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LAC REGIONAL WORKFORCE DEVELOPMENT PROGRAM (ADVANCE)

Guatemala Labor Market Assessment

MAY 2017

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The use of non-discriminatory language or that which constrains gender is taken into consideration in the LAC Advance Program, made possible by USAID. This document has deferred the use of terms associated with traditional masculinity, understanding the importance of using inclusive language for potential beneficiaries of this program.

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EXECUTIVE SUMMARY

The LAC Regional Workforce Development Program—known as the Advance Program—is strengthening the capacity of select two- and three-year tertiary technical education programs in Honduras, Guatemala, and Jamaica to provide market-relevant, quality training to disadvantaged youth to increase employment. Advance works to build target institutions' capacities by (1) improving curriculum design and pedagogy, (2) providing professional development opportunities for faculty and staff, and (3) enhancing labor market bridging services to help students find gainful employment after graduating.

The program designed and conducted baseline assessments to examine the labor markets—and in particular, market demand for skills—in all three countries. The evaluation of each country's labor market analyzed economic trends and patterns and identified growth subsectors. Each study looked at the demand for technical education graduates and the supply of qualified workers in selected growth subsectors. The studies entailed significant use of a value chain framework—a tool designed to be adopted by local stakeholders to identify and understand ongoing demand for the types of skills provided through technical education at the tertiary level. The goal of the assessment in Guatemala is to help technical training institutions in the country revamp their offerings, and, more generally, to help decision makers understand what the demand for skills might look like in the future.

Traditional labor market assessments are based on detailed occupational mapping. However, in Guatemala—as in many other developing countries—this approach is not viable due to data limitations. Therefore, FHI 360's labor market assessment methodology identifies priority skills needs by working backwards from market demand, which requires gathering and analyzing data to properly select growth subsectors, identifying and interviewing key informants in those subsectors, and validating information with experts. While this process can take a significant amount of time, it is indispensable for conducting analysis based on sound quantitative and qualitative evidence in a data poor environment.

First, we undertook desk research and quantitative analysis to answer questions about the overall economic context and employment trends and briefly reviewed relevant policies. We then conducted a rigorous sector selection based on quantitative and qualitative data, choosing five priority subsectors as a starting point for the assessment (vegetables and legumes, textiles and apparel, processed food, non-alcoholic beverages, and tourism). The selected five subsectors were not all the top-ranked ones; rather, their rankings ranged from 1 to 11, well within the desired ranking range. We then focused our attention on mapping business owners in these subsectors to prepare for a set of interviews.

Next, we conducted primary research by interviewing representatives of 29 organizations in the target geographical region—the Western Highlands. We zeroed in on the skills demanded by employers that can be developed within the context of two- and three-year technical degree programs (the focus of this program). We paired this analysis with research into existing technical training and education programs and analyzed how well they are matched to the demands of employers.

What did we find? Although economic growth has been moderate in Guatemala since the global economic crisis of 2008–2009, growth in gross domestic product (GDP) has not kept up with population growth, and economic gains have not been inclusive. This is in part because public investment in social services is low; for example, the government only spends 34 cents per day on each young person. This is a contentious issue in the country. Recent investigations have alleged that officials have diverted tax revenues for personal enrichment. Because of meager investment, poverty has increased in the last 25

years, and the net elementary enrollment rate has fallen. Nationally, only 23 percent of the out-of-school youth population has completed upper secondary school—although this is an improvement over past generations. Although official unemployment is minimal, the informal economy predominates and female labor force participation is low, particularly among indigenous and rural women.

Overall, the majority (77 percent) of the working-age population has a lower secondary education or less. However, Guatemalan youth are becoming increasingly educated. According to FHI 360's calculations based on the 2014 *National Survey of Living Conditions* (ENCOVI), conducted by Guatemala's National Statistical Institute, 19 percent of 15 to 29-year-olds who are not in school have a secondary education. This group constitutes the target population for our program. An additional 4 percent of youth ages 15 to 29 have at least some post-secondary education.

Guatemala continues to be stymied by serious issues of inequality. Decent work opportunities are beyond the reach of many, but particularly of rural, indigenous, and female youth. Investments in education that align with the current needs of employers and anticipate future demand can help both businesses and individuals to achieve their full potential.

In mapping priority value chains in our selected subsectors, we aimed to learn their structures, the opportunities that exist within them, and the current and potential responses of the education system to these opportunities. We paired our value chain maps with workforce overlays showing specific positions, alongside "sister" or parallel diagrams of existing and potential education offerings. We found that there are currently no technical training programs at the university level for several occupations and potential occupations in Guatemala, as identified by interviewees or by the assessment teams.

- In the vegetables and legumes subsector, these occupations include food processing technicians to regulate production practices, logistics and transportation technicians to ensure the safety and quality of goods being delivered to market, and marketing and sales specialists to create opportunities in new and existing markets.
- In the textiles and apparel subsector, occupations include designers familiar with international trends and marketing specialists to sell innovative designs, as well as machine maintenance technicians to support "speed to market" production.
- In both the processed food and non-alcoholic beverages subsectors, occupations include technicians who can carry out continuous product research relevant to local businesses, as well as logistics and transportation technicians whose knowledge of local markets and geography can help businesses take advantage of new opportunities.
- In tourism, occupations include marketing and sales managers with knowledge of web design, graphic design, and publications to support local and international marketing.
- Across all value chains, the need for logistics and transport technicians was noted; logistics is both a constraint and a major potential opportunity, because Guatemalan businesses currently must operate within the context of a limited and deteriorating road infrastructure.

Economic growth can help the poor either through the creation of decent jobs and income-generating opportunities or through social services expenditures that are dependent on government revenues. Today, however, neither is occurring in Guatemala to the extent necessary to reverse recent increases in poverty.

This analysis identifies specific subsectors of potential economic growth. The sector selection undertaken for this assessment was a rigorous exercise, and it should be iterative; as the economy grows and changes and new information becomes available, the analysis will need to be updated. Furthermore, the assessment is far from exhaustive, as there are very promising subsectors beyond the ones analyzed here.

Lastly, the assessment aimed to help technical training institutions and local stakeholders become familiar with value chain maps and learn how to develop and analyze them—and in so doing, build local capacity for analysis and action that will reach far beyond the findings of this document. This ability will allow local stakeholders to detect and evaluate how economic opportunities and relationships between market actors will drive skills needs—not only today but also in the future. For educational institutions to better address the needs of these businesses, they must first talk to them. Currently, the connections between academia and the private sector in the target region are few and weak. The current assessment can provide a common understanding among parties so they can initiate, and maintain, a conversation about how the technical education system can better respond and adapt to the needs of employers.

ACRONYMS

AGEXPORT	Guatemalan Association of Exporters/Asociación Guatemalteca de Exportadores
ANACAFE	National Coffee Association**/**Asociación Nacional del Café
ASCONFEG	Union of Knitwear, Textile Guild, and the Tailoring Association of Guatemala
ASIES	Research and Social Studies Association
BANGUAT	Bank of Guatemala/Banco de Guatemala
CACIF	Coordinating Committee of Agricultural, Commercial, Industrial and Financial Associations/Comité Coordinador de Asociaciones Agrícolas, Comerciales, Industriales y Financieras
CAMTUR	Guatemalan Chamber of Tourism
CELADE	Latin American Center of Demographics
CEPAL	Economic Commission for Latin America/Comisión Económica para América Latina
CIIU	International Classification for Industrial Standards/Clasificación Internacional Industrial Uniforme
COFETARN	Economic, Tourism, Environment and Natural Resource Development Commission
ENCOVI	National Survey of Living Conditions/Encuesta Nacional de Condiciones de Vida
ENEI	National Survey of Employment and Income/Encuesta Nacional de Empleo e Ingresos
ENJU	National Youth Survey/Encuesta Nacional de la Juventud
ENS	National Health Survey**/**Encuesta Nacional de Salud
ENSMI	National Survey of Maternal and Child Health/Encuesta Nacional de Salud Materno Infantil
FHI 360	Family Health International 360
FUNDESA	Development Foundation of Guatemala/Fundación para el Desarrollo de Guatemala

GDP	Gross Domestic Product
IADB	Inter-American Development Bank
ICEFI	Central American Institute for Fiscal Studies/Instituto Centroamericano de Estudios Fiscales
IGSS	Guatemalan Social Security Institute/Instituto Guatemalteco de Seguridad Social
IMF	International Monetary Fund
IOM	International Organization for Migration
INAB	National Forestry Institute/Instituto Nacional de Bosques
INE	National Statistical Institute of Guatemala/Instituto Nacional de Estadística
INGUAT	Guatemalan Tourism Institute
INJUD	National Youth Institute of Guatemala/Instituto Nacional de la Juventud
INTECAP	Technical Institute for Training and Productivity/Instituto Técnico de Capacitación y Productividad
LAC	Latin America and the Caribbean
MAGA	Ministry of Agriculture, Livestock and Food/Ministerio de Agricultura, Ganadería y Alimentación
MARN	Ministry of Environment and Natural Resources/Ministerio de Ambiente y de Recursos Naturales
MDG	Millennium Development Goals
MINECO	Ministry of Economy/Ministerio de Economía
MINEDUC	Ministry of Education**/**Ministerio de Educación
MINITRAB	Ministry of Labor/Ministerio de Trabajo
MSMEs	Micro, small and medium enterprises
OECD	Organization for Economic Cooperation and Development

PRONACOM	National Competitiveness Program**/**Programa Nacional de Competitividad
RWDP	(LAC) Regional Workforce Development Program
SAFT	Selected Tertiary Academic Training Venues/Sedes académicas de Formación Terciaria seleccionados
SEGEPLAN	General Secretariat of Planning and Programming of the Presidency
TNE	Net Enrollment Rate/Tasa neta de escolaridad
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USAC	Universidad de San Carlos de Guatemala
USAID	United States Agency for International Development
VESTEX	Industry Association of Apparel and Textiles
WB	World Bank
WDI	World Development Indicators (World Bank)
WEF	World Economic Forum

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The document draws upon FHI 360's knowledge gained through carrying out labor market assessments in Latin America, Africa, the Middle East, and Asia.

OBJECTIVES OF THE PROGRAM

The Advance Program is strengthening the capacity of select two- and three-year tertiary technical education programs in Honduras, Guatemala, and Jamaica, providing market-relevant, quality training to disadvantaged youth for increased employment. The program is funded by the United States Agency for International Development (USAID) Bureau of Latin America and the Caribbean (LAC) and the Office of Regional Sustainable Development. With a regional post in Honduras and country offices in Honduras, Guatemala, and Jamaica, FHI 360 engages stakeholders from education and the private sector in each country to strengthen market-relevant technical training programs based on each country's workforce needs. Advance works to build target institutions' capacities by (1) improving curriculum design and pedagogy, (2) providing professional development opportunities for faculty and staff, and (3) enhancing labor market bridging services to help students find gainful employment after graduating.

Additionally, Advance improves access for disadvantaged students to selected technical education programs by (1) strengthening institutions' recruiting and admissions practices and (2) providing local and U.S.-based scholarships for disadvantaged students with strong leadership potential to attend the technical programs being strengthened. To carry out this work, Advance provides grants to local organizations to support disadvantaged youth in attending technical programs and engages local, regional, and U.S.-based academic institutions to partner with local technical institutions to strengthen degree programs, student services, and scholarship programs. Through RWPD, FHI 360 is leveraging its presence in Honduras, Guatemala, and Jamaica to promote the exchange of best practices and lessons learned in tertiary technical education and workforce development among the three countries, with positive implications for the greater LAC region and beyond.

Advance is being implemented by FHI 360, an international nonprofit human development organization dedicated to permanently improving living conditions by promoting comprehensive solutions and local efforts. The organization employs professionals in health, education, labor, nutrition, environment, economic development, civil society, gender, youth, and research and technology—creating a mix of capabilities to meet today's development challenges. FHI 360 serves populations in more than 70 countries and throughout the United States.

PURPOSE OF THIS LABOR MARKET ASSESSMENT

The program began with an assessment to identify key stakeholders and program participants. By design, many of the individuals taking part in assessment activities will be part of future program activities as counterparts, stakeholders, or beneficiaries. The assessment process provided a way of understanding how these individuals might be engaged constructively to ensure relevance, local ownership, and sustainability of program activities. Secondly, the program designed and conducted a baseline assessment to examine a major element of the system: the labor markets—and in particular, market demand for skills—in each of the countries in which the program is working. The evaluation of each country's labor markets identified economic trends and patterns, growth subsectors, demand for technical education graduates, and supply of qualified workers—allowing stakeholders to understand the economic context and employment potential in the given countries. The studies entailed significant use of a value chain framework, a tool that is designed to be adopted by local stakeholders to identify and understand ongoing demand for the types of skills provided through technical education at the tertiary level. The assessment conducted in Guatemala, described here, will help technical training institutions identify and respond to employer demand for skills in the country and will help decision makers understand what skills demand might look like in the future.

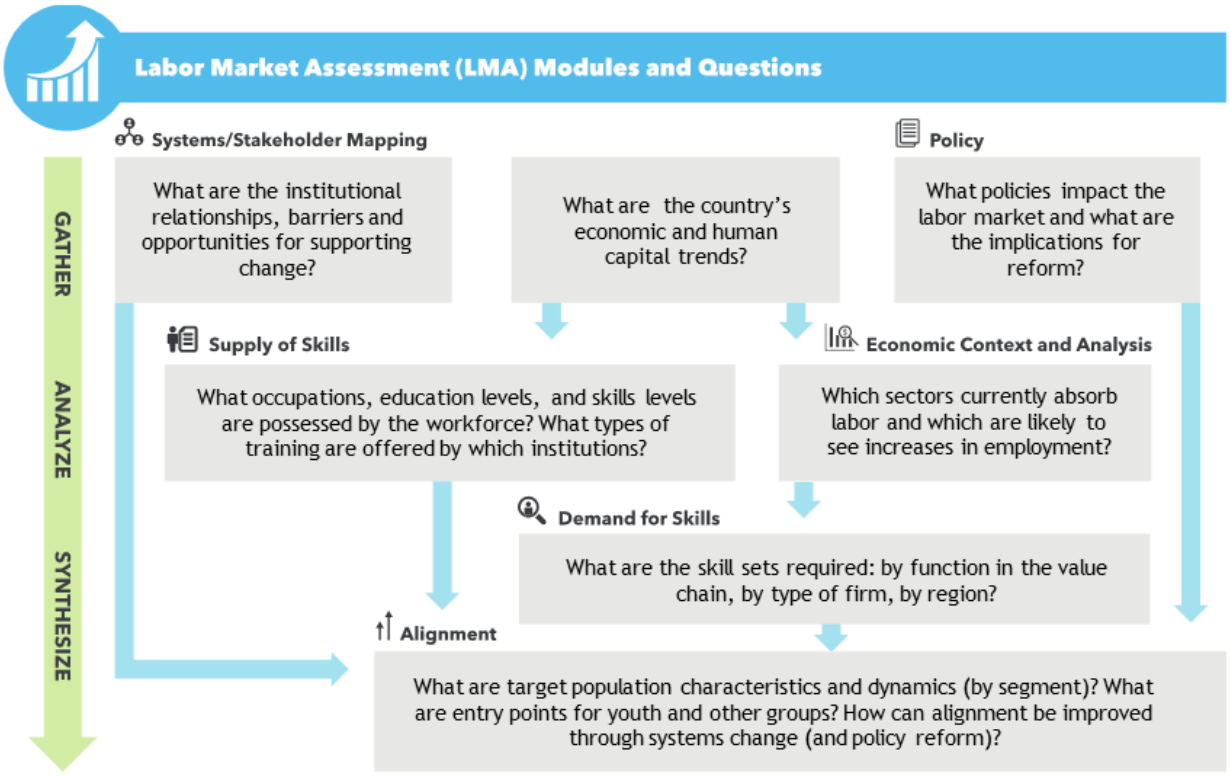
METHODOLOGICAL FRAMEWORK

FHI 360's labor market assessments identified priority skills needs by working backwards from market demand. A traditional labor market assessment is based on detailed occupational mapping, but in Guatemala—as in many other developing countries—this approach is not viable due to data limitations. Specifically, in Guatemala it is difficult to access updated and complete data on employment by subsector, occupation, and geography. Therefore, to understand the demand for skills, we followed a rigorous methodology. We began by (1) researching the general socioeconomic, demographic, and education context; then (2) looking at the market demand for products and services and considering how these may affect demand for skills; (3) selecting growth subsectors likely to generate jobs in the near future; (4) mapping the primary and secondary stakeholders who will be key in supporting change in the system; and (5) interviewing employers and experts to understand how industry structure and value chain relationships within these subsectors influence skills demand as well as the types of employment opportunities. The process of gathering and analyzing data to properly select growth subsectors, and then identifying and interviewing key informants in those subsectors, can take a significant amount of time (particularly in a data-poor environment like Guatemala) but is indispensable for a conducting an analysis based on sound quantitative and qualitative evidence.

FHI 360's labor market assessment framework is modular and can be customized to different areas of focus and degrees of depth depending on client needs, context, and the challenges to be addressed (see figure 1 below). Each module addresses an overarching question and includes a set of associated tools that can help arrive at the answer. Tools are drawn from a range of fields including economics, education, psychology, and business; they include frameworks, approaches, and data sources as diverse as value chains, social network analysis, product space, and the global trade share matrix. We also include questions for use in structured interviews and guidelines for focus groups with the full range of actors in a labor market system. The conclusions derived from the analysis are depicted using infographics accompanied by a simple narrative to help make the findings actionable for decision makers. We believe that our approach provides a better understanding of the ultimate goal of most labor market assessments: the nature of employer demand for skills. Our tools and approaches help to combine quantitative and qualitative information in such a way that we can recognize the prevailing patterns of labor market behavior, their drivers, and therefore their expected future directions.

Figure 1 illustrates our comprehensive framework for examining all aspects of a labor market system.

FIGURE 1. FHI 360's labor market assessment framework



Source: FHI 360, Workforce Connections

This approach seeks to establish a bridge between the demand (for skills, knowledge, and attitudes) by employers, the general labor market, and educational institutions—with the goal of aligning degree programs and training opportunities with labor market demand. By the end of the program, the goal is to achieve better links among public sector institutions, higher technical education institutions, and private sector entrepreneurs, so that together they can create pathways to better employment and help the Guatemalan economy fulfil its growth potential.

TABLE 1. Guatemala labor market assessment tool matrix (schematic conceptualization of important questions, tools, and answers)

Area of Inquiry	Question	Data Source	Principal Tools[1]
1. SYSTEMS **What are the institutional relationships, barriers, and opportunities for supporting change (current and ideal)?**	Who are the actors and intermediaries in the system? How do they interact with each other?	In-country interviews: (typical stakeholders include government ministries in education, labor, etc., education institutions, private sector employers and associations, and intermediaries such as employment matching firms, youth/advocacy groups) Secondary sources: World Bank, International Labor Organization (ILO), etc.	Stakeholder map identifies institutions and actors in the system and traces the dynamic flows of decision-making, resources, and information between them, as visualized in a series of maps.
2. ECONOMIC CONTEXT **What is the economic, human resource, and policy landscape**	What are the key economic, human resource, and policy indicators?	Data analysis: World Bank indicators; UNESCO Institute of Statistics; United Nations (UN) National Accounts; national statistics agencies, etc.	Data dashboard prepared before the evaluation stage previews data and information such as economic growth, investment, potential for diversification, human development (demographic data), levels of education, employment by (sub)sector, current offering and future demand of skills, etc.
	Where is there employment and where is it growing/ shrinking?	Data analysis: National statistic agencies; United Nations Industrial Development Organization UNIDO; ILO Interviews with employers and economic analysts	Sector selection methodology presents sectors with evidence of growth, trade matrix to see where and in what country a subsector is gaining or losing a portion of the market.
3. SUPPLY OF SKILLS **What are the skills being provided and by what institutions; how can skills be classified and measured; what skills exist (or should exist) in the system?**	What are the levels and trends in educational attainment of the population?	Education enrollment statistics (typically from the Ministry of Education)	Stock and flows diagram reveals a dynamic picture of skills supply in a workforce, as represented by formal education levels. Can be constructed for a subset of the labor force and further disaggregated by gender or age group.

[1] FHI360. *Market Analysis Tool Matrix*. Workforce Connections Project FHI 360, USAID. Washington, D.C.

Area of Inquiry	Question	Data Source	Principal Tools[1]
4. DEMAND FOR SKILLS **Which sectors are likely to see increases in employment and what are the skill sets required?** **What is a framework for linking sector growth and skills demand?**	What sectors have high employment growth potential?	Data analysis: Atlas of Economic Complexity (Harvard and the Massachusetts Institute of Technology [MIT])	Trade-share matrix[2] allows the reader to understand the value and strength of different segments of a country's export market relative to global past performance and global growth in demand of those segments. Product Space analysis[3] reflects export trends based on competitiveness and economic complexity.[4]
	What occupations, processes, skills, requirements, and certifications are associated with specific value chains? What skills are in demand?	In-country focus groups and interviews with value chain actors	Value chain analysis shows how a product flows through different market channels at the country level; identifies constraints and opportunities for improving different channels' performance at different levels of the chain; and identifies employment and entrepreneurship entry points for youth by education/skill level.
5. PUBLIC POLICY **What policies impact the labor market and what are the implications of reform?**	What are the policy areas that impact employment; how do different legal traditions affect employment outcomes?	Interviews with employers and government Secondary sources: World Bank; ILO; national reports; journal articles etc.	Presents an overview of the policy areas that impact the labor market and provides a guide with specific questions to be asked during both desk research and of stakeholders during field research.
6. ALIGNMENT (Aligning education programs with skills demand)	What are the curriculum needs for developing necessary technical skills and soft skills in the identified subsectors?	Facilitated discussions between sector employers, education institutions, etc.	A structured process allowing educational institutions to use the findings of the analysis to develop offerings that respond to local labor market needs.

[2] International Trade Center. Trade Map: List of Exported Services for the Selected Service. Switzerland. Accessed June 29, 2016. http://www.trademap.org/(X(1)S(zaiwhoynkidcy155hnsnvf55))/Service_SelService_TS.aspx.

[3] Hausmann, Ricardo, Hidalgo, Cesar, et al., "Atlas of Economic Complexity: Mapping Paths to Prosperity." Harvard University Center for International Development and MIT Macro Connections Media Lab. Massachusetts, 2011. Accessed July 1, 2016. http://atlas.cid.harvard.edu/explore/tree_map/export/gtm/all/show/2014/.

[4] Ibid.

Source: FHI 360, Workforce Connections

In the first phase (depicted at the top of the figure 1 framework) we undertook desk research. The review of secondary literature focused on a series of related documents that helped in orienting our research and sector selection (see list of references). Next, an in-depth review, analysis, and discussion of quantitative information served to answer questions about the overall economic context, human capital and employment trends, and characteristics of the target population in Guatemala. We then conducted a preliminary sector selection according to a rigorous three-step process, selecting five subsectors: legumes and vegetables; clothing and textiles; chocolates, sweets, baked goods and other processed foods; non-alcoholic beverages; and tourism. Finally, we focused our attention on mapping stakeholders for a set of interviews to be conducted by FHI 360.

In the second phase, we conducted primary research to analyze priority value chains—those that have been identified as generating employment now and in the future—by interviewing businesses in the Western Highlands, where the program will focus.[5] During this phase, we zeroed in on the functional roles mentioned by employers for which skills can be developed within the context of two- and three-year technical degree programs, as these are the focus of the program. We paired this analysis with research into existing technical training and education programs and how well they are matched to the demands of employers. To present the findings, for each of the selected subsectors we developed a value chain map with workforce overlay, a "sister" or parallel diagram that aligns positions with existing and potential degree programs, and corresponding analysis. Each analysis demonstrated opportunities for strengthening technical programs across the selected subsector. (See Annex B and C for the interview guide and surveys.)

The third phase will serve as the "alignment" process, allowing educational institutions to use the findings of this assessment to develop offerings that respond to local labor market needs. Universities and technical training institutions are some of the key stakeholders that will benefit from the findings. The goal is for discussions between employers and educators to build on the findings of this labor market assessment, using tools including value chain mapping, to identify and develop curricula for existing and new two- and three-year technical degree programs.

LIMITATIONS OF THE ASSESSMENT

It should be noted that this assessment is not meant to be a comprehensive labor market analysis presenting a series of historical and current labor market indicators. Although indicators such as employment by detailed subsector would bolster the analysis, as noted above, data on employment are limited in Guatemala. Therefore, without precise numbers, this assessment relies on published estimates and those provided by experts regarding employment in each of the subsectors studied here. Furthermore, although data used in the trade-share matrix are the most recent and reliable available, they do not reflect changes in the composition and value of exports since 2014 (which may be significant in certain subsectors affected in recent years by internal and/or external factors).

[5] Although much of this assessment focuses on the Western Highlands, the socioeconomic analysis is based largely on national data.

SOCIOECONOMIC CONTEXT

Guatemala is a land of diversity. It is multicultural and multiethnic—home to the Maya, Xinca, Garifuna y Ladina peoples—and multilingual, with 25 different languages spoken in the country. The total population is 15.6 million, of which indigenous people represent about 38.8 percent.[6] Guatemala's 22 departments are divided into 340 municipalities.

The agriculture sector absorbs the greatest portion of the labor force (31.9 percent), followed by trade (26.8 percent), and manufacturing industries (14.8 percent), with the remainder working in other industries.[7] The economic growth figures from the Bank of Guatemala range from a relatively healthy 3 percent to 4 percent, though growth has not reached the country's potential of 7 percent (as considered in the Peace Accords) due to low labor productivity.

Guatemala continues to face challenges stemming from an unfinished peace agenda. Additionally, the rise of globalization, international competition, lack of basic social services in rural areas such as decent health care and education, limited employment opportunities particularly in the formal sector, internal and international migration patterns, the fight for control of natural resources, and climate change and resulting natural disaster all affect the possibility of achieving more inclusive social development for both rural and urban populations.

PRINCIPAL DEMOGRAPHIC TRENDS

More than half of Guatemala's population is under 25 years old. Those under 15 represent just over a third of the population. Half (51 percent) of the population is female. While the urban population has increased, 49 percent of Guatemala's population live in rural areas (figure 2).

