboration based on PTB study

Given the precise nature of this work, traceability, accreditation, and mutual recognition are important to ensure the reliability of measurements. A measurement is traceable to a reference standard when its value can be related through an unbroken chain of comparisons with known uncertainties to that standard.⁴⁰ For example, Guatemala's mass measurements are traceable to Mexico's National Metrology Center. If a laboratory, public or private, obtains an accreditation under the international quality system standard ISO/IEC 17025, then they have demonstrated that their measurements are traceable to proper reference standards of known uncertainty. In metrology, mutual recognition arrangements provide a framework for the formal recognition of national measurement standards and calibration capabilities. Under the International Bureau of Weights and Measures, the International Committee for Weights and Measures Mutual Recognition Arrangement (CIPM-MRA) establishes the degree of equivalence of national measurement standards maintained by national metrology institutes (NMIs), and guarantees that MRA signatories will accept measurement results that are traceable to the NMI.⁴¹ Costa Rica and Panama are the only Central American countries that have signed the CIPM-MRA for any of their measurements. For example, some of Costa Rica's mass and volume measurements are recognized under the CIPM- MRA.

³⁸ Calibration of balancing instruments

³⁹ Calibration of masses

⁴⁰ Racine, Jean-Louis, ed.

⁴¹ Ibid.

Efforts at coordinating metrology in Central America date back to 1956 when the six countries signed a treaty establishing the Central American Institute of Research and Industrial Technology. The Institute was established under SICA and the metrological facility was established in Guatemala City and hundreds of thousands of dollars were invested in the facility and staff training. Unfortunately, few of the neighboring countries ever used the laboratory's services and eventually the institute became defunct.⁴²

More recently, the six countries have again attempted to coordinate their metrology efforts. In 2010, with assistance from PTB, representatives from the metrology institutes met to discuss the establishment of the Central America Metrology Network. The countries, along with the Dominican Republic, established a regional action plan. Similar to the FOCA, if continued, this network could be an important mechanism for strengthening regional cooperation and coordination of metrological services.

3.2 Recommendations

In all three areas – accreditation, standards, and metrology – Central American countries are making progress to advance and harmonize their systems. However, given the importance quality infrastructure plays in advancing the trade agenda, greater priority should be given to developing the systems and obtaining international recognitions. Raising the awareness of firms of the importance of adopting quality standards and certifications will also increase the demand and encourage the development of the quality infrastructure. Particularly for SMEs, which are the majority of firms in these countries, strengthening their capacity and awareness to increase their application of quality practices could have important economic development impacts. For example, the National Metrology Laboratory in Nicaragua is working with industrial associations to raise awareness of the importance of quality and of the services available. Also, the financial aspects of implementing quality systems for firms, especially SMEs, can be onerous. In Honduras, a World Bank project had a matching grants program to help firms obtain quality certifications. 110 firms, including 87 MSMEs, obtained quality certifications (such as ISO 9000) with the matching grants support and technical assistance. Replicating that type of program would also have a multiplier effect. In Honduras, an additional 200 firms obtained quality certifications without project support, while only 25 firms in the country were known to have quality certifications before the project started.⁴³

Another recommendation is to strengthen the existing platforms for regional coordination. For example, in accreditation, FOCA has been an important forum for coordinating accreditation activities and obtaining international financing for training and conferences. However, more

⁴² Racine, ed.

⁴³ World Bank. "Implementation Completion and Results Report - Enhancing Competitiveness: Trade Facilitation and Productivity Improvement Project." June 20, 2011.

support should be given to strengthen the Forum and to push the harmonization of accreditation criteria in the region. FOCA could also be instrumental in helping countries that are not full members of IAAC and ILAAC to become so. In standards and technical regulations, the countries should move toward developing harmonized and comprehensive systems. This will also help the remaining countries to become full members of the ISO. SIECA or another forum could help with work on harmonizing standards and regulations by compiling information on those required by the EU and the USA so firms have easy access to the information.⁴⁴

In metrology, more specific actions are needed to develop the systems, which are really incipient in all of the countries except Costa Rica and Panama. Given the size of the economies, demand for services in all measurements is not likely to be enough to justify the costs and work needed to maintain each one. However, through their study, PTB recommended that each country maintain a “basic basket” of measurement services. Table 12 lists those measurements.

Table 12: Basic Basket of Metrology Services

Service	Scope
Mass	
Calibration of analytical balances	1 mg to 200 g
Calibration of analytical balances	1 mg to 1, up to 4 kg
Calibration of commercial balances	5 g to 20 kg
Calibration of masses	1 mg to 2 kg
Temperature	
Comparison calibration in baths	-20 C to 250 C
Comparison calibration in ovens	100 C to 600 C
Volume	
Calibration of glassware (gravimetric method)	1 ml to 1 l
Calibration of volumetric containers	Up to 20 l
Length	
Calibration of micrometers and calipers	1 mm to 100 mm
Calibration of rulers	Up to 1m
Pressure	
Manometers and pressure transducers	Up to 10MPa
pH	
Characterization of pH meters	2,000 mV
Electricity (to be defined)	

Source: “Quality Infrastructure for Competitiveness: Plan of Action to Strengthen Basic Capabilities of Metrological Services in Central America and the Dominican Republic.” PTB. September 2010.

This “basic basket” of measurements was agreed upon as the regional baseline. After each country has established this basket, and obtained some back-up of those services, other measurements could be used as a basis of a distributed network. Specific countries can specialize in measurements and provide services that may not be as commonly demanded as those in the basic basket to the other countries. For example, if Guatemala developed a capacity in flow measurements and Honduras increased their capacity in pressure measurements, firms in both

⁴⁴ Guasch, et al.

countries could use the others' systems. Building complementary capabilities would help these countries save on operating costs while still strengthening the region's metrological capacity.