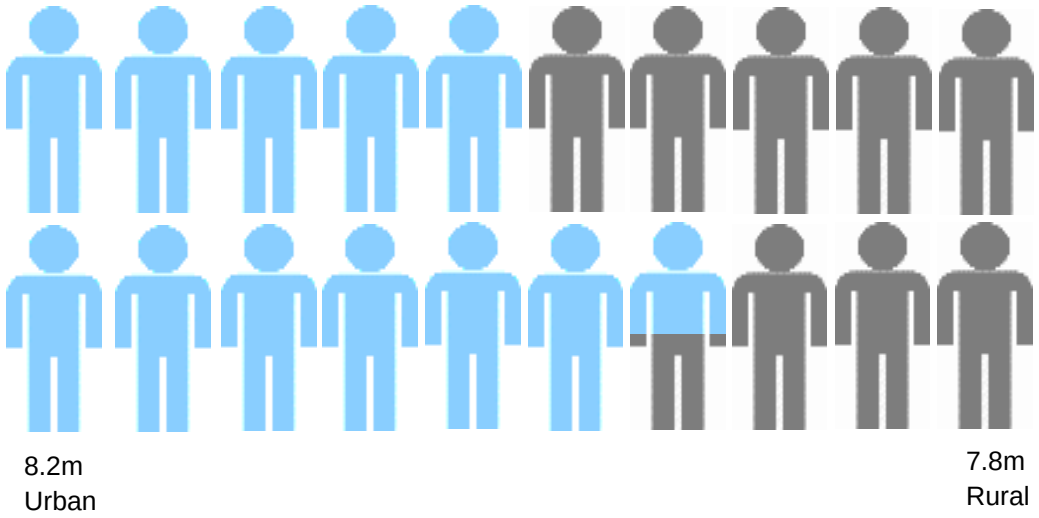
An important source of information is the national census, but because the last census was carried out 13 years ago, it is difficult to fully capture some of the more recent demographic changes in Guatemala. However, based on an estimated annual growth rate of 2.4 percent from 1980–2015, the population is expected to reach 18 million by 2020.[8]

[6] Guatemala National Institute of Statistics. *National Survey of Living Conditions (2-2014).* https://www.ine.gob.gt/index.php/encuestas-de-hogares-y-personas/condiciones-de-vida

[7] Ibid.

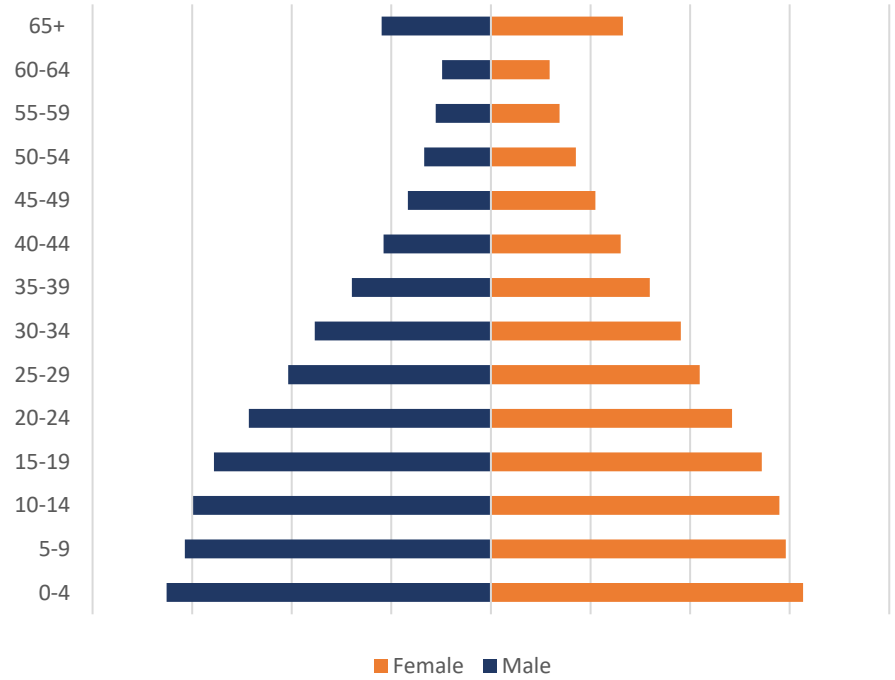
[8] Secretary of Planning and Development. "Indicators: Demographics." Guatemala City. Accessed June 2016. http://www.segeplan.gob.gt/2.0/index.php?option=com_remository&Itemid=274

FIGURE 2. Population structure: urban and rural



Source: WDI 2014

FIGURE 3. Population pyramid, 2016

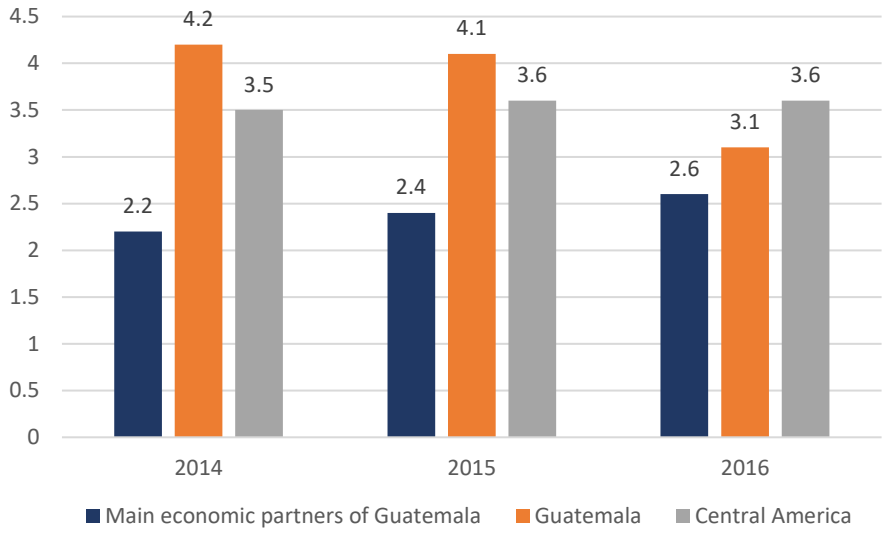


Source: UNDP 2015

MACROECONOMIC CONTEXT

Since 2013, the annual growth in GDP has been 3–4 percent, robust to the global economic climate. The World Bank forecasts it will stabilize at around 3.5 percent through 2018.[9] However, GDP per capita growth has not topped 2.1 percent since 2007.[10] Currently, economic growth in Guatemala does not contribute appreciably to poverty reduction. The World Bank has indicated that real economic growth accounts for just a third of poverty reduction,[11] contributing very little to improved living conditions. The challenge is to achieve sustained and inclusive economic growth.

FIGURE 4. Real economic growth



Source: Banguat 2016

Most development plans and initiatives in Guatemala ultimately attempt to confront the same issue—entrenched poverty—by broadening social inclusion and supporting more and better income-generating opportunities for women and rural and indigenous populations. In preparing this assessment, the team reviewed a series of relevant documents, including the National Development Plan, *K'atun Our Guatemala 2032, Wealth for Everyone,* which has defined as a national priority the establishment of conditions that stimulate current and potential productive economic sectors. However, the plan does not designate subsectors for investment.

The *Guatemalans Improve Guatemala* initiative proposed by Fundación para el Desarrollo de Guatemala (FUNDESA) and Comité Coordinador de Asociaciones Agrícolas, Comerciales, Industriales y Financieras

[9] World Bank. *Global Economic Prospects: Divergences and Risks.* Washington, D.C. June 2016. http://www.worldbank.org/en/publication/global-economic-prospects#data.

[10] World Bank. "World Bank Indicators: GDP per capita growth (annual percent)." Washington, D.C. 2016. http://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG?end=2015&locations=GT&start=2006.

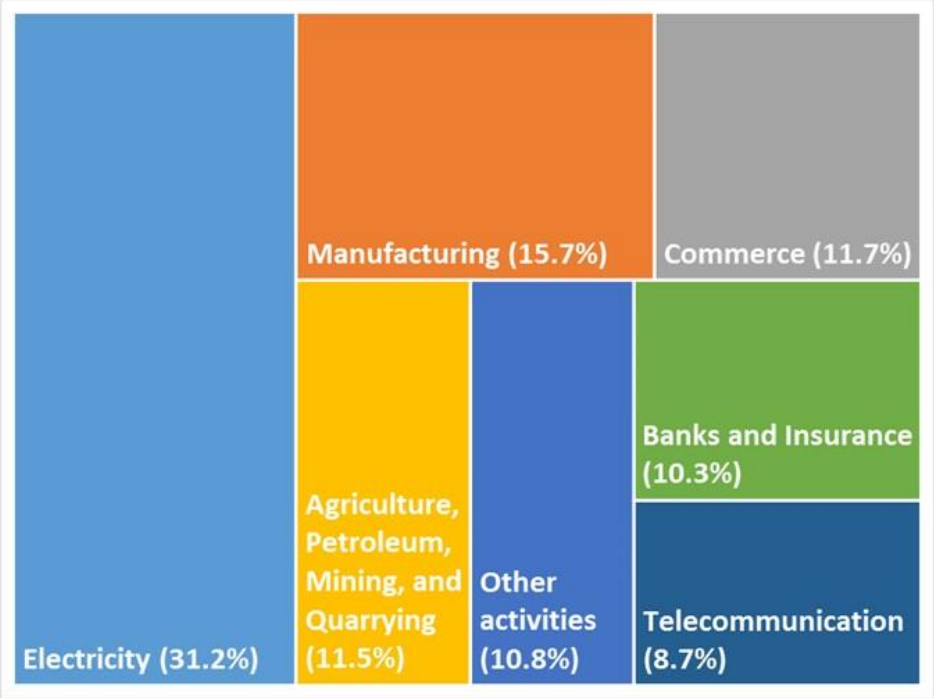
[11] World Bank, 2009 "Guatemala Poverty Assessment: Good Performance at Low Levels.", World Bank, accessed August 2016, http://siteresources.worldbank.org/INTLACREGTOPPOVANA/Resources/GuatemalaPovertyAssessmentEnglish.pdf.

(CACIF) has engaged private and public sector actors to tackle the challenges of social inclusion in the country. This assessment draws on a study produced by the initiative in 2011 that included an extensive economic and sector analysis.[12]

Additionally, the Guatemalan Association of Exporters (AGEXPORT) is working to help rural entrepreneurs gain access to employment and markets through its *Encadenamientos Empresariales* project. Leadership at AGEXPORT has expressed interest in working to develop a grassroots-driven agenda for integrated rural development, supported by strong demand-based technical linkages with local universities.

In Central America, in contrast to other regions in Latin America, economic dynamics as measured by some short-term indicators remain positive; namely, increased household consumption, partly due to the increase in real income and family remittances. However, investment continues to grow moderately.[13] At the same time, gross fixed capital formation (formerly gross domestic investment) has decreased as a percentage of GDP, from 20.8 percent in 2004 to 13.4 percent in 2015.[14]

FIGURE 5. Foreign direct investment, 2015



Source: Banguat 2015

[12] FUNDESA. *Guatemalans Improve Guatemala: A Proposal for a More Prosperous, Solidary, and More Secure Guatemala*. Guatemala, 2012. Accessed June 2016. https://issuu.com/fundesaguatemala/docs/mejoremosguate.

[13] Bank of Guatemala. "FDI Flow Chart by Economic Activity and Country of Origin." 2014. http://www.banguat.gob.gt/inc/ver.asp?id=/Publica/v_man_bpagos/flujo_IED_2014.htm&e=115682

[14] World Bank. "Gross capital formation (percent of GDP)." Data based on national accounts from WB and OECD, 2016, accessed on August 18, 2016. http://data.worldbank.org/indicator/NE.GDI.TOTL.ZS?locations=GT&view=chart

This decrease has been evident in public investment, especially in construction, where just 1.5 percent of GDP was spent in 2014, compared to 3.9 percent of GDP in 2001.[15] Low investment in the deteriorating road network and in infrastructure are key factors limiting economic growth and social and economic development.

According to statistics from the Bank of Guatemala, the beneficiary sectors of foreign direct investment (FDI) are light manufacturing, electricity, trade, mining, agriculture, and telecommunications. During the period 2010–2015, the greatest growth in investment was in the manufacturing sector (78 percent), followed by electricity (65 percent), and trade (43 percent). The largest growth in 2015 was in the electricity sector, totaling US $377 million; followed by manufacturing ($189.3 million); trade ($141.9 million); and agriculture ($130.5 million).

PUBLIC POLICY: HOW DOES POLICY IMPACT OPPORTUNITY?

Although two in three Guatemalans are under the age of 30, the Guatemalan government's annual investment in the development of young people is just $124 USD per person (34 cents a day).[16] Moreover, the structure and composition of investment are inadequate. Average annual public spending on youth was 8.1 percent of the national public budget between 2006 and 2011 and just 2.1 percent of GDP.[17] Actual investment is not keeping up with the amount required to reduce poverty and inequity. Over the past ten years, investment in education has not exceeded 3 percent of GDP (figure 6).

There is a direct correlation between the level of tax revenue, a state's ability to invest, and institutional weakness. Tax collection in Guatemala is hampered by both corruption and a large informal sector. In 2015, tax revenue reached just 10.2 percent of GDP, the lowest proportion since 1997. Decreased state spending compared to 20 years ago has severely constrained efforts to combat hunger, poverty, and inequality.[18]

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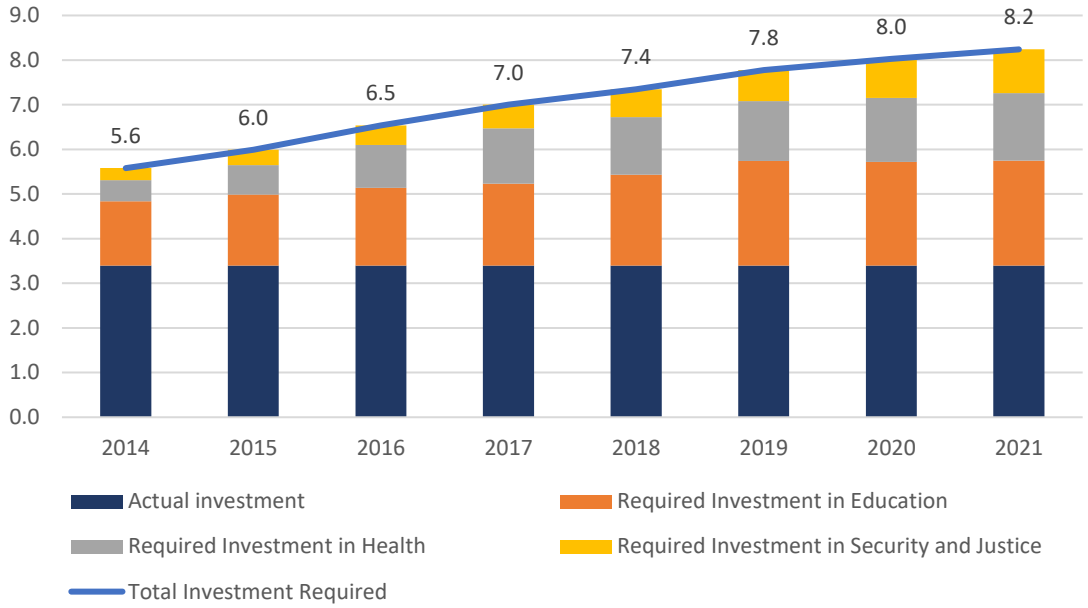
[15] United Nations Development Program. *Guatemala: Millennium Development Goals Final Report, 2015.* Accessed July 19, 2016. http://www.gt.undp.org/content/guatemala/es/home/presscenter/articles/2016/01/11/informe-final-de-cumplimiento-de-los-objetivos-de-desarrollo-del-milenio.html.

[16] Central American Institute for Fiscal Studies (ICEFI). "Public Investment in Youth." Guatemala City: ICEFI, 2016. Accessed September 2, 2016. http://icefi.org/publicaciones/principales-retos-del-presupuesto-publico-2016-elementos-para-la-discusion-ciudadana.

[17] ICEFI. "Public Investment in Youth: 2006-2011." Guatemala City: European Union, 2012. Accessed June 6, 2017. http://icefi.org/sites/default/files/la_inversion_publica_en_juv.pdf

[18] Central American Institute for Fiscal Studies. "Public Investment in Youth." 2016.

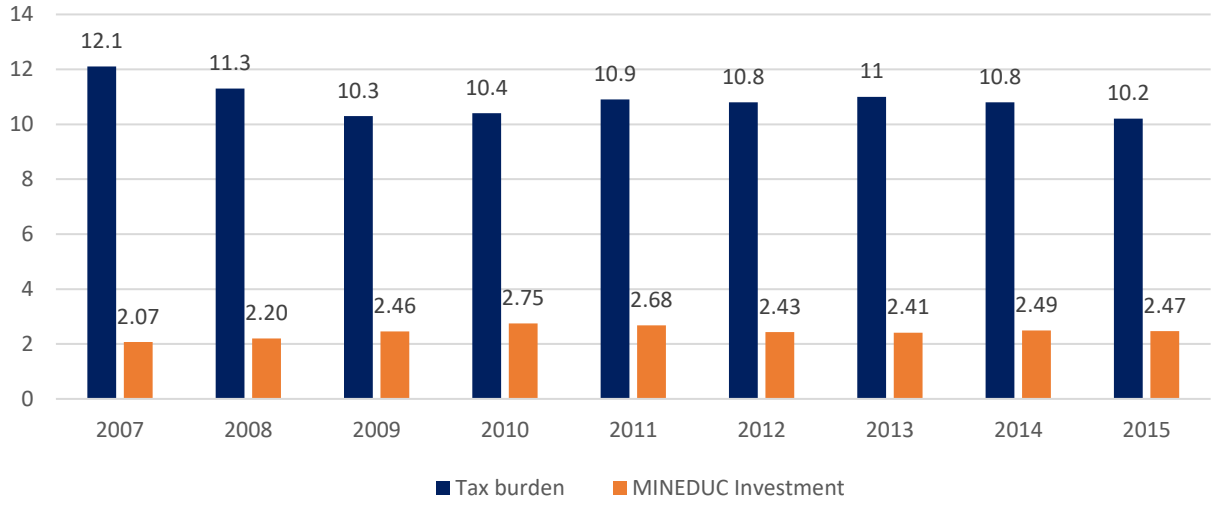
FIGURE 6. Minimum necessary public investment in education, health, security, and justice for children and adolescents vs. actual investment, as a percentage of GDP (2014–2021)



Source: UNICEF 2015

Figure 6 shows that the government currently has budgeted 3.4 percent of GDP for investment in children and youth through 2021. In 2017, however, the total minimum investment necessary to cover vulnerable children and youth in 125 priority municipalities—those with the highest rates of poverty, malnutrition, and exclusion—will reach 7 percent of GDP.

FIGURE 7. Tax burden and levels of social investment in public education by year (2007–2015)

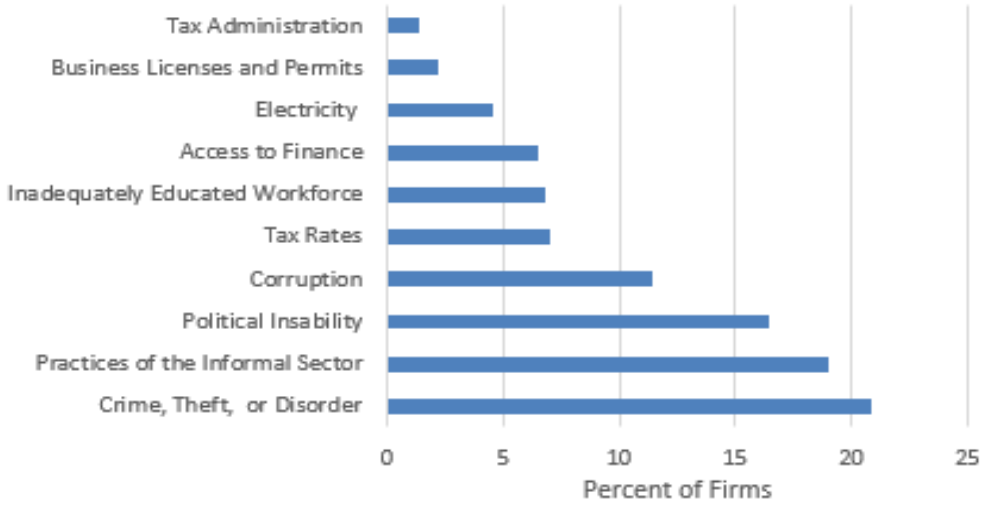


Source: FHI 360 using data from Ministry of Finance, 2007-2015 National Budgets, comprehensive tables. http://www.minfin.gob.gt/index.php/presupuestos-aprobados

In 2016, total direct public investment in children and youth was estimated to reach 16.9 billion quetzals (US $2.2 billion) that year, or just 3.23 percent of GDP.[19] Guatemala is Central America's largest economy, yet has the lowest levels of public investment in children and adolescents in the region. This is one of the causes of early entry into the labor market and unaccompanied migration to the United States.

There is a negative perception among enterprises, citizens, and experts regarding the ability of the Guatemalan government to develop and implement policies that would help the private sector grow, in contrast to perceptions about neighboring Costa Rica, El Salvador, and Panama.[20] Several surveys show similar findings. In 2015, the country ranked 81 out of 189 economies on the World Bank *Ease of Doing Business Scale.* Employers reported crime, informality, political instability, and corruption as the greatest obstacles (figure 8).[21] The *Global Competitiveness Report* produced by the World Economic Forum (WEF) for 2014–2015 listed slightly different obstacles, including access to finance, corruption, inadequate education for work, and inadequate infrastructure.[22] According to a Manpower survey in 2016,[23] 20 percent of employers in Guatemala reported it is difficult to find skilled labor. Compared to the LAC region as a whole, a higher percentage of firms in Guatemala identified corruption as a major constraint to business (figure 9). In 2015 Guatemala was ranked 123 out of 168 countries on the *Corruption Perceptions Index*.[24]

FIGURE 8. Obstacles to doing business in Guatemala



Source: World Bank Ease of Doing Business Scale

FIGURE 9. Perception of corruption in Guatemala

[19] Ibid.

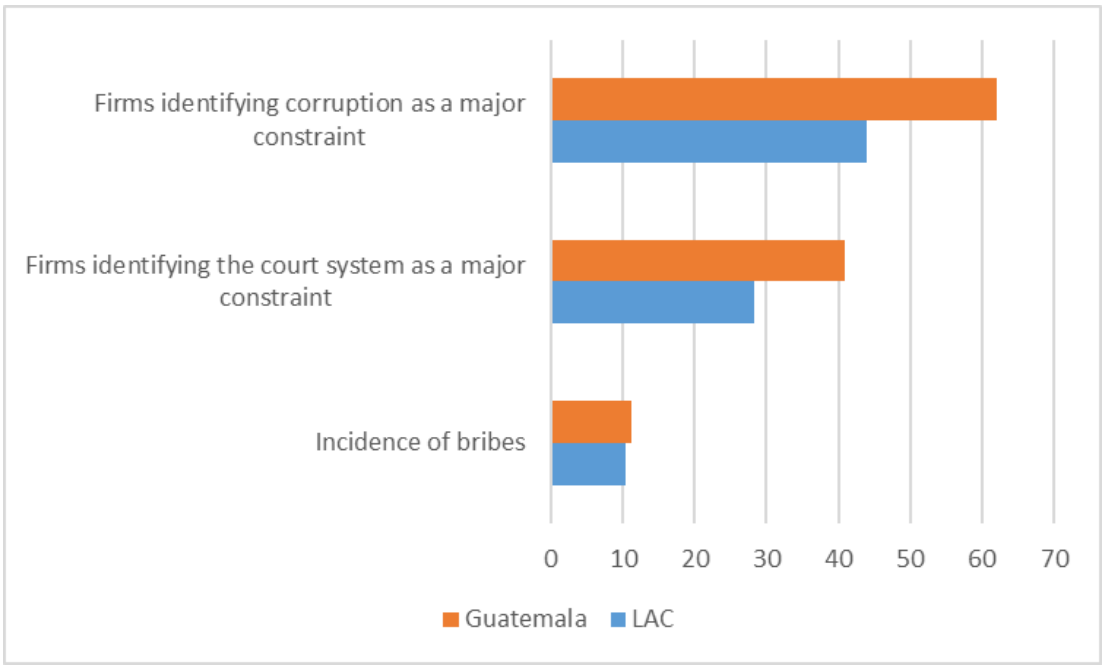
[20] Worldwide Governance Indicators. Accessed June 12, 2017. http://info.worldbank.org/governance/wgi/#home

[21] World Bank. "Ease of Doing Business Scale." June 2015. http://www.doingbusiness.org/rankings. Accessed September 2, 2015.

[22] World Economic Forum. *The Global Competitive Report 2014-2015*. 2015Geneva: World Economic Forum, 2014, page 198.

[23] Manpower Group, Employment Expectation Survey Guatemala, 2016 (Q2). In this survey of a representative sample of 626 employers in Guatemala, 23 percent expected to increase hiring, 5 percent anticipated a decrease, 67 percent expected to stay the same and 5 percent did not know. Companies in the western region of the country were the most optimistic, with 22 percent expecting to increase their profits.

[24] Transparency International. "Corruption Perception Index: Guatemala." 2015. http://www.transparency.org/cpi2015.



Source: World Bank, Guatemala Enterprise Survey 2010

SOCIAL CONTEXT

The extreme poverty line in Guatemala is Q.5,750.00 per year per person (US $756).[25] Extreme poverty increased in Guatemala from 18.1 percent in 1989 to 23.4 percent in 2014 (a rise of 5.3 percentage points—or 3.7 million people).[26] General poverty (subsistence on less than Q.10,218.00 a year, or US $1,344) is also severe, although the rate of change has been less dramatic. The rate decreased from 62.8 percent in 1989 to 51 percent in 2006. It then rose again to 59.3 percent in 2014. This translated to nearly 5.7 million people in general poverty in 2014.[27,28]

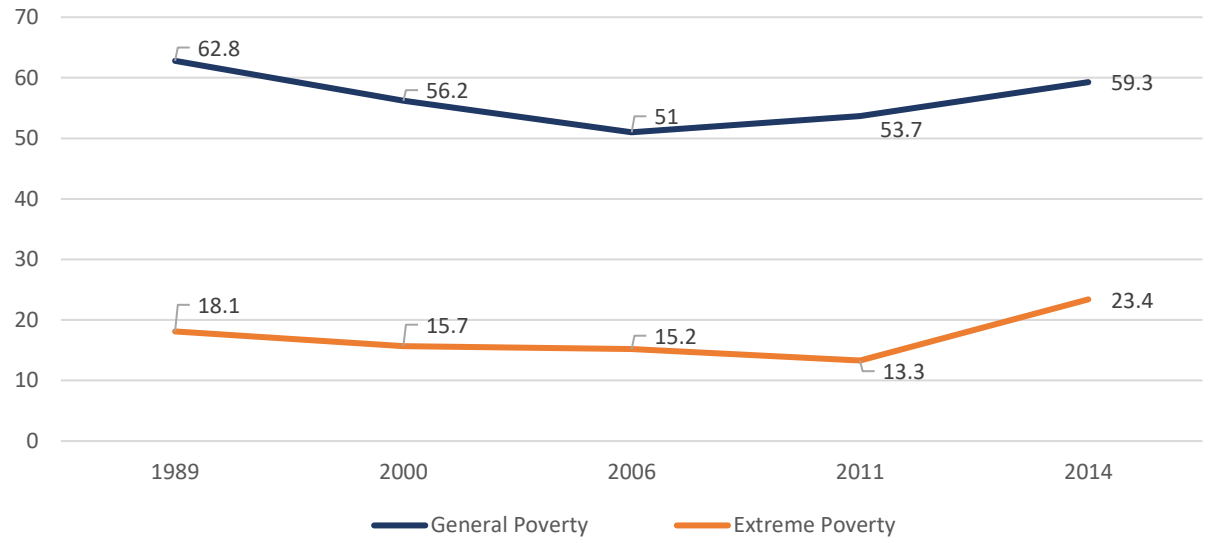
[25] Bank of Guatemala. Exchange rate of US $7.60 as of August 18, 2016.

[26] The extreme poverty line represents the cost of acquiring a food basket that meets the annual minimum calorie requirements per person. Those in extreme poverty are individuals whose total annual expenditure is less than this amount. The general poverty line is determined by adding consumption costs of other basic nonfood goods and services to this minimum calorie cost. United Nations Development Program. *Guatemala: MDG Report (Objectivos de Desarrollo del Milenio. Informe Final),* 2015. Accessed June 12, 2017. http://www.gt.undp.org/content/guatemala/es/home/presscenter/articles/2016/01/11/informe-final-de-cumplimiento-de-los-objetivos-de-desarrollo-del-milenio.html.

[27] Bank of Guatemala. Exchange rate of US $7.60 as of August 18, 2016

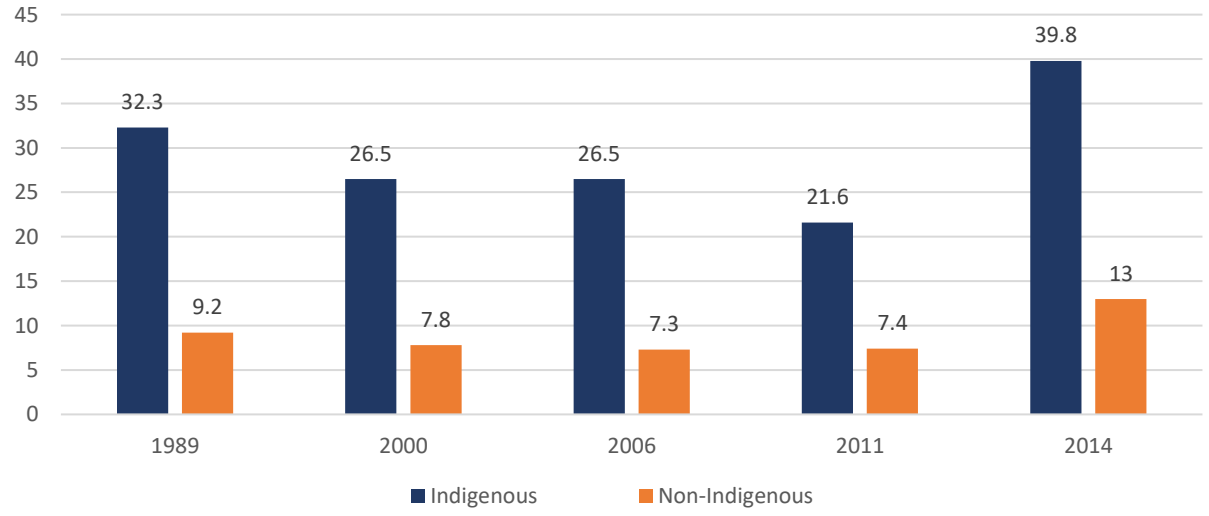
[28] Guatemala National Institute of Statistics. *National Survey of Living Conditions (2-2014).* Guatemala City. 2014. Accessed July 3, 2016. https://www.ine.gob.gt/index.php/encuestas-de-hogares-y-personas/condiciones-de-vida.

FIGURE 10. Percentage of population in poverty and extreme poverty (1989–2014)



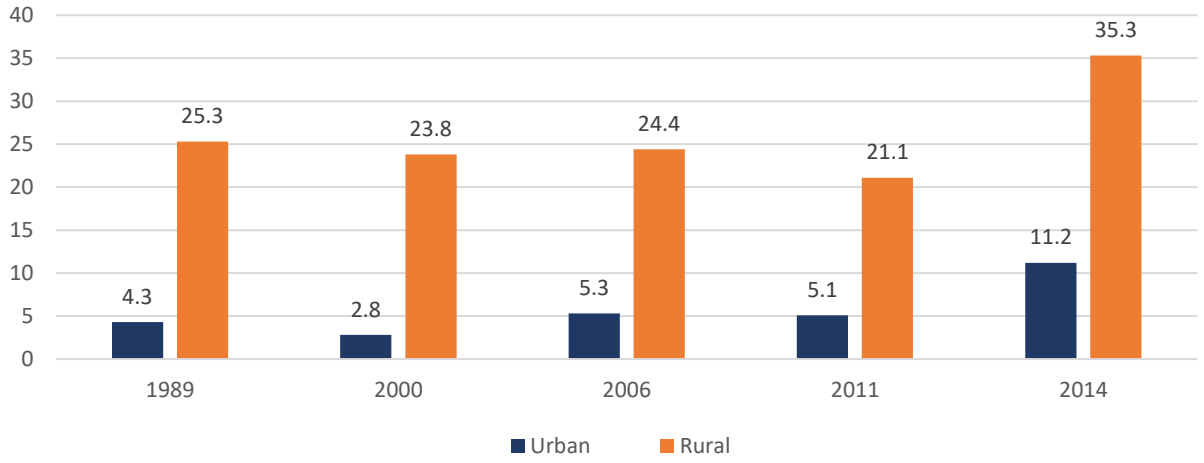
Source: ODM Final Report 2015, ENS 1989 and ENCOVI from 2000 to 2014

FIGURE 11. Percentage of population in extreme poverty by ethnic group (1989–2014)



Source: United Nations Development Program. Guatemala: *MDG Report (Objectivos de Desarrollo del Milenio. Informe Final) 2015; ENS 1989 and ENCOVI 2000 to 2014*

FIGURE 12. Percentage of population in extreme poverty by region (1989–2014)



Source: MDG Final Report, 2015; ENS 1989 and ENCOVI 2000 to 2014

The indigenous population, people in rural areas, and those living in the southwest, north, and northwest (which includes the departments of Alta Verapaz, Quiche, Huehuetenango, San Marcos, and Sololá) continue to experience the highest rates of poverty.[29] Moreover, 46.5 percent of the total population under the age of 5 suffers from stunting.[30] The non-indigenous population and people living in urban areas have experienced a smaller increase in poverty. Poverty in Guatemala is based on exclusion, inequality, and inequity.[31] The lack of public policies with an inclusive and long-term vision, and the decrease in investment in social systems, deepen gaps in access to and provision of social minimums—such as education and health—and reduce opportunities for income gained from decent work. In general, the population living in rural areas, indigenous groups, and women continue to experience low levels of improvement in human development.

EDUCATION

On average, Guatemalans 15 years and older have 5.6 years of schooling.[32] Among indigenous females 15 years and older, the average is only 3.4 years. While the net primary school enrollment rate rose from 71.6 percent in 1991 to 98.7 percent in 2009, the rate then decreased to 80.7 percent in 2015. Historically, public investment in education has been insufficient and public school systems have been

[29] United Nations Development Program. *Guatemala: MDG Report (Objectivos de Desarrollo del Milenio. Informe Final), 2015.*

[30] Guatemala National Institute of Statistics. *National Survey of Maternal and Child Health: ENSMI 2014-2015*. Basic Indicators Report. November, 2015. Guatemala. Accessed June 6, 2017. http://pdf.usaid.gov/pdf_docs/PBAAD728.pdf

[31] United Nations Development Program. *Guatemala: MDG Report 2015.* Guatemala National Institute of Statistics. *National Survey for Employment and Income (2-2014).* Accessed August 18, 2016. https://www.ine.gob.gt/sistema/uploads/2015/07/22/YXFVZe0cIfRDUPYuNwuVak3qjNsF8g2w.pdf

[32] National Survey of Living Conditions (2-2014).

unable to support the growing numbers of students. This has been true at every educational level except primary.[33]

In 2015, 26 out of 100 students in their last year of upper secondary school passed national reading tests and only 9 out of 100 passed the mathematics test.[34] The principal reasons for poor scores include insufficient investment in quality educational programs; lack of attention in native languages for children, particularly those in early years of schooling; and weakness in the training and professionalism of teachers.[35] Stunting affects approximately nearly half of children in Guatemala, thus limiting cognitive development.[36,37]

These statistics identify poverty as a principal cause of attrition in schools: 57 percent of those not in primary school have dropped out because of poverty, as have 69 percent of those not in lower-secondary and 70 percent of those not in upper secondary.[38]

[33] The gross enrollment rate indicates the percentage of the population registered for each grade, regardless of age, according to national regulations.

[34] Employers for Education. “Indicadores Educativos de Guatemala.” Graphic 14. 2015. Accessed June 12, 2017. http://www.empresariosporlaeducacion.org/sites/default/files/Contenido/Recursos/Documentos/Documentos%20Guatemala/indicadores_educativos_de_guatemala_2016_0.pdf

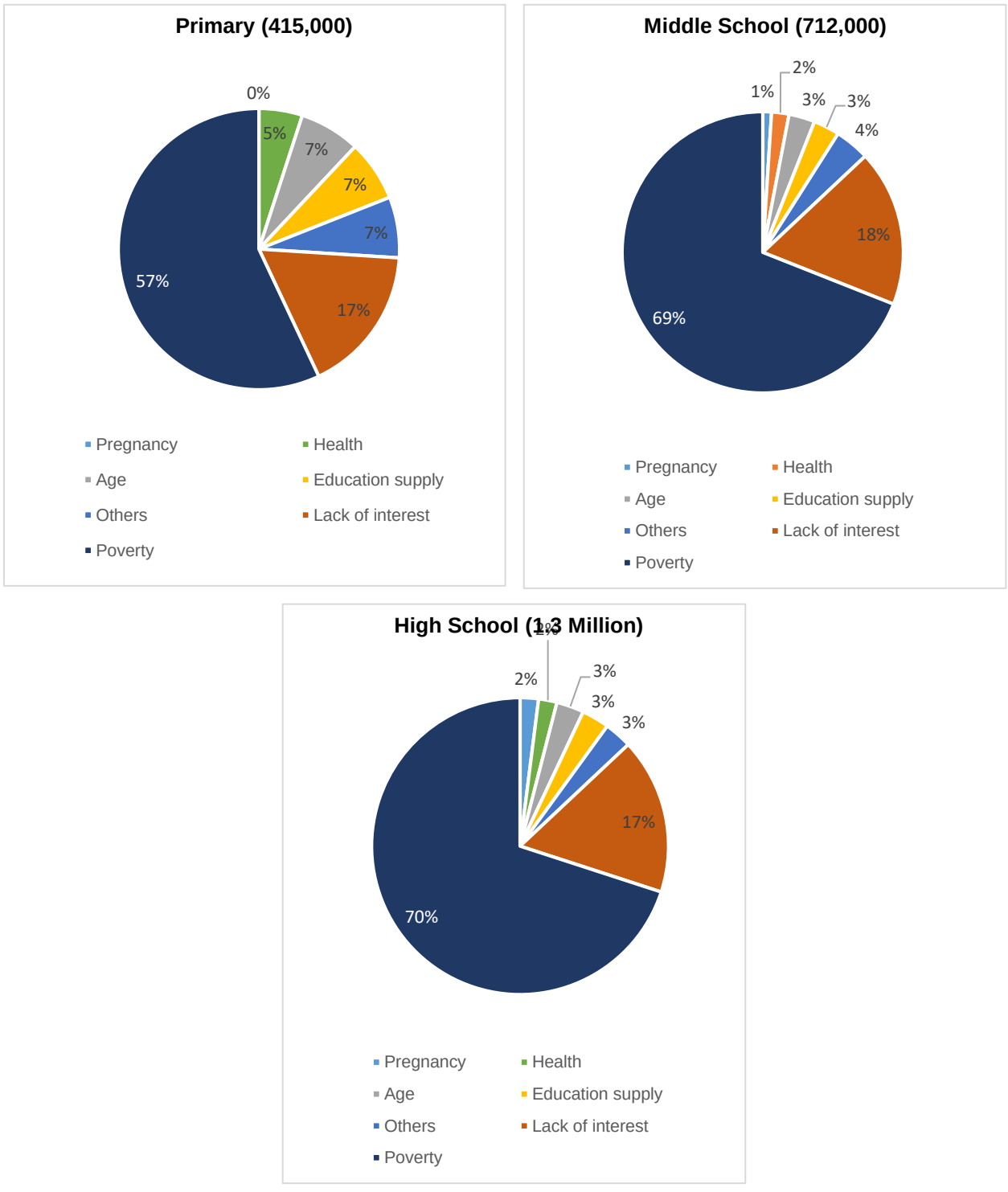
[35] Center for National Economic Research (CIEN) and Inter-American Dialogue. “Guatemala: El Estado de las Políticas Públicas Docentes.” 2015. Accessed June 12, 2017. http://www.thedialogue.org/wp-content/uploads/2015/06/FINALPol%C3%ADticasDocentesGuatemala.pdf

[36] “National Survey of Maternal and Child Health: ENSMI 2014-2015”

[37] Save the Children. “Food for Thought: Tackling child malnutrition to unlock potential and boost prosperity.” 2013. Accessed June 6, 2017. http://www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/FOOD_FOR_THOUGHT.PDF

[38] Central American Institute for Fiscal Studies. "Public Investment in Youth.” Guatemala City.: ICEFI, 2016.

FIGURE 13. Numbers of children/youth out of school and reasons given, by school level



Source: ICEFI/International Plan based on Survey of Living Conditions (ENCOVI) 2014. National Statistics Institute.

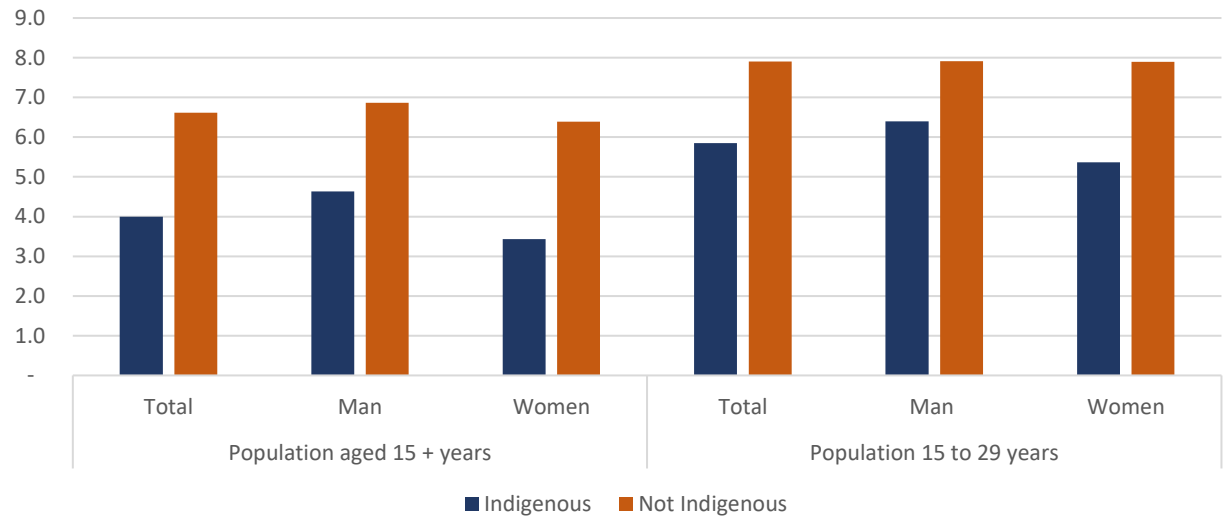
Note: There is no information on the pre-primary education level.

GUATEMALAN YOUTH: STRENGTHS AND CHALLENGES

The supply side of the labor market consists of human capital—the knowledge and skills of individuals able to manufacture goods and provide services. This human capital depends to a great degree on the accumulated years of schooling acquired by individuals and the characteristics and qualities of the education system itself. This educational capital that people accumulate throughout their lifetime is based on the foundation of the first stage of formal education.

In this respect, Guatemala faces a major challenge: on average, the national population has not completed primary education. The breakdown by sex and ethnicity also reveals a strong pattern of social inequality. Figure 14 shows that in 2014, women aged 15 years and older had attained only 5.3 years of schooling on average, as compared to 6 years on average for men. Further, the indigenous population aged 15 years and older had an average of only 4 years of schooling, and indigenous women had achieved only 3.4 years of schooling on average, exhibiting the poorest educational attainment profile of all sex and ethnicity groups.

FIGURE 14. Average number of years of schooling by age, sex, and ethnicity



Source: Calculated based on the Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014

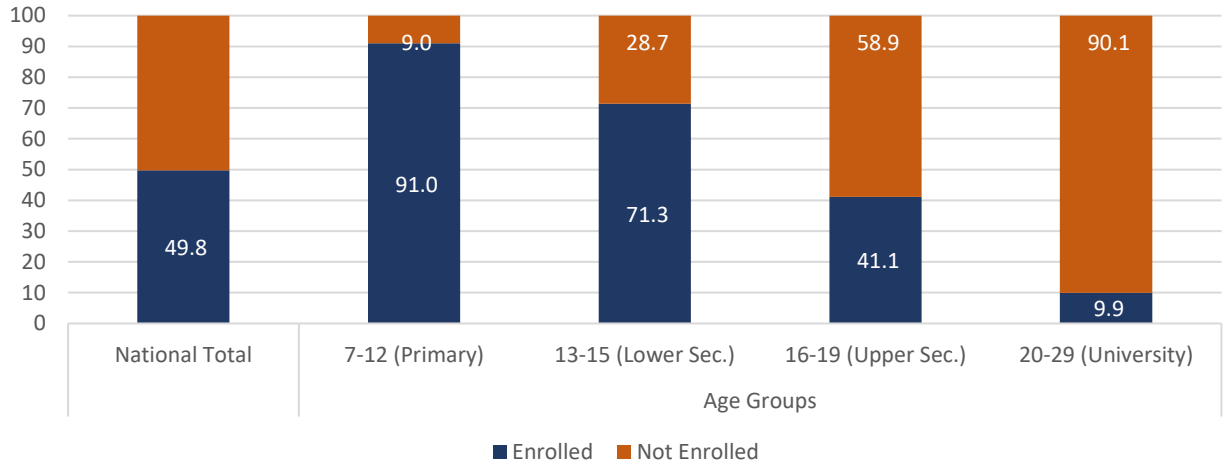
At the same time, figure 14 also shows that youth aged 15 to 29 years are better off in terms of years of schooling than the overall population. In 2014, he total youth population had 1.4 more years of schooling than the total population aged 15 and over. Although gender and ethnicity gaps continue to manifest themselves in the young population, these gaps have been reduced, especially regarding indigenous women.

ENCOVI 2014 indicates that 50.2 percent of the population aged 7 to 29 years old was not enrolled in the education system that year.[39] Figure 15 shows the breakdown of enrolled and not enrolled according to

[39] Guatemala National Institute of Statistics. *National Survey of Living Conditions (2-2014).*

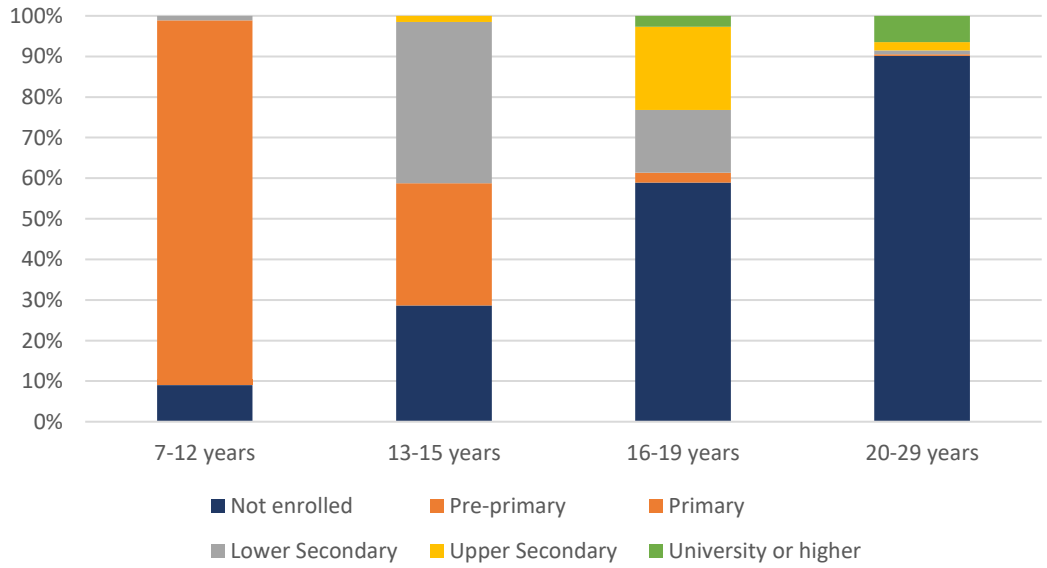
age and the progressive drop off in enrollment according to age. While 9 out of 10 children of school age attended primary education, only 1 in 10 young people between 20 and 29 years old was enrolled in university.

FIGURE 15. Percent educational enrollment of young people by age range



Source: Calculated based on the Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014

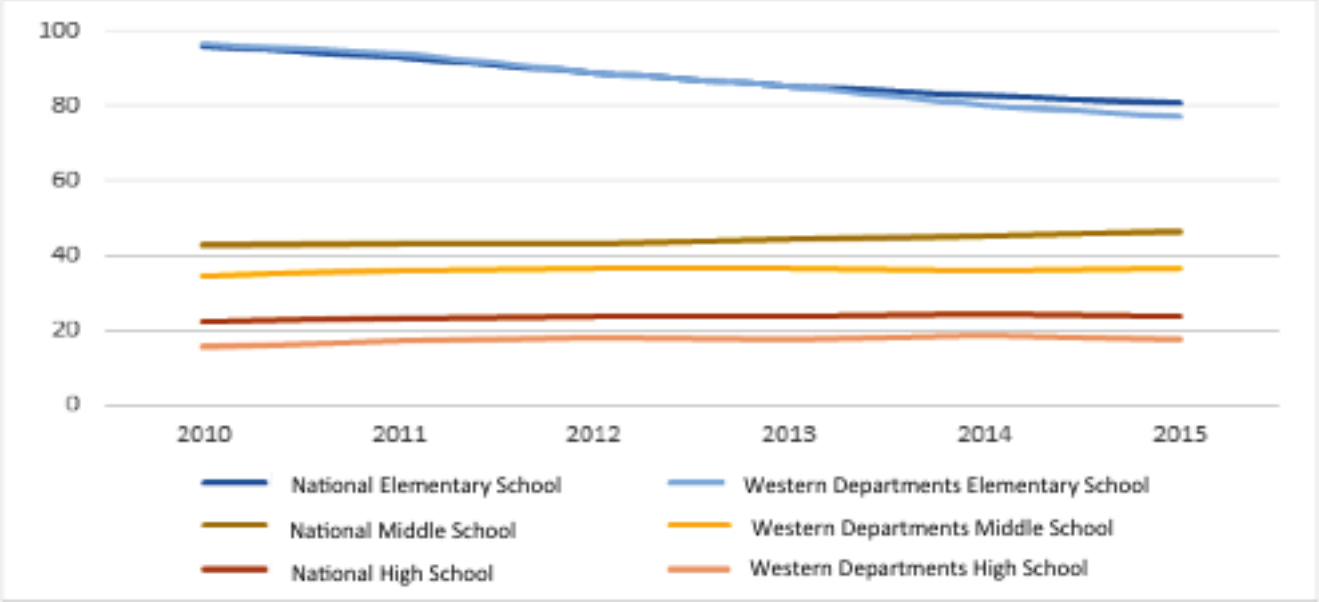
FIGURE 16. Enrollment in the educational system by age group and education level



Source: Calculated based on the Encuesta Nacional de Condiciones de Vida (ENCOVI) 2014

The net enrollment rate over time demonstrates an additional challenge in education in Guatemala. From 2010 to 2015, the education system experienced a steady decline in primary enrollment because of low public investment in education, among other factors. Net enrollment rates in the lower- and upper-secondary levels have not increased. This same phenomenon is repeated in the western departments of the country (Huehuetenango, Quetzaltenango, San Marcos, Totonicapán and Quiche), which also experience lower levels of schooling.