Innovation and Quality Conclusions

Cross-cutting recommendations related to strengthening innovation and quality systems through enhanced regional integration include the following: (1) Strengthen regional institutions and provide them with greater authority; (2) Develop and improve cross-country associations and networks; and (3) Increase local capacity. Each cross-cutting recommendation is described below.

Strengthen regional institutions and provide them with greater authority. Central America has many regional institutions and programs that can provide the structure for greater coordination and collaboration. Many of these organizations do not seem to have sufficient authority or resources to propose or implement significant interventions. For example, the CTCAP program under SICA has an extensive Plan on Science, Technology, and Innovation for the region, but it is unclear what has been accomplished by this program. The case is also similar for FOCA in accreditation – the Forum could play an important role in promoting the importance of accreditation and assisting the development of the national agencies. International donors have been involved in strengthening these institutions, but more could be done, especially to publicize results from efforts, which in turn could encourage more support for efforts in other areas.

Develop and improve cross-country networks. Integration efforts cannot just occur among public institutions; private enterprises, universities, research institutes, and professionals need mechanisms for cross-country collaboration. In science, technology, and innovation, more extensive networks could be developed that encourage collaboration between universities, research centers, and private enterprises, similar to the EU's KIC program. A program, such as CTCAP that is made of public institutions, could coordinate the development of such a network.

Increase local capacity. This recommendation may seem slightly counterintuitive when discussing regional integration. However, basic capacity is needed before there is cross-country confidence in services offered. For example, in metrology, the NMIs should work to obtain adequate back-ups (such as accreditation, CMCs, and regular inter-comparisons) so that other countries can trust their results. Confidence in the quality of other countries' products can help expand trade in both goods and services.

References

- Barquero, Marvin. (March 2011) “Centroamérica unifica reglas para la agricultura orgánica.” *La Nación*. <http://www.nacion.com/2011-03-4/Economia/NotasSecundarias/Economia2711485.aspx>
- Cañas-Dinarte, Carlos. “Centroamérica: Una Historia de Uniones y Desuniones.” SICA. April 26, 2002.
<http://www.sica.int/busqueda/Centro%20de%20Documentaci%C3%B3n.aspx?IDItem=8278&IdCat=32&IdEnt=401&Idm=2&IdmStyle=2>
- CYTED website. <http://www.cytcd.org/index.php?lang=en>
- Estado de la Nación. (2012) “Capítulo 7: Integración Regional.” *Estado de la Región*.
<http://www.estadonacion.or.cr/index.php/biblioteca-virtual/centroamerica>
- European Institute of Innovation and Technology. <http://eit.europa.eu/kics/>
- Gordillo, Darwin Marcelo, Aiga Stokenberga, and Jordan Schwartz. “Understanding the Benefits of Regional Integration to Trade: The Application of a Gravity Model to the Case of Central America.” Policy Research Working Paper 5506. World Bank. December 2010.
- Guasch, José Luis, Liliana Rojas-Suarez, and Veronica Gonzales. “Competitiveness in Central America: The Road to Sustained Growth and Poverty Reduction.” Center for Global Development. 2012.
- Inter-American Accreditation Cooperation.
<http://www.iaac.org.mx/Documents/Controlled/Administrative/AD%20002%20IAAC%20Bylaws.pdf>
- Inter-American Development Bank. “Sector Strategy to Support Competitive global and Regional Integration.”
- International Laboratory Accreditation Cooperation website.
<http://www.ilac.org/ilacarrangement.html>
- ISO website. http://www.iso.org/iso/home/about/iso_members.htm
- Jovanović, Miroslav (2006). *The Economics of International Integration*. Cheltenham, UK: Edward Elgar.
- López, J. Humberto and Rashmi Shankar, eds. (2011) *Getting the Most out of Free Trade Agreements in Central America*. The World Bank.
- Park, Donghyun and Mario Arturo Ruiz Estrada. (May 2010) “A New Multi-Dimensional Framework for Analyzing Regional Integration: Regional Integration Evaluation Methodology.”

ADB Working Paper Series on Regional Economic Integration No. 49. Asian Development Bank.

Porter, Michael and Niels Ketelhohn. “Central America: Strategy for Economic Integration.” *Harvard Business School Case*. May 6, 2008.

PTB and others. (September 2010) *Quality Infrastructure for Competitiveness: Plan of Action to Strengthen Basic Capabilities of Metrological Services in Central America and the Dominican Republic*.

Racine, Jean-Louis, ed. (2011) *Harnessing Quality for Global Competitiveness in Eastern Europe and Central Asia*. The World Bank.

SICA – Central America Integration System.

http://www.sica.int/sica/marco_j_en.aspx?IdEnt=401&Idm=2&IdmStyle=2

SICA – FOCA website.

http://www.sica.int/centro_documentacion/inst/sgsica/Foro%20Centroamericano%20de%20Acreditaci%C3%B3n%20de%20Organismos%20de%20Evaluaci%C3%B3n%20de%20la%20Conformidad%20%28FOCA%29.pdf

World Bank. “Implementation Completion and Results Report - Enhancing Competitiveness: Trade Facilitation and Productivity Improvement Project.” June 20, 2011.

World Bank. (2010) “Reform and Regional Integration of Professional Services in East Africa.” Washington, DC.

World Bank. (September 2012) “Trade Outcomes Assessment.” *Competitiveness and Integration in Central America*. .

World Economic Forum, Global Competitiveness Report 2011-2012.