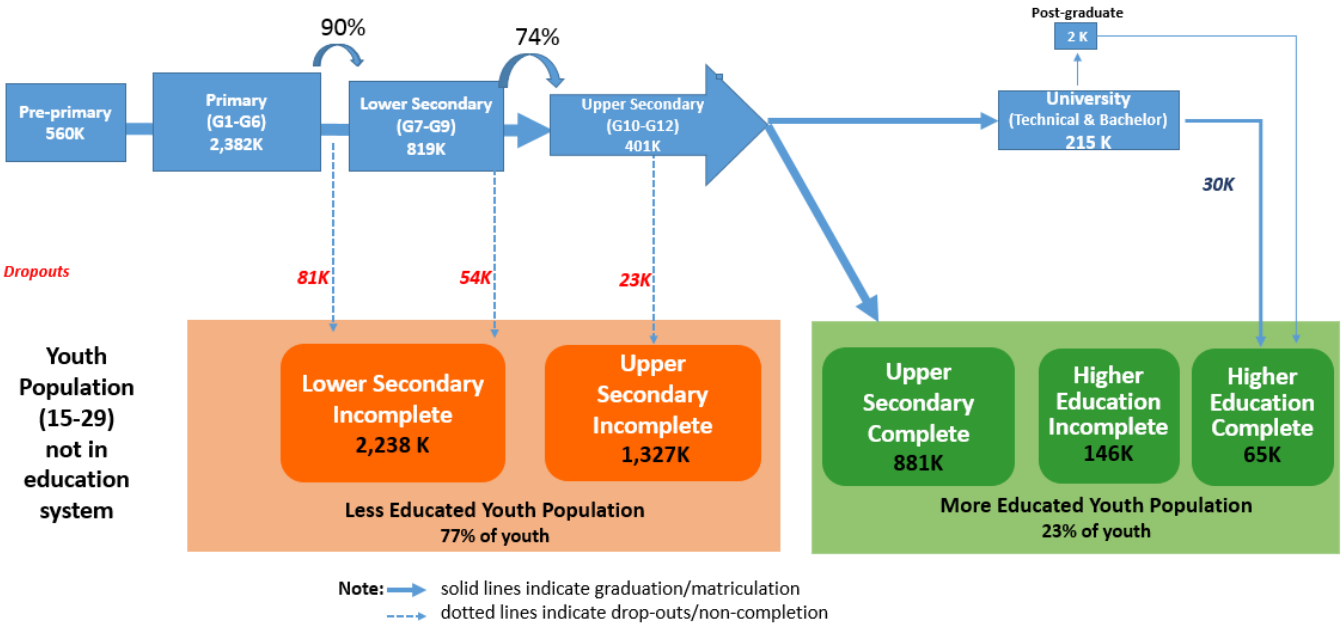
FIGURE 17. Net enrollment rate over time (percentages)



Source: MINEDUC 2015

According to estimates from the ENCOVI 2014, about 2.6 million youth aged 15 to 29 years old (55.7 percent) participated in the labor market. 47.5 percent of all young people in this age group only worked while 8.2 percent both worked and studied. The remaining 44.6 percent did not participate in the labor market; 28 percent neither worked nor studied and just 16.3 percent of all 15- to 29-year-olds only studied. Figure 18 illustrates the distribution of the student population and the working age youth population according to their participation in the educational system and the labor market.

FIGURE 18. Progression of youth through the education system

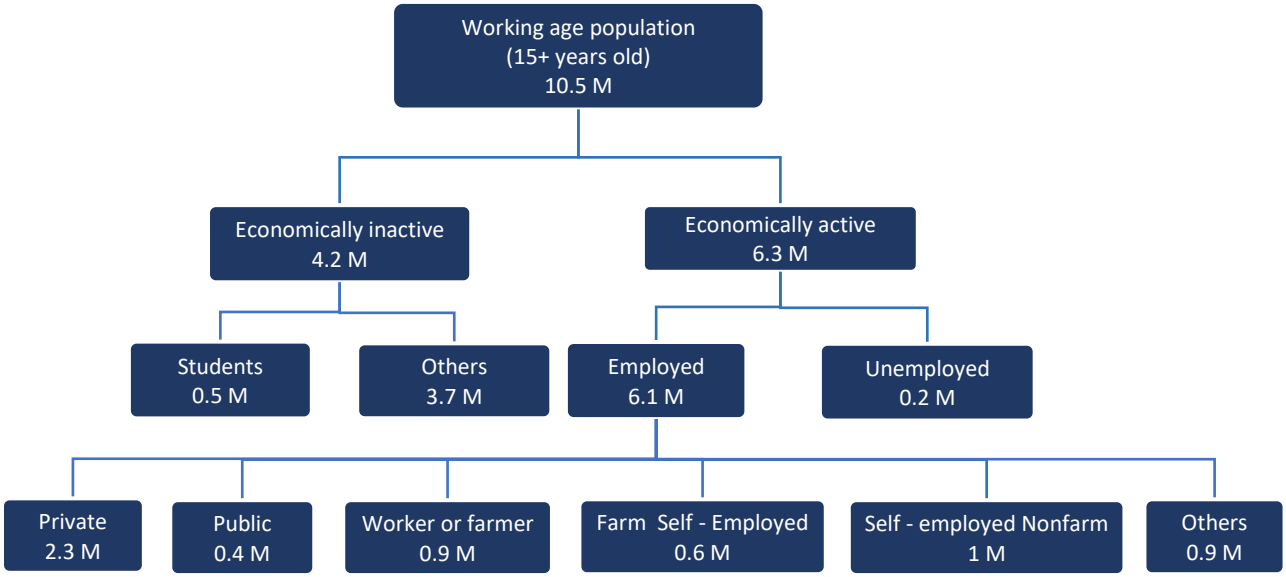


Source: FHI 360 based on data from the National Survey of Living Conditions (ENCOVI) 2014, System of Education Information (MINEDUC)

LABOR MARKET CONTEXT

The economically active population includes approximately 6,316,005 people over the age of 15, of whom 65 percent are men and 35 percent are women. This constitutes around two-thirds of the working age population. The national unemployment rate is 2.9 percent. Women are slightly more likely to be unemployed (3.3 percent) than men (2.7 percent).[40]

FIGURE 19. Working age population and economic activity, 2014



Source: ENEI 2014

Of those employed, the largest group is in private employment, followed by those who are self-employed in nonfarm work, followed closely by farmers and laborers, and others.

Employment is a key link between macroeconomic performance and microeconomic prosperity.[41] However, according to a labor market study conducted by USAID, the National Coffee Association, and the Rural Value Chains Project (Proyecto Cadenas de Valor Rurales, PCVR) in eight municipalities in the departments of Huehuetenango and San Marcos, the potential supply and demand for employment for young people in both departments is limited. There are few job opportunities, and those that exist are difficult to fill because young people do not have the required experience, technical training, and sufficient levels of secondary education.[42]

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[40] Ibid.

[41] World Bank. Guatemala Economic DNA: Harnessing Growth with a Special Focus on Jobs. Washington, D.C. August 2014. Accessed July 2016. http://documents.worldbank.org/curated/en/344081468254937527/pdf/904910WP0Guate00Box385319B00PUBLIC0.pdf

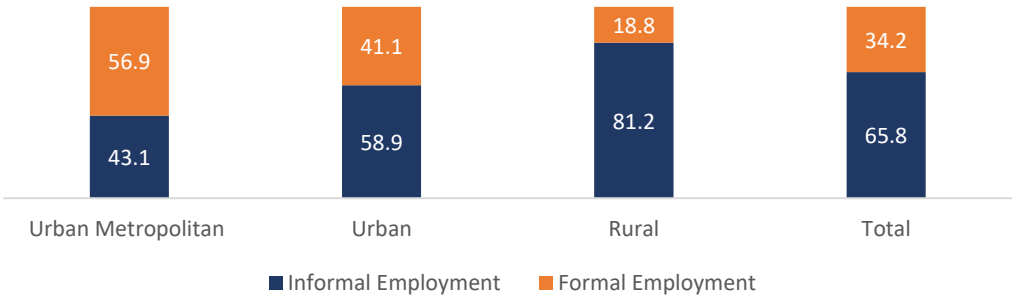
[42] USAID/ANACAFE/PCVR/Education. *Final Labor Market Report on Eight Municipalities in the Departments of Huehuetenango and San Marcos.* Guatemala. March, 2015.

FIGURE 20. Employment by major industry sector, 2014

Source: ENEI 2-2014

Among employed Guatemalans, the rate of employment in the informal sector reached 65.8 percent in 2014 (4 million people as compared to 2.1 million in the formal sector).[43] Agriculture employs the greatest number of people (31.2 percent of the formal labor force and 43.7 percent of the informal labor force); followed by trade (26.4 percent of the formal labor force and 27.9 percent of the informal labor force); and manufacturing industries (14.4 percent of the formal labor force and 11.2 percent of the informal labor force).

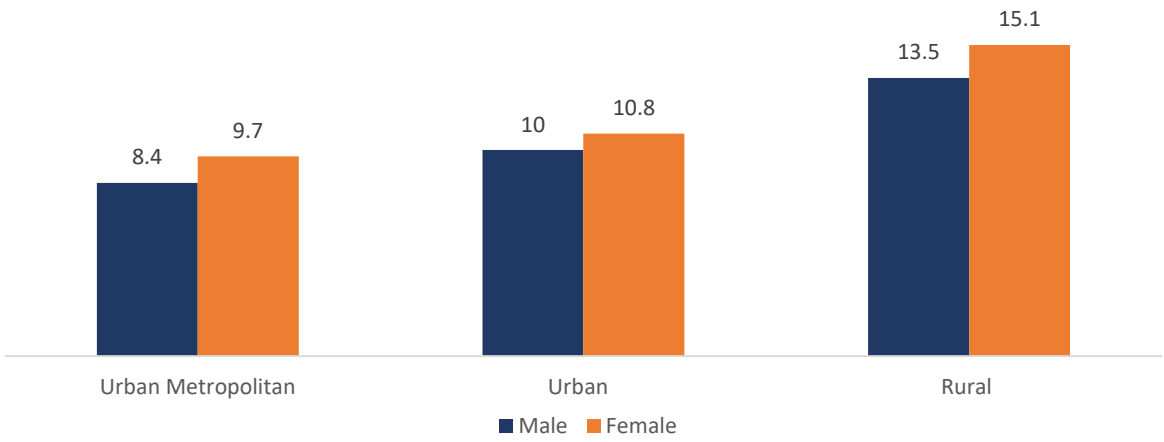
FIGURE 21. Employment by economic sector and region, 2014



Source: ENEI 2-2014

[43] Guatemala National Institute of Statistics. *National Survey of Living Conditions (2-2014).*

FIGURE 22. Underemployment by sex and region



Source: ENEI 2-2014

Although many women manage to find jobs when seeking employment, women are more likely to be underemployed than men. This is particularly true in rural areas. Also, slightly higher percentages of working women end up in the informal sector as do men (65.9 percent as compared to 65.7 percent)[44] where they have little social protection.[45] Most women in the informal sector work in trade (42.3 percent), services (18.3 percent), industry (17.9 percent) and agriculture (16.8 percent).[46] The informal sector is more likely to provide employment for women in rural areas (82.2 percent of those employed), as well as indigenous people (78.4 percent), adolescent girls between 15 and 17 years (93.8 percent), and older adults (87.2 percent).

PRODUCTIVITY

During the period 1989–2014, the average growth rate of labor productivity was -0.2 percent, with cyclical swings (figure 23). The performance of this indicator is explained by a number of factors, including the moderate growth of the economy (an average of 3.5 percent during these years according to the IMF), limited human capital (low educational level and low technical and professional skills), low productivity of much of the working population as almost two thirds worked in the informal sector, limited and deteriorating road infrastructure, the impact of natural disasters (Hurricanes Mitch, Stan, Agatha, among others), and the 2008–2009 global recession.[47]

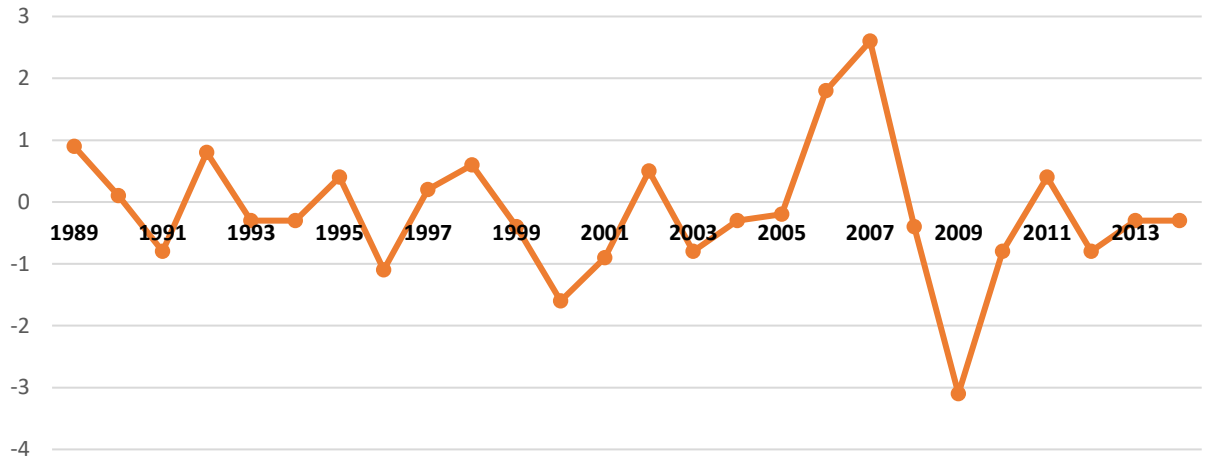
[44] This includes all employed individuals in the following categories: a) employers, employees and workers in businesses with fewer than 6 people; b) all own-account or autonomous workers, excluding professionals and technicians, c) all non-paid family workers, and d) domestic servants (National Statistics Institute, 2015: 83). ENEI-II

[45] Guatemalan Institute of Social Security. *Annual Labor Report, 2014.* Guatemala. http://www.igssgt.org/images/informes/subgerencias/resumen_ial2014.pdf. Access to health services, loans, public pensions (IGSS), paid vacations, bonuses, etc.

[46] Central American Institute of Fiscal Studies. "Public Investment in Youth." 2016.

[47] Guatemala National Institute of Statistics. National Survey of Maternal and Child Health: ENSMI 2014-2015. 2015.

FIGURE 23. Change in labor productivity of the employed population 15 years old and over (1989–2014)*

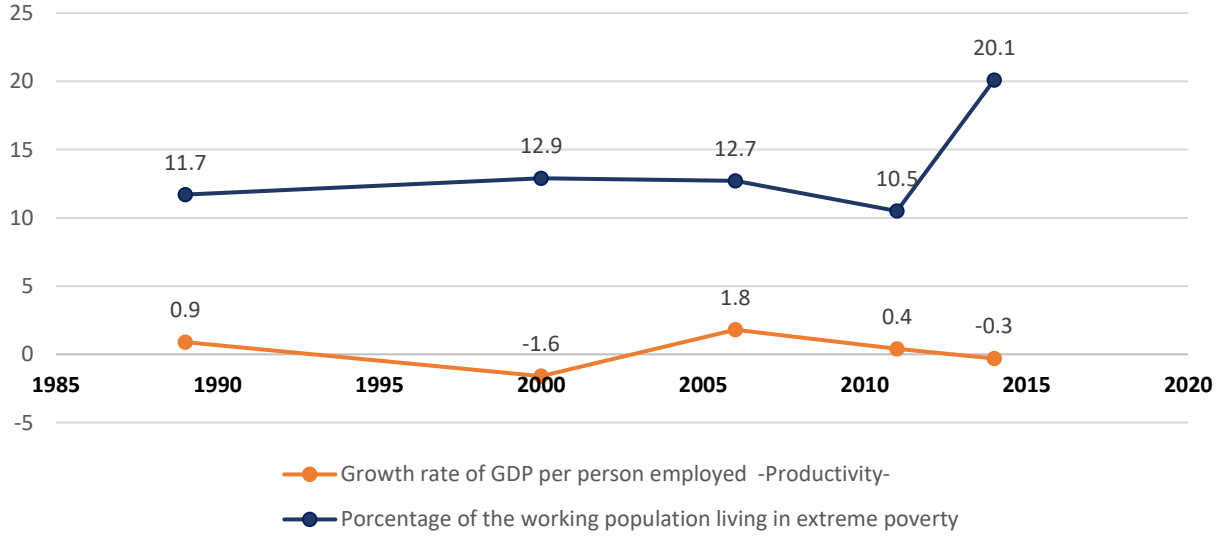


Sources: MDG Final Report, 2015, calculated with data from IMF and ECLAC

*Note: Labor productivity is calculated as GDP per person employed. Labor productivity represents the quantity of product obtained by adding an additional unit of labor to the productive process.

As figure 24 shows, productivity growth and extreme poverty have a negative correlation.

FIGURE 24. Productivity and poverty

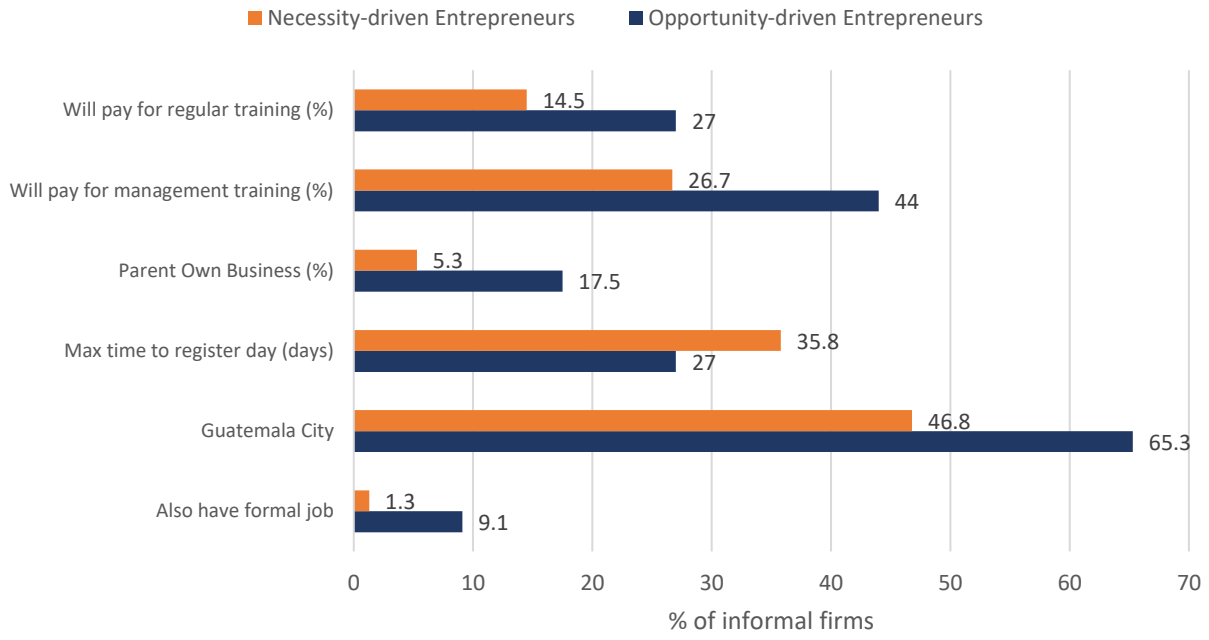


Source: MDG Final Report 2015

CHARACTERISTICS OF ENTREPRENEURSHIP

Micro-, small-, and medium-sized enterprises (MSMEs) are the main source of employment in Guatemala, accounting for 85 percent of total employment and approximately 40 percent of GDP.[48] Slightly more women than men are business owners (52.7 percent versus 47.3 percent).[49] The Global Entrepreneurship Monitor (GEM) ranks Guatemala among the highest worldwide (13 out of 80 countries studied) in terms of entrepreneurship; in 2013–2014, 19.3 percent of Guatemalans aged 18–64 were nascent entrepreneurs or owners of a new business. A very high percentage of people in Guatemala consider entrepreneurship a desirable career choice (89 percent), ranking it third among all countries worldwide.[50] While this statistic may be seen as positive, it also reflects a lack of job opportunities.[51]

FIGURE 25. Opportunity-driven enterprises tend to be more productive than necessity-driven enterprises



Source: Global Entrepreneurship Monitor 2014-2015

[48] Inter-American Development Bank. *Bank Industrial MSME Financing Partnership.* Washington, DC, 2010. http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=37953697.

[49] Ministry of Economy. Guatemala Emprende: National Policy on Entrepreneurship, 2015.

[50] Babson University et. al. *Global Entrepreneurship Monitor: 2014 Global Report*. United States. 2014.http://www.babson.edu/Academics/centers/blank-center/global research/gem/Documents/GEM%202014%20Global%20Report.pdf

[51] Ibid.

Entrepreneurship in Guatemala is driven more by necessity than by opportunity.[52] 35.9 percent of early-stage businesses are held by people with low levels of formal education.[53] The majority of entrepreneurs are self-employed; 71 percent are consumption-focused and operate small businesses out of necessity. No additional jobs are generated by 42 percent of these entrepreneurs.[54] Meanwhile, opportunity-driven entrepreneurs are more likely to have formal jobs, live in Guatemala City, pay for their training, and have parents who own their own business.[55]

ANALYSIS AND SECTOR SELECTION

Inclusive economic growth is necessary for poverty reduction in Guatemala. If current patterns of economic growth continue without improved productivity, it would take the country more than 24 years to reduce extreme poverty to the Millennium Development Goal (MDG) of 9.1 percent of the population, and almost 60 years to reduce overall poverty to the MDG of 31.4 percent of the population.[56] Reaching an average annual growth rate of at least 6 percent over the next 10 years would require public policies formulated around a sustainable, comprehensive, and long-term vision. Additionally, policies must consider improved investment practices, improvement in human capital, and innovation and modernization of processes in sectors that currently have lower competitive advantages.

In general, poverty has been associated with the lack of what society considers basic economic resources or living conditions.[57] A more nuanced concept of poverty, however, goes beyond considerations of income to include issues of deprivation, capabilities and fundamental human rights.[58] The UNDP concept of human poverty includes lack of sufficient income as an important factor in human deprivation, but not the only one.[59] For the UNDP, this definition of poverty is closely linked to the concept of human development, understood as the process of broadening people's choices, allowing people to live long and healthy lives, and giving them access to the knowledge and resources needed for a decent standard of living.[60] Therefore, improving education and health care would give the poor and vulnerable more opportunities to overcome poverty.[61]

In Guatemala, there is a clear need for more investment in human capital to create more and better jobs. greater and better investment in health and education, based on a comprehensive, long-term vision—and

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[52] World Bank. Guatemala Economic DNA: Harnessing Growth with a Special Focus on Jobs.

[53] Ministry of Economy. "Guatemala Emprende," National Policy on Entrepreneurship, 2015. Guatemala, 2015. Accessed July, 2016. http://www.mineco.gob.gt/sites/default/files/SDE/Emprendimiento/guatemala_emprende_version_final.pdf.

[54] Ibid.

[55] World Bank. Guatemala Economic DNA: Harnessing Growth with a Special Focus on Jobs.

[56] FUNDESA. Guatemalans Improve Guatemala: A Proposal for a More Prosperous, Solidary, and More Secure Guatemala. Guatemala. 2012. https://issuu.com/fundesaguatemala/docs/mejoremosguate.

[57] Williams, Louise D. "Training for the World of Work: A Value Chain Approach." The Jobs Challenge: Fresh Perspectives on the Global Employment Crisis. Developing Alternatives, (Vol 15: 1), 2012.

[58] Sen, Amartya. *Libertad y desarrollo.* Bogotá: Editorial Planeta. 2000: 114.

[59] United Nations Development Program. *Guatemala: Millennium Development Goals Final Report, 2015.*

[60] Ibid.

[61] Ibid.: 118

going beyond the efforts of past lackluster programs. Inclusive growth requires skills-based, people-centric investments.

Since the 1990s, the lack of opportunity in Guatemala has created new migration patterns, mainly composed of those looking for work abroad. The west of the country has been the greatest contributor to such migration.[62] The immigrant population from Guatemala living in the United States is made principally of those of working age. Most of these migrant workers in the United States find jobs in the construction industry, manufacturing, and in certain service subsectors—particularly in food, recreation and lodging, and administration.[63] However, it is important to note that 55.6 percent of immigrants to the United States in 2012 did not graduate from high school,[64] thus limiting their future opportunities.

Generating good employment opportunities is crucial to boost productivity and growth. Equally important is the integration of efforts under a broad strategic vision.

STAKEHOLDER MAPPING

Figure 26 shows actors in the labor market system—organizations, individuals, and entities—initially identified as agents of potential support to strengthen tertiary technical education in Guatemala. These include actors from the public sector, private sector, civil society organizations, national and international cooperation, the education sector, and the present and future workforce. The figure also shows intermediaries—those having relationships with and links to one or more groups of actors.

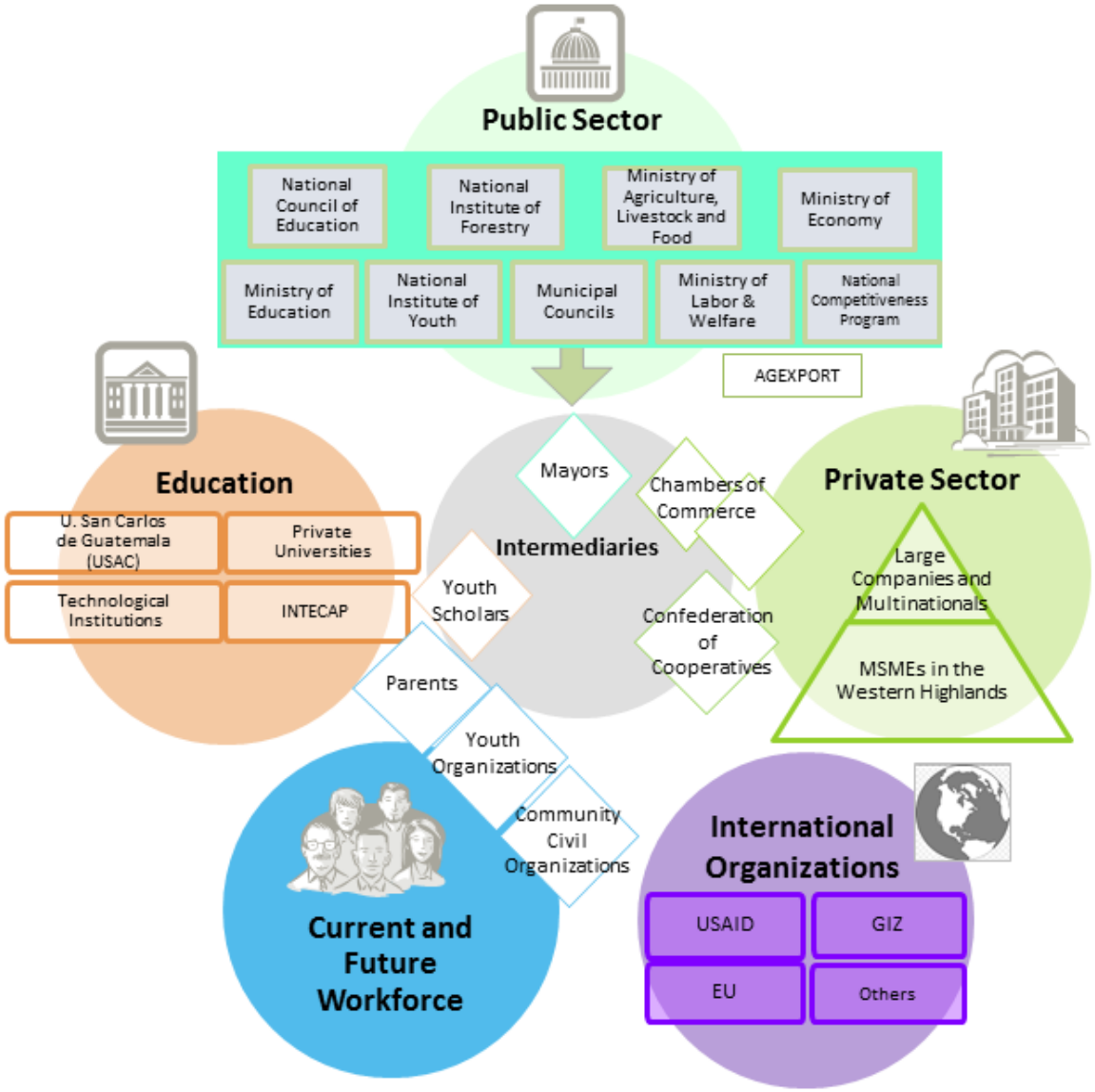
Some of the actors are linked to the labor market (e.g., technical skills and demand for these). Others are key to influencing public policies and to the transformation of education in the country. Still others support engagement between technical tertiary institutions and academia. Table 2 identifies potential roles for the stakeholders identified in the labor market system map. The first column lists the actor and the second describes how they are already, or could be, helping tertiary technical education to improve the skills of young people and increase their integration into the labor market. During the development of the program, additional actors are also likely to emerge.

[62] Rodríguez, Manuel. "Occidente, la región con más índices de migración." *La Hora*, Guatemala, March 5, 2015. Accessed June 12, 2017. http://lahora.gt/occidente-la-region-con-mas-indices-de-migracion/.

[63] Center for Central American Financial Studies and Inter-American Development Bank, Multilateral Investment Fund. *Profile of Guatemalan Population in the United States.* June 2014. http://www.cemla-remesas.org/principios/pdf/PrincipiosRemesas-Guatemala-2014.pdf.

[64] Ibid.

FIGURE 26. Guatemala workforce development system actors



Source: Adapted from Workforce Connections, FHI 360

TABLE 2. Stakeholder Roles

PUBLIC SECTOR	
National Education Council	Actor for secondary education reform and transition for tertiary technical careers
USAC-Universidad de San Carlos of Guatemala	Actor in favor of supporting innovative tertiary technical careers and providing scholarships to students
Technical Institute for Training and Productivity	Actor to expand technical training at the tertiary level
Ministry of Education (national and departmental)	Manages secondary technical programs (*ciclo diversificado*) and the National System of training for work
Municipal Councils at the Departmental level	Actors in promotion, dissemination, and investment in tertiary education
Mayors	Actors in support of strengthening post-secondary non-tertiary education, upper secondary cycle, and tertiary technical education
National Institute of Youth	Reference for identifying youth organization leaders inside the country
National Institute of Forestry	Technical assistance and tertiary training centers for forestry issues
Ministry of Agriculture, Livestock, and Food	Technical assistance and centers of tertiary education in agriculture, livestock, and food issues
Ministry of Labor and Social Welfare	Technical assistance and tertiary education in issues concerning labor policy
Ministry of Economy	Reference to entrepreneurship policy, foreign trade policy, and support for economic growth
National Competitiveness Program	Manages programs and projects in support of competitiveness
PRIVATE SECTOR	
Private universities present in the target areas	Actor in favor of strengthening existing degree programs and encouraging innovative proposals for tertiary technical education
Federations National Council of Cooperatives and Development Foundation	Institutional space to support young leaders in tertiary education processes that drive scholarship programs at the tertiary level; support internships for students and job creation
Chambers of Commerce and Subsidiaries	Strategic actors in employment generation
Guatemalan Association of Exporters (AGEXPORT)	Actor in opening export markets and thus in generating employment for technical university students
Small, medium and large enterprises	Generators of jobs and improving business competitiveness
Technological institutes	Technical training centers with technological specialties updated in response to labor demand
INTERNATIONAL ORGANIZATIONS	
Programs and projects directly involved in youth employment and technical education (international cooperation)	Coordination of efforts to support post-secondary non-tertiary technical education and tertiary technical education
CIVIL SOCIETY ORGANIZATIONS	
Community social organizations (cultural context)	Reference for the support and promotion of rural tertiary technical education
Youth Organization	Identification and motivation of young leaders to diversified post-secondary non-tertiary technical education and tertiary technical education
Youth Scholars	Disadvantaged youth with leadership potential in their communities to promote development—selected for scholarships in technical tertiary education promoted by the program
Parents of Youth Scholars	An essential part of the educational community

SECTOR SELECTION

The evaluation team used a rigorous methodology to assess and prioritize subsectors with respect to their potential for job creation. Predicting job growth with some degree of precision is almost impossible, especially given the short time and insufficient data to complete a full analysis. However, using certain widely available data, combined with selected qualitative criteria and expert opinion, project managers developed an objective framework for selection of subsectors.

Criteria and methodology for subsector selection

The team adapted a methodology developed for the World Bank[65] to conduct a rapid assessment with limited resources. The approach ranks subsectors according to three sets of criteria in a Sector Appraisal Matrix, as described below.

Step 1. Identifying subsector selection criteria

The first step, before collecting data, is to establish the subsector selection criteria.

Size of subsector. The indicators in this group all aim to characterize the scale of the subsector, which is linked to its capacity to provide employment. If reliable employment data at the appropriate level of disaggregation were available, no other indicators would be needed in this group. However, in Guatemala, as in many countries, only rough estimates of employment are available at the individual subsector level. However, for almost all subsectors, data on exports or expenditures are available. Where the reliability of the employment data is weak, the weight for employment is reduced and the score for the size criterion is derived from a weighted average of the scores for employment, exports, and/or expenditure.[66] These data, in turn, can also be enhanced when quantitative or qualitative estimates can be generated indicating the intensity of activity in that subsector for the target region, as opposed to the entire country. For example, although palm oil is quite 'large' for Guatemala as a whole, it is virtually non-existent in our target region.

Growth potential. It is impossible to accurately predict which subsectors will grow. However, some indicators (such as recent trends in export growth) tend to correlate with future growth. In addition, forecasts made by working groups of subsector experts[67] incorporate valuable industry-specific knowledge of market and technology trends. This group of indicators includes an "economic diversity" measure, derived from the Atlas of Economic Complexity[68] , which estimates the potential contribution to

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[65] World Bank. "Sector Competitiveness Analysis Tools: A Reference Guide." Finance and Private Sector Division. 2011.

[66] The goal is to understand the current size of the sector's employment (i.e., how many people it will impact). Since employment data are not easily available, we used proxies. Size of exports is a good proxy for "size." The data are reliable but are skewed toward more expensive products. Relative employment in tobacco, for example, is likely to be lower than the relative value of exports. Looking at exports does not aid in estimating employment in a product or service largely sold in the domestic market. For this reason, we also included domestic expenditure (both business to business, or intermediate, and business to consumer, or final consumption) to get a balanced picture of the value of production. The total export amount plus domestic expenditure gives the total value of production, which is a reasonable proxy for 'size' (with the exception mentioned above that $1 million of higher value products will not represent as much employment as $1 million in a low value product).

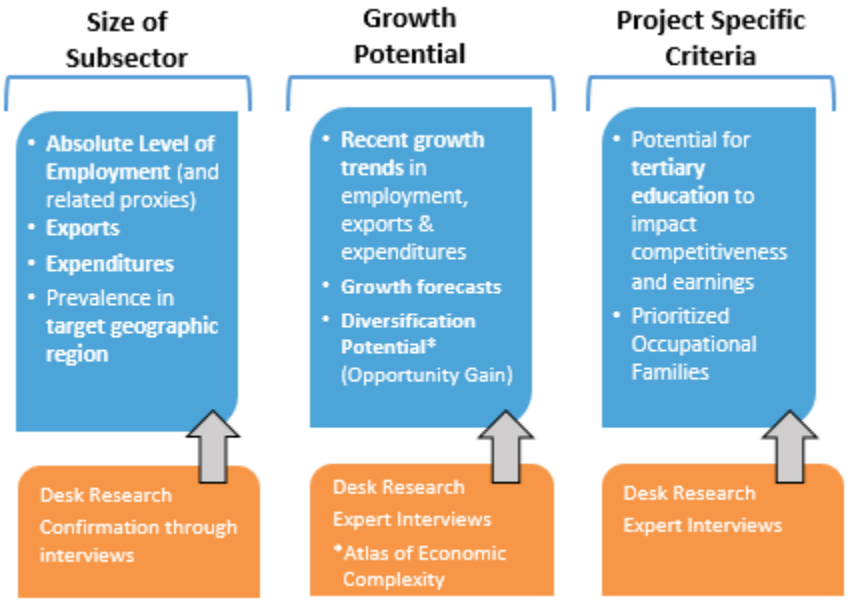
[67] FUNDESA. *Guatemalans Improve Guatemala: A Proposal for a More Prosperous, More Solidary, and Safer Guatemala*. Guatemala, 2012. Accessed June 2016. https://issuu.com/fundesaguatemala/docs/mejoremosguate.

[68] Hausmann, Ricardo & Hidalgo, Cesar, "Atlas of Economic Complexity: Mapping Paths to Prosperity." Harvard University Center for International Development and MIT Macro Connections Media Lab, 2011.

industrial diversity and economic complexity (the "opportunity gain" indicator) from expanding economic activity in any given subsector. This indicator has been shown to correlate well with future GDP growth.

Project specific criteria. The final group of indicators incorporates criteria with specific reference to the Advance Program's terms of reference. The "higher educational potential" indicator attempts to capture the potential for the program to affect competitiveness, employment, and poverty directly or indirectly in a subsector via interventions in tertiary educational institutions. (Interventions may be via education and direct university-industry linkages with subsectors such as contract research, applied research centers, and student projects). The "Prioritized Occupational Families" reflect the government's prioritization of ten occupational groupings (out of a total of 28) based on the proportion of people employed.[69]

FIGURE 27. Subsector selection categories and criteria



Step 2: Creating the long list

Drawing on existing data sources, the team compiled a "long list" of roughly 144 subsectors and subsectors representing the widest possible universe of goods and services to be considered. This was drawn from the key exports, leading domestic industries,[70] and notions of emerging subsectors.[71] Certain subsectors were eliminated (e.g., metal ores—a conflict industry in Guatemala) because they failed to meet basic project requirements, therefore obviating the need for data-driven analysis.

[69] More than 80 percent of Guatemalan workers are involved in an economic activity linked to one of the top ten occupational families. See Government of Guatemala, Ministry of Labor and Social Welfare, General Directorate of Employment, Labor Market Observatory. "Characterization of the Guatemalan Labor Force by Occupational Family." 2016. Accessed June 12, 2017. http://empleojuvenil.info/wp-content/uploads/2017/01/2-Caracterizacio%CC%81n-de-la-Fuerza-de-Trabajo-en-Guatemala-por-Familia-Ocupacional.pdf

[70] Bank of Guatemala. "National Accounts." Average consumption and household expenditures. 2015. Accessed June 12, 2017. http://www.banguat.gob.gt/cuentasnac/Tomo_II_2012_act2015.pdf

[71] FUNDESA. *Guatemalans Improve Guatemala: A Proposal for a More Prosperous, More Solidary, and Safer Guatemala*.

Step 3: Developing the subsector appraisal matrix

Based on information from initial interviews, and applying the subsector selection criteria, the candidate subsectors were narrowed down to a "medium list" and finally a short list via a sector appraisal matrix (see figure 30). The matrix allows both quantitative and qualitative information to be assessed together by converting all criteria to scores ranging from 1 to 5. Weights are applied to each criterion, resulting in a total score for each subsector.

The most reliable and objective data were for exports and domestic expenditures, due to the systematic and well-established data collection mechanisms for these indicators. In some cases, as for the economic diversity index, we had quantitative data only for product subsectors; we used qualitative judgement to estimate scores for the services subsectors. While very few subsectors have official data on employment at this level of aggregation, nearly all subsectors have reliable data on at least exports or expenditures. For this reason, the sum of weights assigned to those two indicators is greater than to employment in the appraisal matrix.

While it is not recommended that projects strictly follow the priority rankings that result from the subsector rubric, this consistent and objective framework is useful as a basis for discussion. Below provides further detail on the selection criteria. The category of subsector size includes territoriality, or presence of the subsector in the target region. The category of growth potential includes trade behavior analysis, product diversification and economic complexity.

Territoriality

The program aims to assist the following populations: disadvantaged youth from rural and urban communities who live in communities with high rates of crime or violence, indigenous populations, and those excluded because of ethnicity, sex, religion, disability, or sexual orientation or identity. Attention is also placed on addressing gender inequalities.

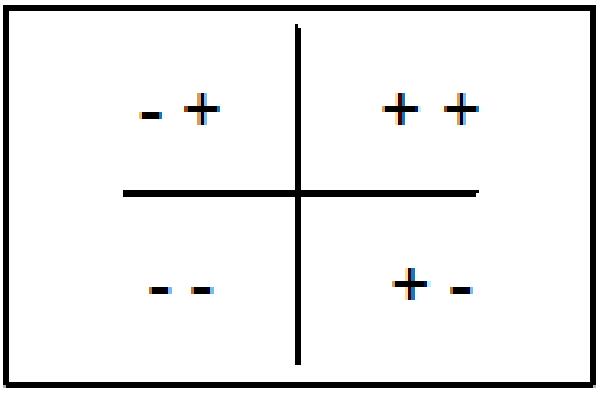
The program will work in departments that have a high incidence of poverty such as Quezaltenango (56.0 percent), San Marcos (60.2 percent), Huehuetenango (73.8 percent), Totonicapán (77.5 percent) and Quiché (74.7 percent).[72] One of the criteria considered in the Sector Appraisal Matrix was the existence of subsectors in these departments and their potential for employment growth as understood by experts. The deliberation was based on a 1 to 5 ranking, where 1 indicated low potential relationships in employment in the region and 5 indicated high potential employment generation. It should be noted that this territorial weighting does not preclude a focus on other populations.

Trade analysis

Both the volume and performance of exports were important criteria in the subsector selection evaluation (under the broader category of growth potential). It was necessary to assess whether exports have increased only because the market size has grown, or if market shares have indeed expanded. Therefore, it was important to combine these criteria: the value of exports with patterns of market behavior.

[72] Guatemala National Institute of Statistics. *National Survey of Living Conditions (2-2014).*

FIGURE 28. Stylized Trade Share Matrix



One tool to analyze the dynamic behavior of recent trade is the trade share matrix (an adaptation of the Boston Consulting Group Matrix, or BCG).[73] The matrix categorizes exports into two dimensions: (1) on the x-axis, the annual growth rate of the world market during a given time period, and (2) on the y-axis, the annual growth rate of Guatemala's exports during that time period (see figure 28 for a stylized matrix).

- **Quadrant + +:** indicates that both world markets and the country's exports are growing faster than average. (This corresponds to the "stars" quadrant indicated in red lettering in figure 29.)
- **Quadrant + -:** indicates that world markets are growing faster than average, but the country's exports are growing slower than average (or shrinking). (This corresponds to the "opportunities" quadrant in figure 29.)
- **Quadrant - -:** indicates that the world market is growing slower than average (or shrinking), and the country's exports are as well. (This corresponds to the "challenges" quadrant in figure 29.)
- **Quadrant - +:** indicates that world market is growing slower than average (or shrinking), but the country's exports are growing faster than average. (This corresponds to the "cash cows" quadrant in figure 29.)

The resulting Guatemala trade share matrix (figure 28), describing the top 30 export products[74] for the years 2010–2014, outlines the dynamic behavior of trade in Guatemala relative to the world (figure 28). The size of each bubble indicates the value of exports. To provide the "relative" context to optimize the four quadrant titles, an extra frame showing the average growth of the country's exports (parallel to x-axis) and the average growth of the world market (parallel to y-axis) has been added in dotted red lines.

- Guatemala's 'stars' quadrant (where Guatemala's growth is above average in markets that are also growing at an above average rate) includes legumes, petroleum gas, plastic lids, refined petroleum, light rubberized knitted fabric, flavored water, baked goods, palm oil, and ethyl alcohol (a synthetic organic chemical used at the industrial level).[75]

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[73] The trade share, or Bethesda, matrix is an adaptation of the well-known Boston matrix originally introduced by the Boston Consulting Group for analysis of firm-level strategy. The trade share matrix has a similar strategic dimension, but is used here primarily as a predictive device. For a succinct and accessible discussion of the strategic implications of the Boston matrix, see Koch. R., The Financial Times Guide to Strategy. How to Create and Deliver a Useful Strategy. 3rd edition. 2009. London.

[74] These are the top 25 out of 1,250 products in the Harmonized System (HS) codes at the 4-digit level (developed by the World Trade Organization). These 25 products represent $7.5 billion in exports and account for 65 percent of Guatemala's total commodity exports.

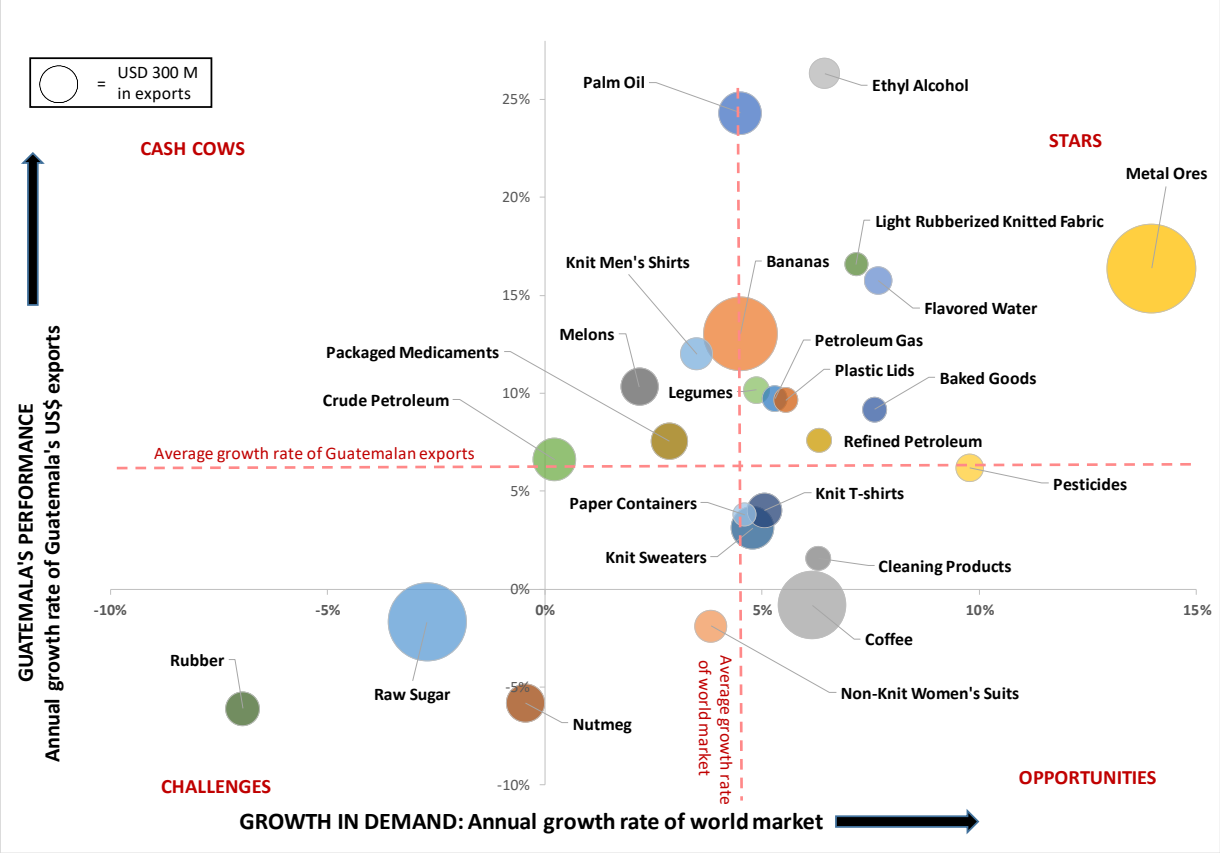
[75] Metal ores also appears in this quadrant, but as it is a conflict industry in Guatemala, has been disqualified for support and not included in the sector selection process.

- The “cash cows” quadrant (where Guatemala’s performance is strong in a relatively weak market), includes products such as bananas, knit men’s shirts, melons, crude petroleum, and packaged medicaments.
- The “opportunities” quadrant (where the global market is growing faster than average but Guatemala’s export growth rate is below average) includes paper containers, knit t-shirts, knit sweaters, cleaning products, coffee, and pesticides.
- Finally, the products found in the “challenges” quadrant (where both the global market and Guatemala’s exports are both growing slower than average), include women’s suits,[76] raw sugar, rubber, and nutmeg.

A derivative of the rate of growth of exports in Guatemala and the rate of growth of Guatemala’s share of the world market were included as criteria in sector selection. To boost competitiveness, a higher weight was placed on products in the stars and cash cow quadrants.

[76] Specifically, this category includes women’s suits as well as other apparel such as separates, skirts, dresses, pants, shorts, etc. that are not knitted or crocheted, but generally made of woven fabric.

FIGURE 29. Trends in relative market share and export market size (Guatemala trade share 2010–2014)



Source: Developed by FHI360, based on international trade data for 2010 and 2014 from MIT. Note: This matrix does not reflect changes in Guatemalan or global exports since 2014, which may be significant in particular subsectors that have been affected by internal and/or external factors.[77]

Product diversification and economic complexity

Another indicator that adds considerable accuracy to the "growth potential" criterion is derived from the Atlas of Economic Complexity.[78]

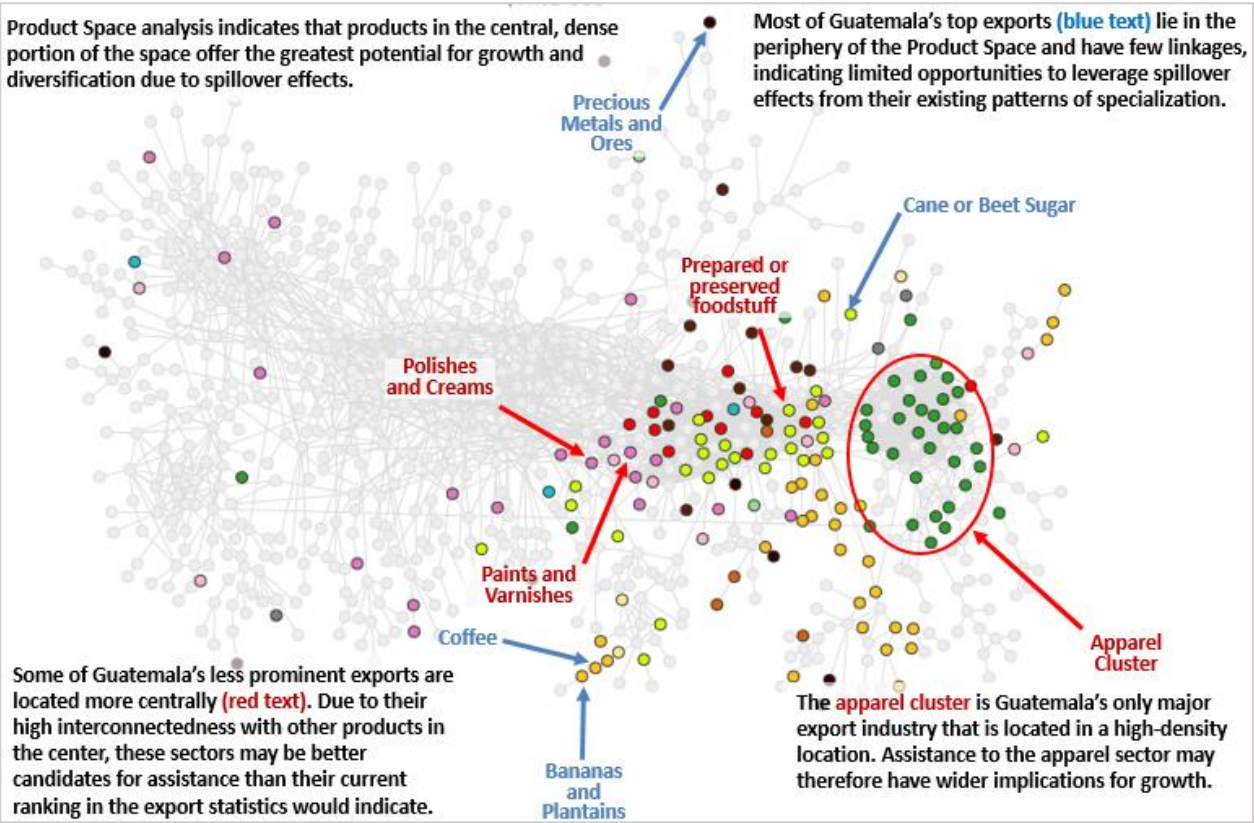
Our ability to extract meaningful information from highly aggregated and unreliable data is limited, but trade data tend to be more detailed and of a more uniform quality (since data can be verified from two sources, the exporters and the importers), and some researchers at Harvard University, led by Ricardo Hausmann and Cesar Hidalgo, have developed pioneering new methods to utilize these data. Their "product space analysis" utilizes, across all countries in the world, the correlation between increases in

[77] Metal ores – which, as a conflict industry, has been disqualified for support from this program-- lies in the upper right-hand quadrant due to an increase in prices in the international market during 2010–2014. However, the position/size of the bubble does not imply significant job creation (in contrast to the vegetables and fruits sector, for example, where the total value of exports is lower but the sector generates higher employment). It is also important to note that foreign direct investment in the mining sector in Guatemala has declined in recent years.

[78] Hausmann, Ricardo & Hidalgo, Cesar, "Atlas of Economic Complexity: Mapping Paths to Prosperity." Harvard University Center for International Development and MIT Macro Connections Media Lab, 2011.

exports for specific products and a country's subsequent growth. Their analysis concludes that income rises faster in countries whose product mix has a higher "economic complexity"—i.e., production is dependent on a denser and more tightly integrated network of overlapping capabilities, ranging from natural resources, to infrastructure, to human capital (such as skills and intellectual property). This economic complexity is correlated with income growth because overall, complex products tend to be more difficult to produce and their scarcity raises their value.

FIGURE 30. Product space analysis of economic subsectors in Guatemala



Source: R. Hausmann, C. Hidalgo et al., "Atlas of Economic Complexity" Kennedy School, Harvard University & MIT Media Lab. http://atlas.cid.harvard.edu/explore/product_space/export/gtm/all/show/2014/

The product space analysis can serve as a guide to optimizing future export diversification for a country, using a special mapping of the products' relationships to one another. It provides a network map in which the distance between products is correlated to the strength of their relations in terms of export growth and the specific location of the bubbles on the map reflects the degree to which the products are linked—through the kinds of technology, skill sets, or other factors required to produce them.[79] Based on conditional probability analysis of trade flows, for any given export product in which a country currently specializes, there are other products that share the same resources and labor capabilities (including skills). For example, countries competitive in the export of fresh flowers also tend to be competitive in the export of fresh fish, since both depend on the existence of a world-class cold chain.[80] If an economy is

[79] The Atlas of Economic Complexity. Accessed at http://atlas.cid.harvard.edu/about/glossary/.

[80] World Bank. Sector Competitiveness Analysis Tools (SCAT) Reference Guide. 2011. 35-36.

competitive in exporting product X, then it will have higher chances of upgrading to production of other products that are in the neighborhood of product X on the map.

In figure 30, each colored bubble on the chart represents a product that Guatemala exports. Colored bubbles (as opposed to gray) have a Revealed Comparative Advantage score of 1 or greater.[81] This means that Guatemala is already successfully exporting the selected product. The color of the bubble represents the category of export products (e.g., green for textiles and apparel, yellow for processed foods).

The central, dense area of the product space includes the most promising products. Unfortunately, most of Guatemala's existing high volume export products are concentrated in the periphery of the product space, where there are very few of the growth-inducing spillover effects that foster economic complexity. In fact, most of the biggest export products only have one linkage in the product space network (coffee, bananas, palm oil, cane sugar), while other products such as electric machinery, packaging materials, and milk products (all of which Guatemala exports but in smaller quantities) are in the center of the product space, with as many as 15, 20, and even 25 growth-inducing linkages. The textiles and apparel cluster is the exception. While the various products are clumped together in a high-density cluster, indicating strong linkages and spillover effects among products in the cluster, these products have very few linkages to products in other subsectors. Their locations in the product space are neither central nor peripheral but a little of both.

One of the more fascinating features of the product space analysis is that it indicates spillover effects between subsectors that have very few buyer-supplier linkages (the type of linkages that are used to construct input-output tables, which lie at the core of the national accounts measures and much of our traditional thinking about economic development). Unfettered by the limitations of input-output relationships, the trade growth data have revealed subtler and hidden relationships between subsectors, whereby skills and tacit knowledge built up in one subsector can be applied to other seemingly unrelated subsectors. For example, workers with a low level of education may be able to go from the hotel industry more easily to health care, or experienced workers in the garment industry may tend to be better prepared to work in the medical device industry.

It is important that Guatemala grow beyond a "labor-intensive labor market" to one that is economically diverse and supported by the accumulation of skills, innovation, and development of necessary production capacities. This can be aided by selecting products in the center of the product space, which offer the greatest potential for economic growth and diversification due to spillover effects. Economic diversification in this sense will increase competitiveness and therefore drive export products in the international market. The assessment team has adapted Hausmann's formula for strategic subsector selection to devise three different strategies for subsector support (described in Annex D).[82]

The product space, because it is based on capabilities, indicates where coordinated investments in skills and business could be expected to yield higher returns—i.e., towards the center of the product space. But where exactly, and for how many of the dots, should we target investments in skills? The complexity index, mentioned above, helped us identify the most strategic selections. But first we need to understand

[81] The Revealed Comparative Advantage (RCA) is an index used to calculate the relative success a country has had in the export of a certain good. An RCA > 1 indicates that the country's share of the world export market in that product is higher than its average world market share (across all products). See http://atlas.cid.harvard.edu/about/glossary/.

[82] Based on methodology developed by Ricardo Hausmann, Harvard University & African Development Bank "Comparative Study on Export Policies in Egypt, Morocco & Tunisia," 2012.

where we are on the map and in time. The product space database contains historical data that are helpful in interpreting the "big data" that comprise the export patterns. Using that information and current information, the products sort themselves into "communities" with linkages among products. For example, there was a strong linkage between "woven fabrics of cotton" and "electrical capacitors," so they ended up in the same community.

We then sorted the product communities into columns—yielding a table with three options (see Annex D). The first option is "jobs, jobs, jobs." It lists subsectors a policy maker should prioritize if his/her position is, "I need to place as many people in jobs, as fast as possible, regardless of their skills." Prioritizing this list however, might hurt a country's competitiveness because it will be competing globally, based on low wages. The third option is made up of "strategic bets"—the list of subsectors that would benefit from serious, medium- to long-term investment. Over time these would lead to high-skilled jobs and position the country at a much higher level in the value chain(s) related to those products. The second option is probably the most realistic. Called "parsimonious transformation," this option includes subsectors that a government strapped for funds can consider. Some of the subsectors would offer immediate employment options for a share of the population, while the other subsectors would create the foundation for longer-term growth and competitiveness.

If our criteria in this labor market assessment were only economic, there would be no need to go further. This calculation provides an excellent option for subsector selection with both jobs and competitiveness in mind. For the purposes of this education project, however, we felt it was important to introduce several qualitative criteria—such as the feasibility of addressing the top subsectors' challenges with tertiary level technical degrees and the presence of the subsectors in our target regions. Thus, we used the product space analysis as only one of the criteria for selecting subsectors.

Figure 31 shows the sector appraisal matrix that takes the above criteria (in columns) into account.

FIGURE 31. Sector appraisal matrix

CANDIDATE VALUE CHAINS	CURRENT SIZE	Employment	Exports	Presence in Occidente Region	Expenditures (Intermed & Final)	GROWTH POTENTIAL	2010-14 Growth in Guatemalas' Exports	2010-14 Growth in World Market Size	Forecast Employment Growth	Economic Diversity Index	OTHER CRITERIA	Prioritized Occupational Families	Higher Education Potential Impact	TOTAL SCORE	RANK
Weights ==>	40	15	5	15	5	45	10	10	10	15	15	5	10	100	
Food Processing	3.9	4	4	4	5	3.6	3	5	5	2	5.0	5	5	78.5	1
Logistic services	4.0	5	3	3	5	3.2			2	4	5.0	5	5	75.8	2
ICT (incl software & call centers)	2.3	2	4	3	1	5.0			5	5	3.7	1	5	74.5	3
Tourism	3.9	4	5	4	4	3.0			3	3	5.0	5	5	73.5	4
Financial services	3.0	3	2	3	4	3.8			2	5	5.0	5	5	73.2	5
Textiles, apparel and footwear	4.8	5	5	5	5	2.1	2	3	3	1	5.0	5	5	72.4	6
Forest products, furniture & packagin	3.1	4	3	2	4	3.6	4	1	5	4	4.3	5	4	70.0	7
Horticulture	3.2	3	4	3	5	3.1	4	3	4	2	3.7	1	5	64.5	8
Construction	3.6	5	2	3	3	2.6			2	3	3.6	5	3	63.3	9
Education services	3.4	5	1	3	2	2.8			1	4	3.7	1	5	63.2	10
Beverages (non-alch)	2.3	2	3	2	3	3.8	5	4	5	2	3.0	1	4	61.0	11
Other non-traditional agriculture	3.0	3	4	3	2	2.9	2	4	4	2	3.6	1	5	60.9	12
Metals & machinery	2.6	2	3	3	4	3.1	3	1	4	4	3.7	1	5	59.5	13
Health care services	2.2	1	1	4	3	3.4			1	5	3.7	1	5	59.1	14
Retail & Wholesale Trade	4.1	4	1	5	5	1.4			2	1	3.6	5	3	56.5	15
Dairy and livestock	2.5	4	1	1	4	3.1	2	5	1	4	2.3	1	3	55.0	16
Pharmaceuticals	1.8	1	4	2	1	3.4	3	2	3	5	3.0	1	4	54.0	17
Coffee	3.4	4	4	3	2	2.0	1	4	1	2	2.9	1	4	53.8	18
Honey	1.8	1	1	3	1	3.4			4	3	3.0	1	4	53.7	19
Extractive industries	2.0	2	5	1	2	3.7	4	3	5	3	1.0	1	1	52.0	20
Energy	1.4	1	2	1	3	3.2			2	4	3.6	5	3	50.7	21
Grains	3.0	5	2	1	4	2.3	3	5	1	1	1.7	1	2	50.0	22
Other light manufacturing	2.2	3	2	2	2	2.0	1	2	3	2	3.7	1	5	46.5	23
Plastics & chemicals	2.3	2	3	2	5	2.0	2	1	3	2	2.3	1	3	43.5	24
Poultry	1.6	2	1	1	3	3.0	1	2	3	5	1.0	1	1	43.1	25
Bananas	1.9	3	5	0	1	2.7	5	2	2	2	1.0	1	1	42.1	26
Palm oil	0.9	1	3	0	1	3.3	5	3	4	2	1.0	1	1	40.0	27
Seafood and aquaculture	0.9	1	2	0	2	3.3	4	4	4	2	1.0	1	1	40.0	27
Sugar	2.1	3	5	0	3	1.3	1	1	1	2	1.1	1	1	32.2	29

Of the ranked subsectors above, we selected five for further exploration in this report, covering the three major industry sectors: agriculture, manufacturing, and services. The five subsectors selected, and their matrix rankings were: food processing (#1), tourism (#4), textiles (#6), horticulture (aka legumes and vegetables) (#8), and non-alcoholic beverages (#11). Our selections were well within the desired ranking range. A brief justification for each selection follows.

Legumes and vegetables

The horticulture subsector (especially legumes and vegetables) is in many ways an ideal subsector for Advance, especially given the program's target region in the highlands. Residents of the region are especially isolated from the modern economy by poor road infrastructure and factors related to language and culture. Among rural residents, in some of the deepest pockets of poverty, a common denominator is access to land on which some horticultural crop can be grown. Growth in demand is reliable. Most importantly, the key factors for improving agricultural productivity and related income (especially for export products), are well known and include improved training and technical expertise. Horticulture (like tourism) rates high up in the matrix and has several strong qualitative arguments in its favor. One disadvantage of horticulture and related subsectors (food processing, beverages) is their low rating on the economic diversity index, as compared with milk and dairy products, for example.

Textiles and apparel

Textiles and apparel (along with tourism and construction services) is one of the largest employment subsectors in Guatemala. Rivalry is also fierce in this subsector; so even a relatively small change in competitiveness is likely to affect the employment prospects of a large number of relatively poor and uneducated Guatemalans. Guatemala produces a significant amount of the cloth material that goes into its garments, rather than importing inputs, like many neighboring countries. Also, a portion of Guatemala's clients are interested in indigenously designed garments made from traditional, locally grown and hand woven materials. The exact size and characteristics of this segment of the industry are not known, but it is centered in the Mayan highlands. It could have significant potential for higher value-added growth, if enough attention were given to marketing and commercialization of these garments.

Processed foods

Food processing shares many of the advantages of the horticulture subsector, mentioned above. Although a smaller percentage of the population engages in processing than in primary production, processing represents an important employment opportunity for those without direct access to land for cultivation. Value chain upgrading strategies can focus, for example, on reducing the number of middlemen or using newer, more efficient processing technologies that can be effective at smaller scales. Key capabilities that Advance can address are those of middle managers, food scientists (quality control, process engineers), and specialists in packaging, logistics, and marketing.

Non-alcoholic beverages

Beverages is a narrower subsector than food processing. It excludes alcoholic drinks and milk products. While its growth prospects appear to equal or exceed those of food processing, its smaller footprint in the region and lower employment overall give it a lower score relative to food processing.

Tourism

The diversity of the tourism subsector is a strength, but also makes analysis of the subsector challenging. The multiplicity of employers and self-employment options—from hotels to restaurants, transporters, travel agencies, attractions, handicrafts, and guides—makes the subsector difficult to define precisely, and complex in terms of data gathering. On the other hand, that diversity ensures that the tourism subsector provides ample opportunities for Advance impact via at least two channels: directly via hiring of tertiary graduates, and indirectly via jobs created by those graduates. Worldwide, tourism is one of the most robustly growing subsectors. Within Guatemala, even when one type of tourism (e.g., sand-and-

sun) is threatened, other types (e.g., cultural and business tourism) generally present opportunities for development. Nevertheless, as competition in the Caribbean and Central American markets is intense, a diversity of qualified middle managers and specialists in quality control, communications, facilities maintenance, attractions, marketing, and logistics planning is necessary.

VALUE CHAIN ANALYSIS

Following subsector selection, value chain mapping is useful to analyze need and potential for skills development within a subsector. Value chain mapping helps implementers and policymakers understand industry structure and dynamics by identifying the (approximate) number and type of firms in a specific subsector and diagramming their roles and relationships.[83] A value chain map (see figure 32 as an example) shows how a particular product flows through different market channels at the country level and helps to identify constraints and opportunities for improving the performance of each channel.[84] Adapted from agricultural economics to broader uses in development, value chain mapping is often the first step taken by economic growth programs wishing to increase the incomes of a particular group of firms or individuals (e.g., smallholder farmers or contract workers). A workforce overlay on a value chain map helps identify where training and skills development are needed and how they can be delivered—such as through general education, technical education, vocational training, or on-the-job learning. It can also help identify career pathways for youth within a subsector.

Value chain maps also help us understand industry structure and firm-to-firm relationships. For example, some channels may be vertically integrated (all functions performed by one firm) whereas others may be partially integrated, and others may be completely fragmented (many microenterprises selling products directly in an open market). Industry structure is directly related to value chain governance—i.e., whether power is concentrated in the hands of one firm or many firms and whether chains are buyer- or supplier-driven.[85] Understanding industry structure is critical when identifying potential employer partners to work with on skill building. For example, a lead firm buying products from hundreds of supplier firms will effectively set quality standards in the market, and these quality standards will have implicit skills requirements throughout the value chain. A lead firm is likely to be interested in bringing the quality (and therefore the skills) of suppliers up to standard, and may be willing to co-invest in skill-building initiatives. Such a partnership provides what value chain practitioners call “leverage”—a point of entry that allows an intervention to affect large numbers of firms and/or workers.

On the other hand, where lead buyers are located overseas (as with some segments of the apparel chain), this relationship changes; the lead buyer may not be interested in investing in quality and skills improvements in its suppliers if it is more cost-effective to source from countries where quality is already high. In these situations, industry may work with the government and educational system to develop their own training programs to improve the quality of suppliers, but the investments and quality improvements may not trickle down to the micro-, small- and medium- sized enterprise (MSME) level.

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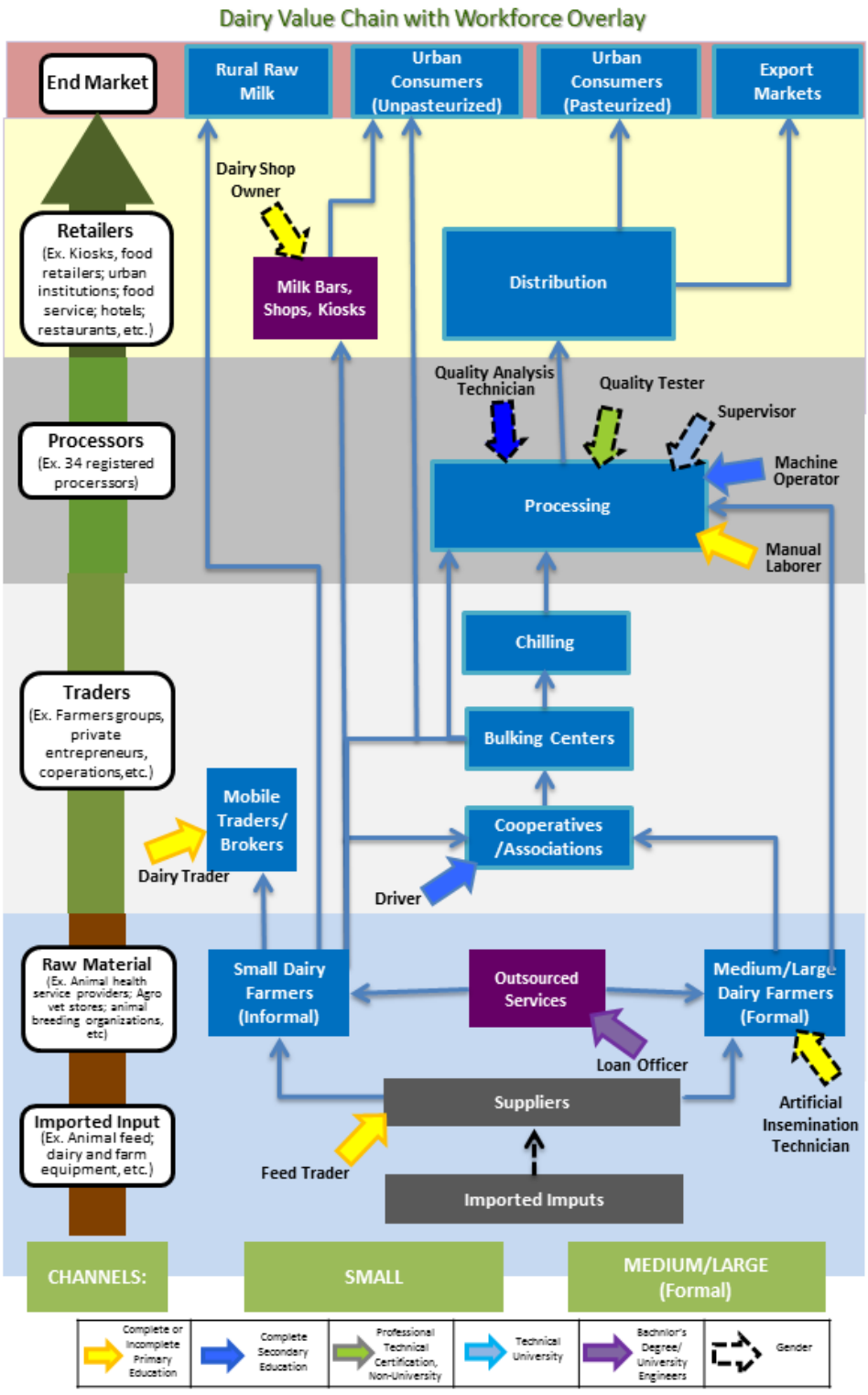
[83] Steen, Cynthia, Rich Magnani, and Lara Goldmark. *Competitive Strategies for Agriculture-Related MSES: From Seeds to Supermarket Shelves.* Washington, D.C.., 2005. Accessed June 2016. https://www.microlinks.org/sites/microlinks/files/resource/files/ML3520_mr_37_competitive_strategies_for_ag-related_mses.pdf.

[84] Ibid. 10.

In figure 32, the colored arrows signify employment opportunities. The skills needs associated with these entry points are identified by the arrows' pattern and colors (showing education or training requirements for the positions). A gender lens is included: arrows outlined in dotted lines indicate professions that industry experts consider to be particularly suitable for women as well as men (based on observed practice rather than traditional stereotypes).

FIGURE 32. Stylized value chain map



Source: FHI 360

In addition to the value chain maps, as part of the study, "sister" diagrams were developed. A sister diagram links technical positions in a value chain with educational programs (existing and non-existing) in Guatemala.

Understanding the function of positions as they relate to knowledge, skills, and attitudes taught at the secondary, tertiary-technical, and university levels aids in analyzing educational pathways for young people. However, it is important to note that these pathways are not mandatory for young people to advance academically and professionally. Moreover, although "*carreras*" (courses of study) follow linear production processes, this does not mean young people are forced in a defined direction or path in their long-term professional roles.

The "sister diagram" identifies technical positions according to the level of education required: (1) at the secondary (*Perito*) education cycle, (2) at the technical university level—including current academic offerings as well as offerings not available but identified as needed by the subsector, and (3) at the *Licenciatura* / *Ingeniero* level (4+ years of university education). Below this description of educational offerings needed (by stage in the value chain) the diagram shows: (1) occupations associated with INTECAP (Technical Institute for Training and Productivity) training at the post-secondary (not tertiary) level, and (2) occupations defined by the ILO International Standard Classification of Occupations (ISCO) as requiring education at the International Standard Classification of Education (ISCED) 5 level. INTECAP offerings complement training that takes place within formal education institutions.

The ILO's ISCO is important to understand in the case of Guatemala for several reasons. Primarily, the Congress of the Republic of Guatemala is currently in the process of passing regulations pertaining to "Government Agreement in Support of the National Labor Training System," while the Ministry of Education is undertaking an initiative to align existing technical education programs with the ILO's ISCO standards. Looking towards the future, the diagram shows not only existing occupations in the sectors, but also those occupations that have the potential to contribute to productivity and competitiveness in identified subsectors according to international standards.

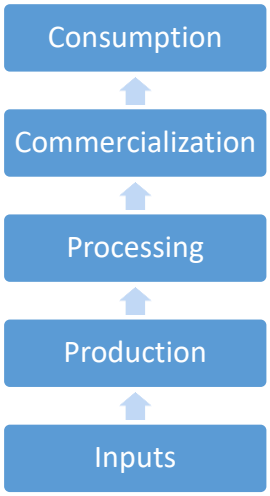
BUILDING A VALUE CHAIN MAP

To develop the value chain maps, FHI 360 interviewed representatives of businesses about key interacting elements: core processes, direct and indirect actors, influence of the environment and other external forces, labor needs, and links between all actors in the given value chain.

Core processes

Through secondary information, core processes were identified as stages through which a product must pass, from the idea of a product to its consumption in the market.

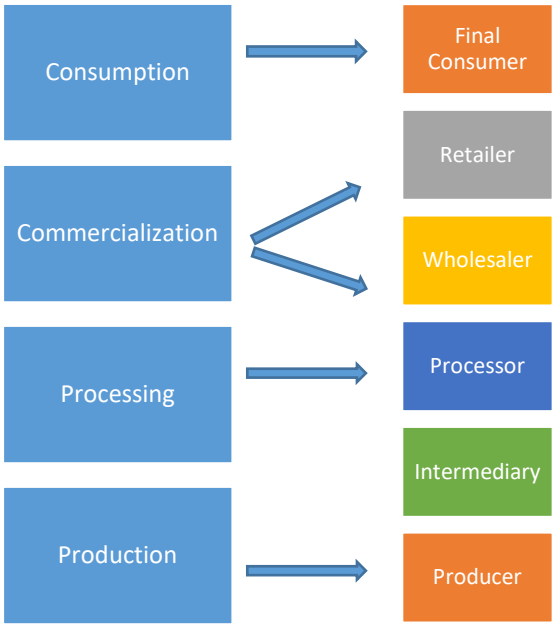
FIGURE 33. Core processes



Direct actors

Principal direct actors are those involved with production processes in a given subsector—such as inbound logistics, production, processing, outbound logistics, marketing and sales, and service. We identified the main direct actors in the production processes. Direct actors are those who take direct possession of the product and "own it" for one or more stages of the process. [86]

FIGURE 34. Direct actors

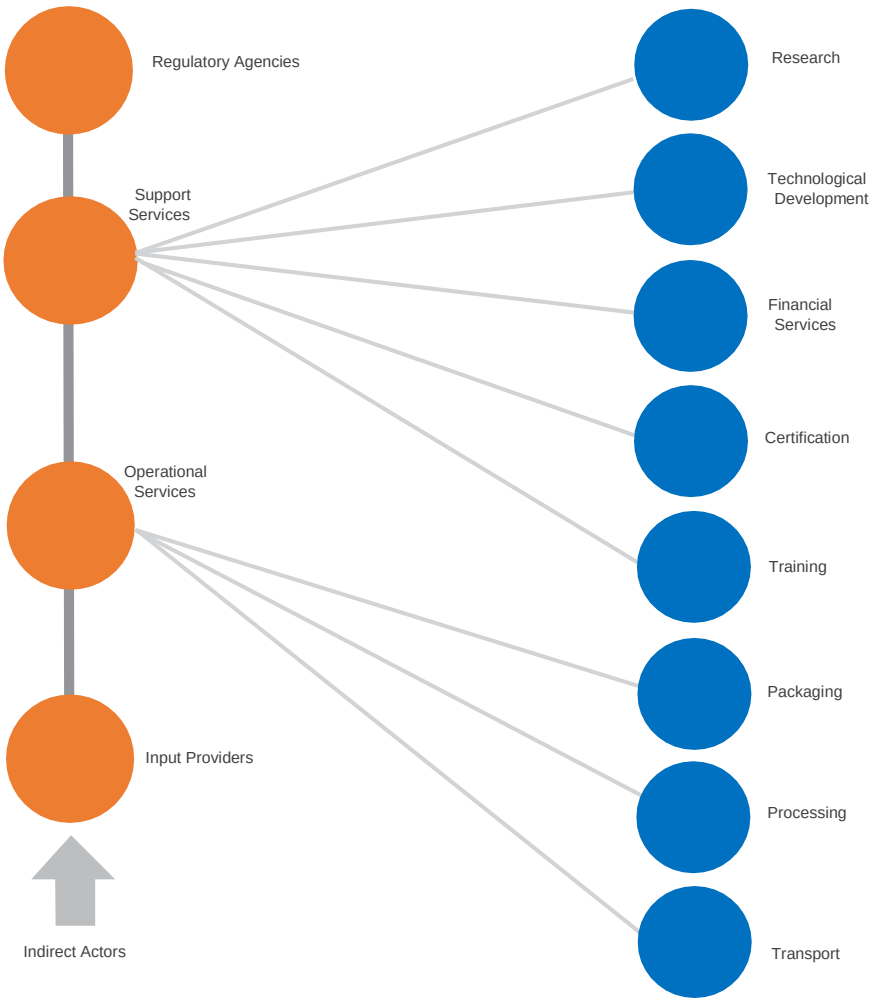


[86] Lundy, Mark. *A Participative Guide for Inclusive Business Models for Small Farmers. Version 2.0.* 2014. Accessed May 2016. https://cgspace.cgiar.org/handle/10568/49607.

Indirect actors

Major indirect actors were identified as those who provide operational services and/or support services in the chain to direct actors on different levels. An indirect actor may have a link with the product or service at a certain moment of production, but is not connected to the product or service throughout the process. Such actors include input suppliers, operational service providers, service providers, and regulatory support organizations.

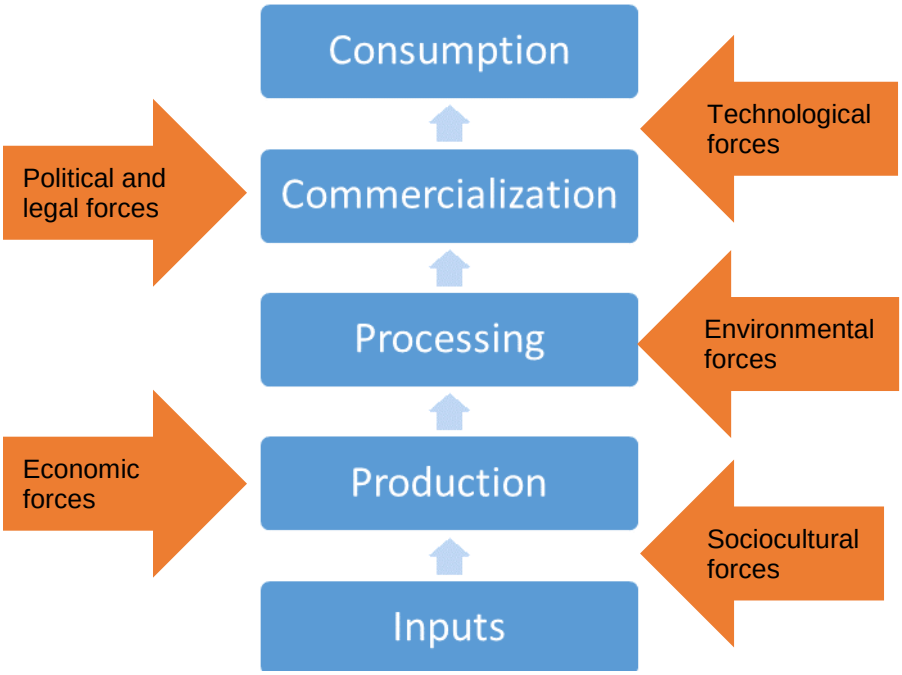
FIGURE 35. Indirect actors



Environmental influences

Environmental influences identified include external economic, political, environmental, and cultural forces that affect the chains. These influences cannot be controlled by direct or indirect actors in the value chain. Some examples are: the creation of new health laws, the price of products such as coffee, and the availability of environmental resources. The power and influence of external forces was addressed throughout the field interviews.

FIGURE 36. Environmental influences



COLLECTING VALUE CHAIN INFORMATION

Secondary information

Secondary information for the assessment included a collection of general information, statistics, studies, and documents, which provided information about products, services, and links that make up each value chain. This part of the technical economic and social context evaluation provided the basis for a comprehensive analysis to identify the potential of a product or subsector.

Primary information

This step allowed the technical team to obtain in-depth information to understand the operations and concerns of a group or actor in the chain. Primary information collection was conducted in two ways:

- **Interviews**: Interviews were conducted by consultants and program staff to collect information directly from actors in the selected subsectors. An interview guide (see Annex B) was developed to obtain data regarding value chain information, business networks, company information, staff recruitment, general and specific skills, and the current and future needs of the subsector itself. The selection of actors interviewed was conducted based on the territorial focus of the program. Twenty-nine interviews were conducted by a field team in Guatemala in the departments of

Quetzaltenango, Quiché, Totonicapan, Huehuetenango, and Chimaltenango. Actors included eight large companies, five medium-sized companies, and 16 small companies.[87]

- **E-mail survey**: The survey collected information from the companies' human resource staff on the development of workforce skills and competencies required generally and specifically by the subsector. This survey was oriented toward actors in the selected subsectors and other subsectors of interest. Nine email surveys were returned to the field team.

SECTORS, SUBSECTORS, PRODUCTS, AND SERVICES IDENTIFIED

Three levels of aggregation were identified for the selected sectors: sector (general level overall), subsector (industry) and corresponding products or services related to economic activity.

Table 4 shows the selected sectors categorized based on the traditional grouping of economic activities in three main groups (primary, secondary, and tertiary activities). Subsequent sections follow the order presented in the table.

TABLE 4. Categorization of selected sectors

TRADITIONAL GROUPING	GENERAL CHARACTERISTICS OF THE SECTOR	SECTOR		SUBSECTOR	PRODUCTS AND SERVICES
Primary Activities	Use of natural resources	1	Agriculture	Non-traditional agriculture	Legumes and vegetables for export
Secondary Activities	Transformation of goods	2	Manufacturing	Processed foods	Chocolates, sweets, and baked goods
				Beverages	Non-alcoholic beverages
				Textiles and apparel	Manufactured apparel
Tertiary Activities	Provision of knowledge, skills, and time	3	Services	Tourism	Lodging, restaurants and transportation

AGRICULTURE: LEGUMES AND VEGETABLES VALUE CHAIN

Globalization and the effects of climate change have moved market demand toward eco-friendly production practices throughout the legumes and vegetables value chain. While the organic movement is driven by demands from external markets such as in the United States and Europe, consumers in

[87] Size of business is characterized as follows: microenterprise: 1-10 employees; small enterprise: 11-25 employees; medium enterprise: 26 to 60 employees; large enterprise: more than 60 employees.

Guatemala are also beginning to participate and drive the trend in the national market. As a result, certification in the value chain is necessary, from seed to store. This requires an upgrading of skills and technology, particularly for smaller producers to benefit from this movement. Key positions as this trend continues in the market include technicians in food processing, logistics and transportation, and marketing and sales personnel. Food processing technicians, responsible for regulating production practices, are key to ensure that organic standard practices are implemented at all stages of production. These technicians may also conduct laboratory research to enhance knowledge of a product itself as well as how it can be marketed. Logistics and transportation technicians are important in this subsector to ensure the safety and quality of goods being delivered from the farm to the factory, or to the port for export. Marketing and sales technicians are necessary to create opportunities in both existing and new markets. These workers would need an understanding of technology, specifically in the use of social media and graphics and web design.

The subsector "non-traditional agriculture and products" includes legumes and vegetables that are exported—such as broccoli, peas (Chinese and sweet), French green beans, zucchini, baby corn, and mini-carrots. Due to the frequency of natural disasters in Guatemala, the non-traditional agriculture sector in Guatemala has had to learn to adapt to the unpredictable challenges of climate that may affect production. After the 2008–2009 global economic crisis, Guatemala faced a drought that destroyed up to 90 percent of crops in some instances.[88] In 2010, indigenous and rural communities faced the eruption of the Pacaya Volcano and tropical storm Agatha, causing devastating landslides and floods. Approximately 500,000 Guatemalans were affected, many of them living and working in agriculture-producing regions.

Despite unstable production years, Guatemala is recognized as a leader in non-traditional export products such as snow peas, green beans, and mini-carrots. This is due to the variety of goods produced in Guatemala's many microclimates, the ability of producers and agriculture associations to plan for disasters and control their crops, and Guatemala's proximity to large markets such as the United States. Non-traditional agricultural production has grown over time and is expected to continue to grow. Non-traditional exports represented 58 percent of exports in 1980 and grew to 76 percent of products exported in 2015.[89] Peas are ranked highest among all exports, according to a United Nations (COMTRADE) report, the United Nation's statistical database on trade.[90] From 2002 to 2015, vegetable exports saw an average growth of 8 percent, despite periodic downturns such as those mentioned above.[91] The main external markets for non-traditional export vegetables are the United States, Canada, European countries, and to a lesser extent, some Central American countries and Mexico. While domestic markets do exist for non-traditional agriculture in supermarkets and in local stores, producers focus on international markets due to better prices.[92] In 2011, FUNDESA (The Guatemalan Development Foundation) stated that the non-traditional agriculture industry overall employed 123,000 individuals and

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[88] World Bank. *International Bank for Reconstruction and Development and International Finance Corporation Country Partner Strategy for the Republic of Guatemala for the Period FY 2013-2016.* Washington, DC, 2012.

[89] Bank of Guatemala. *Guatemala in Numbers, 2015.* Department of Macroeconomic Statistics. Guatemala City, 2015. Accessed June 2016. http://www.banguat.gob.gt/Publica/guatemala_en_cifras_2015.pdf.

[90] Economic Commission for Latin America and the Caribbean. *Strengthening the Tourism Value Chain in Antigua, Guatemala and the Rural Municipalities of the Sacatepequez Department.* Mexico City, 2016.

[91] Bank of Guatemala. *Guatemala in Numbers, 2015.* Department of Macroeconomic Statistics. Guatemala City, 2015.

[92] Economic Commission for Latin America and the Caribbean. *Strengthening the Tourism Value Chain in Antigua, Guatemala and the Rural Municipalities of the Sacatepequez Department.* Mexico City, 2016. Accessed July 29, 2016. http://repositorio.cepal.org/bitstream/handle/11362/39871/1/S1600119_es.pdf.

is expected to reach 248,000 by 2021.[93] This represents a growth of 102 percent employment in the subsector alone.[94] In the legumes and vegetable subsector in 2010, 32,750 were considered direct jobs and 4,529 were considered indirect jobs.[95]

The subsector is governed by the National Committee of Peas and Vegetables, part of AGEXPORT, which represents 28 exporting companies. The process of decision-making in the Committee is managed by the board, composed of representatives from leading companies engaged in the export of peas, including the Cooperativa Unión Cuatro Pinos, Frutesa, Cooperativa Magdalena, Det Pon, and Grupo Siesa. These businesses are engaged in production and processing and packaging. Two of them are also involved in commercialization.

According to those interviewed in the subsector, in future agriculture will move from traditional practices to more advanced practices and focus more on organic production. Obtaining and maintaining organic production certifications from international companies and organizations will be important to actors throughout the value chain process. Moreover, input supplies, farming practices, storage facilities, and production and packaging processes will require additional specialization and improved competencies to meet the standards and needs of organic certifiers.

Understanding the interrelationships among principal actors in the legumes and vegetables value chain

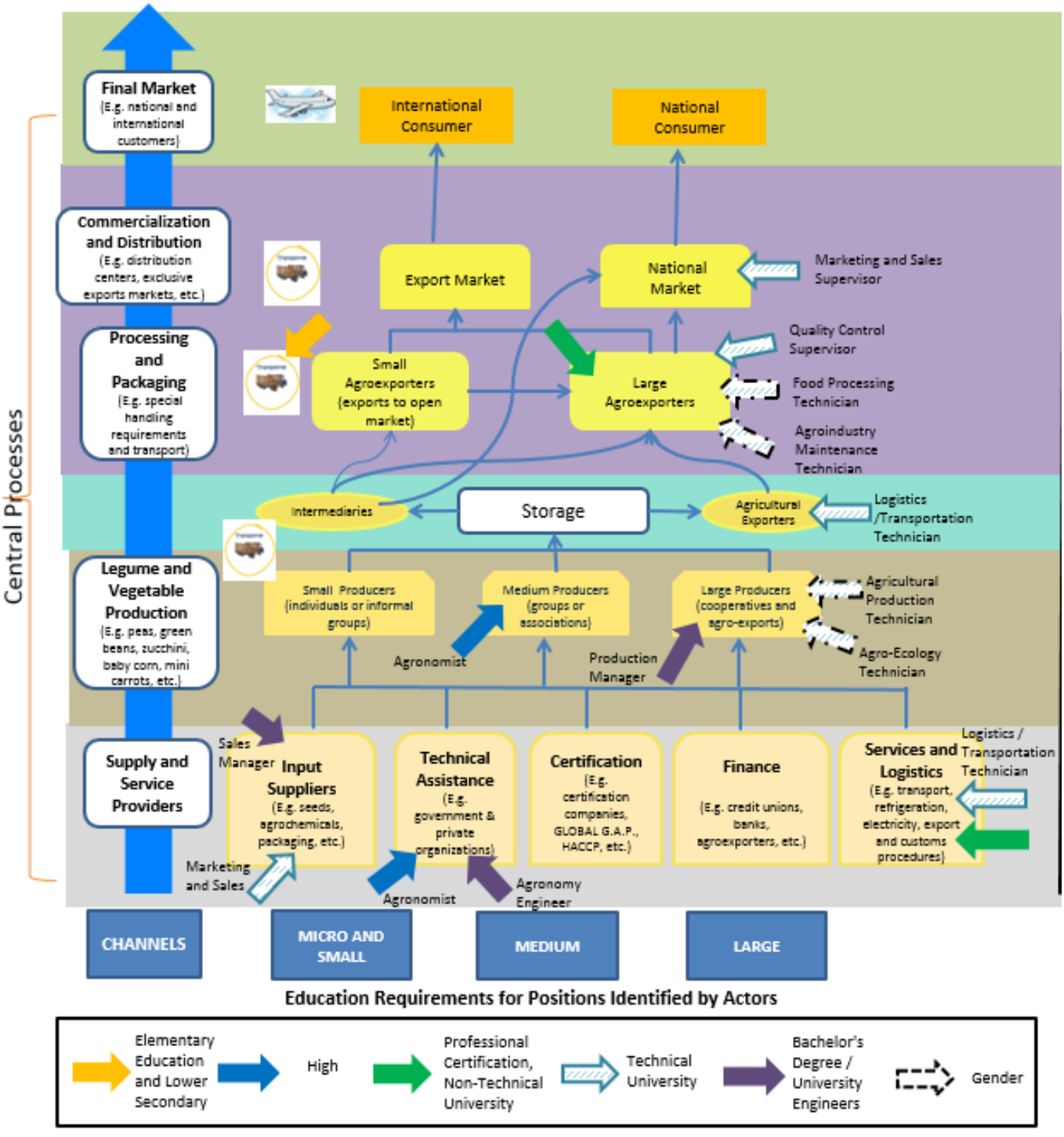
Figure 37 highlights the global and national pressures on businesses in the legumes and vegetables subsector. The value chain map includes knowledge and skill needs mentioned by those interviewed in this study. Effectively, the value chain can be divided into five stages that make up the core production: providers of inputs and services, production, processing and packaging, marketing, and final consumer markets. Resulting positions exist in three categories: (1) directors and managers (university graduates); (2) technical and operational posts (professionals with secondary education university education) and (3) skilled workers (with primary and lower secondary education).

[93] FUNDESA. *Guatemalans Improve Guatemala: A Proposal for a More Prosperous, More Solidary, and Safer Guatemala.* Guatemala, 2012. Accessed June 2016. https://issuu.com/fundesaguatemala/docs/mejoremosguate.

[94] Ibid.

[95] AGEXPORT. *Duplicating Exports and Employment in Guatemala: AN AGEXPORT Proposal. A Renewed Strategy, 2012-2015.* Guatemala, 2015. Accessed June, 2016. http://www.export.com.gt/wp-content/uploads/competitividad/PropuestasdeAGEXPORT/Caraturaportadaresumenejecutivo.pdf.

FIGURE 37. Legumes and vegetables value chain map with workforce overlay



- **Inputs and services.** The first stage of the value chain includes suppliers providing companies with inputs such as seeds, fertilizers, agrochemicals, and packaging supplies. Many of these inputs are imported from Germany or the United States. This first stage of the value chain also includes businesses, institutions, and/or organizations that provide technical assistance, certification processes, and financial and additional services (such as provided by AGEXPORT). In this stage, foreign seed companies drive the chain development as they invest heavily in research and innovation and sell through importing agencies in the domestic market. Our assessment of this stage detected a need for logistics and transport technicians.

- **Production.** In this stage of the value chain, direct actors include: (1) small producers (individuals or those in community-based initiatives), (2) medium producers (groups or associations, often affiliated with large cooperatives and trade unions) and (3) large producers. These entities create support networks for producers and have power in the subsector commensurate with their size. This stage includes every stage of agricultural production, from the preparation of soil conditions to harvest. The processing of crops and transport of products is carried out by small and medium producers in two ways: (1) through intermediaries who buy base production to meet the volume demands of small exporters and in some cases of agricultural exporters who supply local markets and operate informally in the chain; and (2) directly to exporters through agreements for the purchase of goods and via strategic collection centers which allow exporters to move production to processing plants. Direct and indirect actors in this stage have mentioned a need for agricultural production technicians, while the assessment has detected a need for agroecology technicians.

- **Processing and packaging.** This stage includes direct actors in charge of business operations or who rent out processing plants and refrigeration systems where the process of selecting, cleaning, and packaging of vegetables takes place. Marketing is carried out by businesses through a distribution center, where logistics and transport processes are organized. This allows the handling of cargo and the distribution of products, land transportation, the supervision of customs procedures, and the shipment of the final product. In this stage, actors identified a need for quality management supervisors, food processing technicians, and agro-industry technicians.

- **Commercialization.** In this stage, direct stakeholders who act as intermediaries (brokers) manage logistics and customs regulations abroad and market to large domestic supermarket chains, hotels, restaurants, and/or importers. Quality and quantity of product are important to sell a product at an agreed upon price. Those we interviewed for this survey identified a need for marketing and sales supervisors in this stage of the value chain.

- **End market.** This stage is the responsibility of national and international direct actors. Nationally there are companies responsible for the purchase and distribution of vegetables to chain restaurants, hotels, local markets, supermarkets, and shops. At the international level, there are companies that collect products and distribute to supermarket chains, restaurants, hotels, etc.

Limitations of the legumes and vegetable value chain

The main limitations or barriers facing the subsector include access to credit for producers who have limited financial support systems; the lack of modern infrastructure to ensure the production, processing, and packaging of quality products; and lack of agricultural research supported by the private sector and universities. Lack of access to credit harms actors, particularly those at the base of the value chain, and prevents them from attaining purchasing power—thereby limiting investments and future growth.

Financial barriers also impede integration of groups in horizontal and vertical commercial networks, thus slowing the transformation of producers and actors at the base of the value chain.

Limited access to modern infrastructure—including adequate irrigation systems, communication channels, and storage facilities—hinders productivity and affects the quality and quantity of crops produced. Most small producers do not have the capacity to maintain such irrigation systems and have difficulty obtaining sufficient water supplies. Small producers depend on the rainy season, which introduces uncertainty (as seen in the 2010 drought).

There are also limitations associated with the cold chain production process. Larger producers, with access to the technology and infrastructure in the cold chain process, can maintain or extend the life of freshly harvested crops from the time these leave small farms to the time they sit on supermarket shelves. Storage facilities are important to keep goods fresh before export or transfer to market. Often, those who do not have cold rooms to extend the life of fresh vegetables may deliver products that do not meet the quality standards of customers.

Actors and associations in our study also mentioned that the strained relationship between universities and the private sector is a disadvantage as producers look to expand current markets with organic production. Agricultural research is often conducted at universities and in the private sector, which may restrict the transfer of new knowledge to producers and associations who need it most. Research regarding agricultural practices in the context of climate change, for instance, would be valuable in aiding the transfer of knowledge about climatic and soil conditions where productive activities take place.

Other actors highlighted additional concerns in the legumes and vegetable subsector including:

- Social unrest in regions with high agricultural production
- Lack of professional and technical development resulting from the lack of opportunities for specialization
- Weakness in knowledge transfer regarding productive activities to young people due to emigration, resulting in loss of knowledge generationally (particularly in family businesses)
- Lack of soil conservation practices in sloped production areas for small producers
- Lack of access to training in different technologies
- International political issues (especially regarding England and the European Union, which have led to falling prices and the decline of exports)
- Lack of implementation of social policies by the government
- Weak legal institutions and frameworks that fail to regulate and control the migration and infestation of pests, insects, and diseases that affect crops

Key positions and associated skills in the legumes and vegetables value chain

Growth can be seen across the subsector in organic production practices for both national and international markets. The legumes and vegetables value chain highlights occupations for both permanent and temporary workers. Both salaried and temporary positions have been increasing. Growth in market share and product demand also allows for the generation of new products that in turn create

new opportunities for promotion, production, and marketing. This will require additional technical training for small farmers. Temporary workers are generally hired for planting, cultivation, and harvesting. Currently, 64 percent of workers in the non-traditional agricultural sector are female. Activities primarily carried out by women take place either during the harvest (e.g., product quality selection) or during packaging processes.

As these market trends continue, high-priority in-demand positions include food processing technicians, logistics and transportation technicians, and marketing and sales technicians. Food processing technicians—responsible for regulating production practices—are key to ensuring standard organic practices are implemented at all stages of production. They can also be trained in laboratory research and/or marketing. This requires strong analytical skills and oral and written communication skills to create and promote new products. Logistics and transportation technicians are important in this subsector to account for the safety and quality of goods being delivered from the farm to the factory, or to the port for export, and must have knowledge of the commercialization and export processes (when applicable). Marketing and sales technicians are necessary to create opportunities in both existing and new markets. These workers need an understanding of technology, specifically in the use of social media, graphics, and web design. Understanding market context and the needs and desires of consumers is also required to achieve successful campaigns in new markets. Table 5 includes recommendations of subsector actors regarding positions needed to improve productivity across stages of the value chain. Additional positions and related skills are included in Annex E.

TABLE 5. Occupations necessary to strengthen the legumes and vegetables value chain

Stage	Position
Commercialization and Distribution	Marketing and sales supervisor
Processing and Packaging	Quality Management supervisor Food processing technician Agro-industry technician
Legume and Vegetable Production	Agricultural production technician Agroecology technician*
Supply and Service Providers	Logistics/transport technician*

*Source: Interviews with direct and indirect actors in the value chain. *Positions identified by the Program in consultation with experts.*

Attitudes

Survey respondents said that university students coming from technical programs bring competitive advantages to businesses. These include important attitudes that improve work effectiveness and efficiency, production quality, work-friendly environments (thus increasing productivity and access to the market) and thereby improve the incomes of producers, partners, and ultimately families.

Attitudes mentioned most often by those interviewed included a positive spirit, self-motivation, and the ability to work well in groups. Self-motivation and the desire to improve oneself were seen as important particularly for temporary workers as they are monetarily incentivized based on the number of products packed. Those interviewed also valued attitudes relating to responsibility, ability to listen, and a dedication to quality. Dedication to quality may be especially important for businesses focusing on export markets.

Marketing and sales technicians were seen as having an advantage when they could demonstrate a desire to improve and a determination to succeed. Food processing technicians are at an advantage when they are socially committed to their work and dedicated to preserving the environment—particularly as organic production moves the subsector toward safe, sustainable farming and production practices. Additional attitudes are outlined in Annex E.

Legumes and vegetables: how can educational institutions serve the subsector?

Although actors described the need for more formal education and training in the areas of kitchen and administrative staff, options at the technical and university level remain limited in the country. Options for formal programs are described below.

Secondary education programs

Existing programs at the second level include:

- Food industry
- General secondary education with concentration in food industry

These programs are available nationally and are standardized according to an established curriculum defined by the Ministry of Education. While many students receive the Perito distinction, the quality of education is low, and many students struggle to achieve age-appropriate reading and mathematics levels.

Technical tertiary programs (2–3 years)

The following degrees are offered at the technical tertiary level:

- **Quality and food production processes:** Instituto Tecnológico Universitario del Sur, USAC, Palín Escuintla
- **Agro-industrial processes:** Rural University, Quetzaltenango, Coatepeque, Salcajá, Centro Universitario del Sur, USAC, Escuintla
- **Fruit farming production:** Universidad de San Carlos; San Juan Chamelco, Alta Verapaz
- **Agro-ecology:** Universidad Rural, at campuses in Unión Cantinil, San Pedro Soloma, Nentón, Huehuetenango
- **Agro-industry:** Centro Universitario del Sur, Universidad de San Carlos

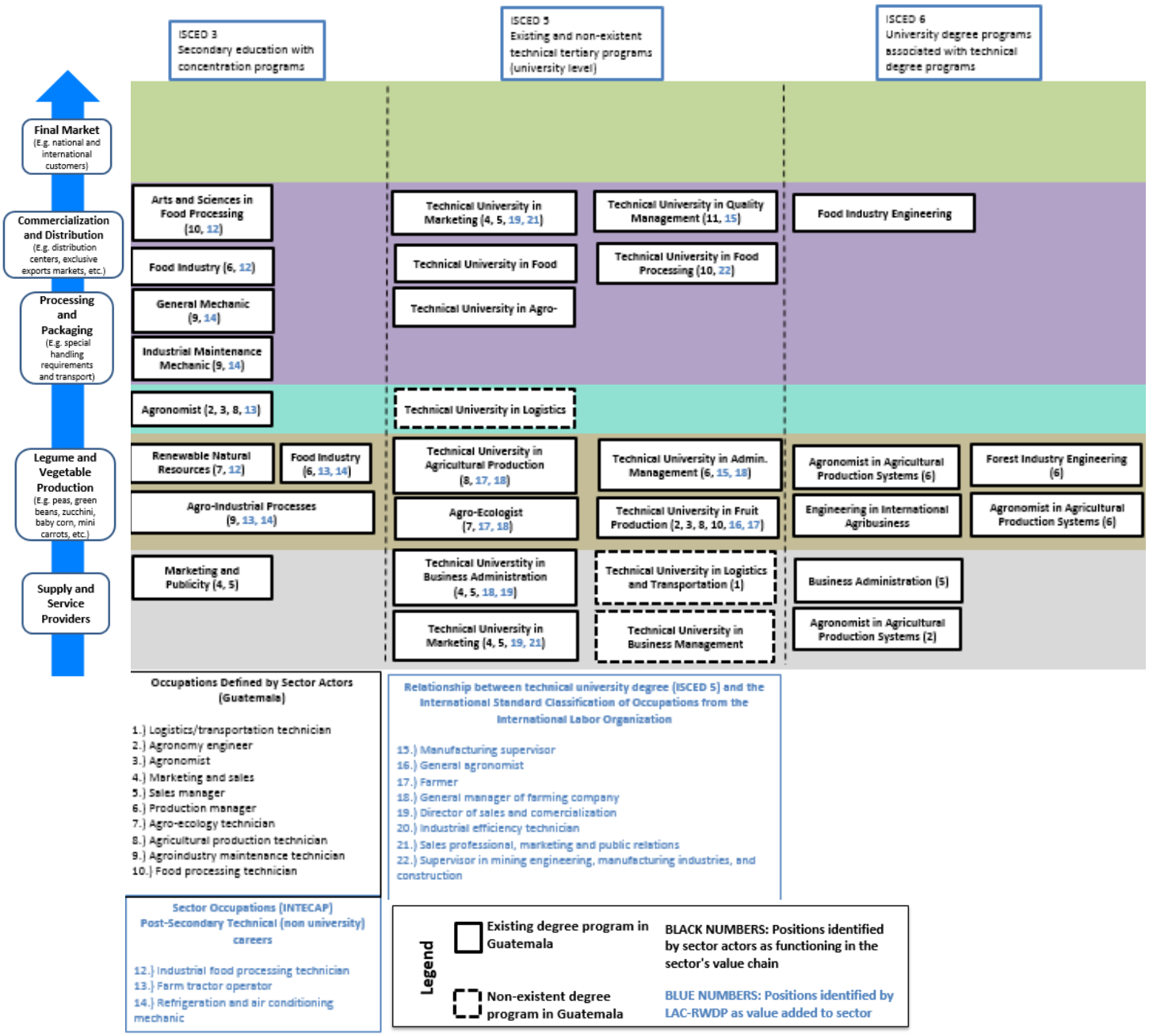
University degree programs (4 years): The following degrees are offered at the *licenciatura* level:

- **Food Industry engineer:** Centro Universitario del Sur Occidente, Mazatenango, USAC
- **Agroindustry engineer:** Centro Universitario del Sur, USAC, Escuintla, Universidad Rural, at Quetzaltenango, Coatepeque and Salcajá campuses
- **Forestry industry:** Universidad de San Carlos; San Juan Chamelco, Alta Verapaz
- **Forestry:** Central University of the Northwest, Huehuetenango
- **International agro-business:** Universidad de San Carlos; San Juan Chamelco, Alta Verapaz

- **Agronomy:** USAC, Guatemala City, Centro Universitario de Occidente, USAC, Quetzaltenango
- **Agronomy, specializing in agricultural production systems:** Universidad de San Carlos; Central University of the Northwest, Huehuetenango
- **Environmental engineering:** Rural University, Quetzaltenango
- **Agronomic engineering:** Rural University, at Huehuetenango, Jacaltenango, Santa Cruz Barillas; Santa Cruz del Quiché; Nebaj; Ixcán Playa Grande, Pachalum, San Pedro, Sacatepequez, San Marcos campuses
- **Agriculture and forestry:** Universidad de San Carlos, Guatemala City

The “sister” or parallel diagram below depicts information on existing and potential agriculture-related educational offerings matched to the key positions in the legumes and vegetables value chain. We note, for example, a potential need for university technical training programs in agriculture production (technician in agriculture production) and quality control.

FIGURE 38. Technical positions, occupations, and education levels in the legumes and vegetable value chain and existing and non-existent career options in Guatemala



MANUFACTURING: TEXTILES AND APPAREL VALUE CHAIN

Both the design and production of Guatemalan textiles and apparel are important to national and international markets. Guatemala's deeply embedded indigenous cultures and heritage are reflected in intricate designs and bold colors. As the world globalizes, many traditional indigenous designs are being exported to international markets (United States and to a lesser extent, Central America and Mexico), making Guatemala a strategic investment for international companies, particularly as export producers who respond to immediate demands via the "speed to market" method of production. The quality of goods produced in this way can only be maintained with additional investments in technology and appropriate training—costly for *maquila* (textile factories in special economic zones) and smaller producers alike due to high taxation and maintenance costs of imported machines and the low level of education found in the current labor market. Necessary positions to support both domestic and export producers in the textiles and apparel chain include machine maintenance technicians and designers. Maintenance technicians are crucial in MSMEs as well as *maquilas*. "Speed to market" production means businesses rely heavily on working equipment to complete orders in a given time frame. Particularly for smaller businesses, older technology must be used as a backup, which may affect quality of product and the time in which an order is completed. Technicians need knowledge of the machines, fine motor skills, and the ability to work under pressure. Designers must be informed of market trends to create innovative designs and know how to market them, as well as be aware of production costs.

The textiles and apparel value chain is a subsector of the manufactured apparel industry. Until the mid-1980s, the industry was almost exclusively oriented towards production in the national and Central American markets. However, a government-incentivized shift in development model moved the industry from import substitution to a focus on export production. The government created free trade zones and provided tax breaks, particularly for imported primary materials for large producers. A comparative advantage in this division of the subsector is the absence of restrictive quotas on products entering the United States market. During the 2008–2009 financial crisis, foreign direct investment in Guatemala dropped to levels that were lower than for both El Salvador and Honduras. The lack of investment from major investors such as the United States, United Kingdom, and Spain has had noticeable effects on the textile industry.[96]

National production is managed largely by SMEs, whereas export-oriented production is managed by large foreign enterprises. Value chain governance is led by the Association of Apparel and Textile Industry, VESTEX— part of the Association of Non-Traditional Exporters (or AGEXPORT). SMEs are largely supported by the Union of Knitwear, Textile Guild, and the Tailoring Association of Guatemala, or ASCONFEG. This organization seeks to strengthen production and the supply chains of the SMEs that they represent on a national level by: (1) finding financial resources that benefit their members, (2) seeking government support, and (3) identifying niche markets. Although the member companies of the Association have no clear comparative advantage today, some have managed to locate institutional and advertising niche markets. Large businesses and exporters benefiting from free trade zone legislation import a "complete package model" from international clients and provide a unique supply chain based on the customer's desired end product. Because of the distinction in markets, SMEs and large producers

[96] World Bank. *International Bank for Reconstruction and Development and International Finance Corporation Country Partner Strategy for the Republic of Guatemala for the Period FY 2013-2016.* Washington, DC., 2012.

have not developed productive chains or clusters where knowledge sharing and technology transfer might occur; as a result, these markets function in isolation.[97]

In 2015, apparel and textiles were the most frequently exported goods from Guatemala, followed by sugar, coffee, and bananas.[98] The Bank of Guatemala estimated that 79 percent of exports in this subsector were destined for United States markets; 11 percent for Central American markets, and 3 percent for Mexican markets.[99] From 2002 to 2015, textiles and apparel grew at an annual rate of 6 percent, suffering a dive during the 2008–2009 financial crisis and slowly stabilizing thereafter.[100]

The majority of textile manufacturing for the domestic market includes traditional garments (knit shirts, cotton trousers, fiber pants, socks, uniforms, etc.) produced by 180 apparel manufacturers.[101] This includes the production of traditional textiles sold and worn by indigenous communities. Seventy percent of exports are also based on these products. Major external markets for indigenous goods include the United States and Europe.

By 2014, manufacturing industries contributed 3.2 percent of GDP.[102] In 2010, apparel and textiles accounted for 110,087 jobs, of which 72,915 were considered direct jobs and 37,172 were considered indirect jobs.[103] The subsector is expected to expand to 24,000 jobs by 2021 (a 60 percent increase over that estimated in 2011).[104] VESTEX estimates that 46 percent of jobs in the textile subsector are held by women.[105]

While these statistics reflect growth in both production and employment, business owners and managers of MSMEs interviewed in the departments of Quiché, Totonicapán, and Quetzaltenango had mixed perspectives regarding subsector growth and future employment needs.[106] One challenge is the need for business owners to consider the costs of updating technology and training their personnel. A micro-enterprise owner in the department of Totonicapán also noted competition (particularly for micro and small producers) from contraband items produced in Mexico and illegally brought into the Guatemalan market. This creates pressure to produce goods of lesser quality to sell at lower prices. Other small producers said they were looking to move into new markets; part of their business in the future will move toward *maquila* production if market demand increases. Growing *maquilas*, requiring employees to

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[97] International Centre for Trade and Sustainable Development. *Apparel and Textile Sector and Sustainable Development in Guatemala.* Switzerland, 2010. Accessed June 2016. http://www.ictsd.org/downloads/2011/03/el-sector-textil-y-confeccion-y-el-desarrollo-sostenible-en-guatemala.pdf.

[98] VESTEX. *Guatemala Apparel and Textile Industry*. Guatemala City, 2015. Accessed September 2016. http://vestex.com.gt/wp-content/uploads/2015/03/VESTEX-ENG.pdf.

[99] Ibid.

[100] Bank of Guatemala. *Guatemala in Numbers, 2015.* Department of Macroeconomic Statistics. Guatemala City, 2015. Accessed June 2016. http://www.banguat.gob.gt/Publica/guatemala_en_cifras_2015.pdf.

[101] VESTEX. *Guatemala Apparel and Textile Industry*. Guatemala City, 2015.

[102] Bank of Guatemala. *Guatemala in Numbers, 2015.* Department of Macroeconomic Statistics. Guatemala City, 2015.

[103] AGEXPORT. *Duplicating Exports and Employment in Guatemala: AN AGEXPORT Proposal. A Renewed Strategy, 2012-2015.* Guatemala, 2015. Accessed June 2016. http://www.export.com.gt/wp-content/uploads/competitividad/PropuestasdeAGEXPORT/Caraturaportadaresumenejecutivo.pdf.

[104] FUNDESA. *Guatemalans Improve Guatemala: A Proposal for a More Prosperous, More Solidary, and Safer Guatemala.* Guatemala, 2012.

[105] VESTEX. *Guatemala Apparel and Textile Industry*. Guatemala City, 2015.

[106] A total of eight businesses were interviewed: six small enterprises, three cooperatives, one micro enterprise, and one large business.

complete one specific task, will require additional training for staff as well as investments in new technology and machinery.

In general, textile business owners interviewed who were looking to expand into new markets were considering the "speed to market" model stressed by many clients in the United States. VESTEX states that speed and consistency of production quality will be important in the coming years, as trends change quickly and e-commerce changes the way apparel has been traditionally sold.[107] However, while one large *maquila* in Guatemala City noted that they do fill orders for e-commerce markets, demand from these types of clients has not yet become the norm. Others expect increased market demand based on a renewed interest in artisan goods. Producers concerned about new business, meeting the demands of foreign markets, and maintaining the quality and consistency of their products may need to reconsider traditional supply and value chains. It will be important for those in the industry to understand the dynamics of local and international trends to diversify and explore better options for commercialization in new markets. As this occurs, industry leaders and business owners must upgrade the skills, knowledge, and attitudes of their workers to achieve success in these new markets.

There are still cultural barriers to women holding positions that require a university technical degree. Some of those interviewed felt that a woman's role should be to attend to domestic chores and begin a family at an early age to reduce the family economic burden by shifting it onto the next generation. In general, both men and women face other barriers linked to poverty, such as the lack of nearby educational institutions and the availability of remittances—both of which often discourage a search for more productive work.

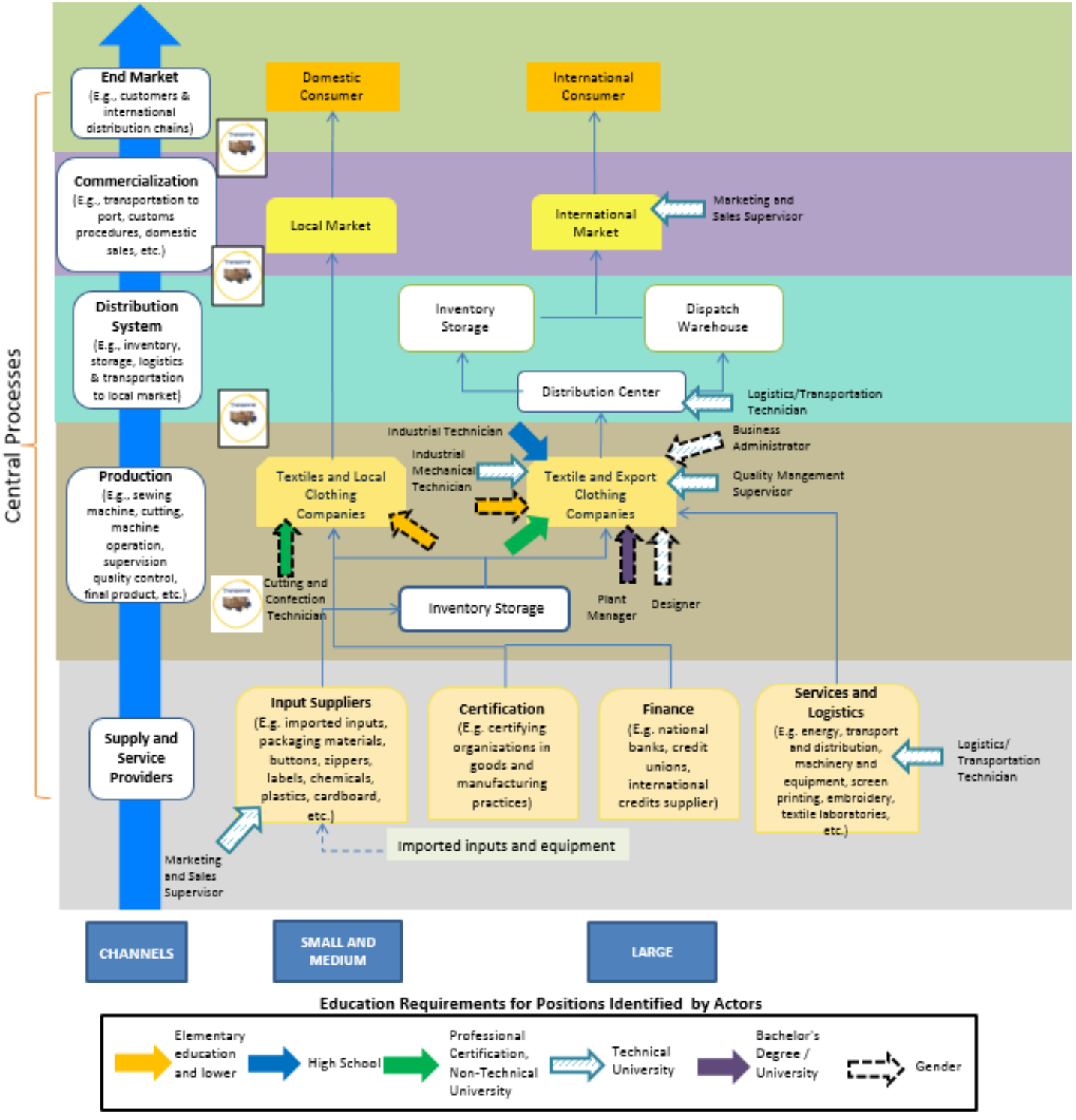
Understanding the interrelationships among principal actors in the textiles and apparel value chain

Figure 39 maps the textiles and apparel value chain with a workforce overlay. The map can help identify skills constraints and opportunities to address future needs in production for both domestic and international markets.

The value chain can be divided into five stages that make up the core processes of textile production across the size and level of production in the industry. These stages include input supply and services, manufacturing and production, distribution systems, commercialization, and final market.

[107] VESTEX. *Market Tendencies in the United States*. Guatemala City, 2016. Accessed September, 2016. http://vestex.com.gt/wp-content/uploads/2015/04/VESTEX-US-Market-Presentation-082516.pdf.

FIGURE 39. Textiles and apparel value chain map with workforce overlay



Production for the domestic market

1. **Input and service providers.** In the first stage of the value chain, input suppliers include companies that supply fabrics to local textile factories and companies that supply imported fabrics, yarns, accessories (zippers, buttons, trusses, etc.), chemicals, machinery, and packaging. According to VESTEX, Guatemala has 28 textile mills and more than 60 trimming companies.[108] Services supporting this stage of production include institutions or organizations providing technical assistance, financing, and equipment maintenance—such as ASCONFEG.

2. **Production.** In the second stage of the value chain, textiles and garments are manufactured for the local market. These include casual clothes, uniforms, and patterns and colors based on Guatemala's indigenous traditions. The level of specialization and expertise is very low and value added usually stems from cutting services or the assembly of garments. Direct actors are divided into formal and informal MSMEs. According to those interviewed, companies in the informal sector operate largely in isolation from sector associations, education centers, and financial institutions. With little oversight, it is not uncommon for employers to fail to pay minimum wage to their employees.

3. **Distribution.** In the third stage of the value chain, distribution systems and logistics are largely handled by MSMEs themselves because they have limited resources to contract outside providers. Whereas larger producers work through distributors, many MSMEs take their products directly to market, both nationally and regionally.

4. **Commercialization.** The fourth stage involves direct sales in local markets, principally with SMEs that are responsible for distribution and wholesale purchasing in those markets. Producers compete for price without differentiating in product. Producers have direct relationships with clients and produce based on the needs of their clients.

5. **End market.** The fifth stage includes the final market, or the consumer or client.

Export production:

1. **Input and service providers.** In the first stage of the value chain, input suppliers include companies that supply fabrics, yarns, needles, silk screening, embroidery, and accessories (labels, seams, zippers). Service providers supporting these processes include laundry, laboratories, freight forwarders, equipment maintenance, and energy providers.

2. **Production.** The second stage in the value chain is made up of direct actors in three groups: (1) local textile companies, (2) foreign textile companies, and (3) internationally owned companies that manage machine inputs. According VESTEX, the main destinations are the United States and Central America. Exported products include hosiery, baby clothes, knitted cotton shirts, pants and shorts, cotton dresses and skirts, and plain weave shirts. Companies receive orders from buyers that include production instructions on what to produce, how much to produce, when to produce, etc.— what is commonly referred to as the "complete package model."[109]

3. **Distribution.** The third stage is defined by a system of distribution—composed of direct actors, large manufacturing companies, and logistics management companies who coordinate inventory

[108] VESTEX. *Guatemala Apparel and Textile Industry*. Guatemala City, 2015.

[109] VESTEX. *Market Tendencies in the United States*. Guatemala City, 2016.

handling, storage area, and dispatch to ports. Exports produced in the Western Highlands most often leave Guatemala for the United States market according to bills of lading.

4. **Commercialization.** The fourth stage includes overseas clients who purchase goods based on the needs of buyers.

5. **End Market.** The fifth stage includes the final market, or the consumer or client.

Limitations in the textiles and apparel value chain

The main limitations or barriers facing the textiles and apparel value chain *in the local market* are access to credit for MSMEs, limited training and education opportunities for MSMEs and informal enterprises, and the lack of available technology, investments, and maintenance and repair services.

Access to credit remains a challenge for MSMEs in Guatemala; most operate without the security of a financial guarantor. Businesses are unable to make long-term investments—not only in training workers, but also in machinery, technology, infrastructure, etc.—thereby limiting opportunities to expand production and enter new markets. In interviews, MSMEs complained about this across departments; many resented the fact that they do not have the same privileges, incentives, tax breaks, and other supports that large *maquilas* do under current government regulations, thereby limiting their growth potential. Informal businesses are doubly challenged because they are not associated with trade unions, industry associations, and so forth. These businesses do not have legal representation. They also do not pay taxes on imports or otherwise. While evading taxes keeps prices low and therefore competitive with formal producers, many businesses continue to operate informally, because even formal businesses are limited in accessing credit.

The low prices offered by informal businesses allows them to compete for sales with larger firms, regardless of quality. At the same time, the shifting nature of informal production makes it hard for sector organizations such as VESTEX and ASCONFEG to standardize and regulate prices of primary goods.

Training and education opportunities do not generally satisfy the needs of either formal or informal businesses, which have trouble accessing existing opportunities due to rigorous production schedules and limited availability of offerings. In addition, training opportunities offered by INTECAP and industry associations do not match the knowledge and skills demanded by the subsector. Those interviewed noted that it is difficult to send employees to outside (or even inside) training opportunities because of the time cost. *Maquilas* and MSME producers must operate and produce under strict timelines to fill client orders. Informal businesses do not have training channels as formal businesses have. While VESTEX and AGEXPORT have in the past created short training programs for informal businesses, most informal businesses rely on themselves for any training needs. While formal businesses do take advantage of training opportunities when time permits, actors in the Western Highlands noted that training does not always fit their needs. Due to the low cost of INTECAP programs, businesses take advantage of what they can and fill additional needs internally.

Finally, high costs and limited training restrict the amount of specialized technology and machinery that would allow for a greater volume and quality of work. MSMEs that have invested in machinery said that, because they do not have maintenance technicians on staff, they contract out this work as necessary. However, few technicians in the country know how to fix the machinery, which is largely imported, so they often rely on old equipment when newer technology breaks down. *Maquilas* often hire full-time technicians because they must fill large demands in short periods of time. Additionally, *maquilas'* relationships with foreign producers, particularly in the United States, provides the support necessary to overcome maintenance problems.

Other limitations in this subsector are: unfair competition arising from smuggling and low levels of association among actors, causing prices and quality to drop; lack of software for recordkeeping; lack of corporate vision to create a business structure with adequate profit margins based on cost and utility; limited expansion of traditional fabric market due to its high price; lack of raw materials; limited access to specialized technology and machinery that would allow for a greater volume and quality of work; bureaucracy and red tape; land lack of government incentives for small businesses and associations.

Key positions and associated skills in the textile and apparel value chain

Perhaps the most important positions (and related knowledge, skills, and attitudes) in the value chain pertain to innovative marketing and sales strategies to address consumption patterns and meet consumer demand in both the domestic and international markets. Employers said important skills include cost and product analysis to help increase productivity, lower costs, and improve competitiveness.

Other actors mentioned the need for innovative and creative designers who can follow trends in color, cut, and material and also know how to use technology and machinery in silk screening and embroidery. This need was mentioned by owners of micro and small enterprises, who also have management roles and may be the only staff members with higher levels of education and who know how to operate more advanced equipment.

Technicians working in logistics and distribution systems are also crucial. As mentioned above, these workers often act as market intermediaries (not only in Guatemala, but also in Mexico, Honduras, and El Salvador). Those in these positions need business and sales skills to sell at advantageous prices.

Finally, maintenance technicians—who are in limited supply in Guatemala—have a key role in operations. *Maquilas* and MSMEs depend on client relationships, quality, consistency of goods, and fully functioning machinery. This is especially crucial for those who have invested in newer machines and technologies. Those interviewed said strengthening the following positions is especially critical.

TABLE 6. Occupations necessary to strengthen the textiles and apparel value chain

State of Production	Position
Commercialization	Marketing and Sales Manager
Distribution System	- Logistics and Transportation Technician
Production	- Business Administrator - Machine Maintenance Technician - Industrial Mechanical Technician - Designer - Quality Management Supervisor*
Supply and Service Providers	- Marketing and Sales Manager - Logistics and Transportation Technician

Source: Interviews with direct and indirect actors of the value chain. Positions identified by the program with expert consultation.*

MSMEs said middle managers hold the positions described above and are generally university graduates. Smaller companies that produce for the local market are more likely to be managed by their owners. This limits opportunities for advancement by lower level employees. Companies that focus on export products may have internal training programs for middle managers and may also recognize the value of different work experiences as part of resume building for workers. Interaction among tertiary technical educational institutions, universities, and businesses is currently based on supervised internships—a graduation requirement for students in this value chain. However, actors mentioned that employing more technically trained staff could lead to competitive advantages in the future. A small business in Quetzaltenango said that understanding market conditions could help maximize opportunities for innovation in both existing and new markets. Another small business in Totonicapán suggested that additional technical professionals on staff would help their business obtain contracts. While INTECAP and VESTEX have developed training programs to upgrade skills for employees in areas not included in university programs, the majority of those interviewed said INTECAP programs alone are insufficient to meet their needs. Businesses rely on internal training processes, supplemented with INTECAP or VESTEX trainings when available.

Those interviewed said positions described above are held by both men and women, although barriers still exist for women to achieve higher levels of education at the university technical level. Traditional gender roles still predominate. Both men and women face other barriers linked to poverty such as the lack of nearby educational institutions and the availability of remittances (which often discourages the search for better work).

Attitudes

Attitudes described by those interviewed as important related to the rigid nature of production and procedures within the business itself. The ability to complete a task was primary. Attitudes included being responsible, disciplined, punctual, objective when making decisions and communicating with other employees, taking responsibility for actions, and being committed to the security of the company. Critical thinking was not as important as following instructions from managers. However, small businesses in Quetzaltenango noted the importance of taking initiative and being proactive on the job; another in Santa Cruz del Quiché said that managers see a difference in the quality of work done by those who take an interest and see a value in their role in the company versus those who do not. Those interviewed suggested that designers should be innovative, creative, and able to work well in a group setting. Machine maintenance technicians should have the desire to learn and have a positive attitude. Additional attitudes are outlined in Annex E.

Those interviewed mentioned the unintended effect of remittances—the process by which family members who migrate to countries such as the United States send money to their families back home—on attitude. They perceived a tendency among young people who receive remittances to become inactive both in school and the work place; many lose the motivation to work or study.

Textiles: How can educational institutions serve the subsector?

Those interviewed described the competitive advantage of hiring young people with university level education. They said technical knowledge could help increase production and sales, open new national and international markets through informed analysis, increase quality of goods produced, cut costs, and ultimately increase social development in local communities. Existing programs that aim to address the needs of the textile industry in target populations in the Western Highlands are described below.

1. **Secondary education programs** related to textiles include:

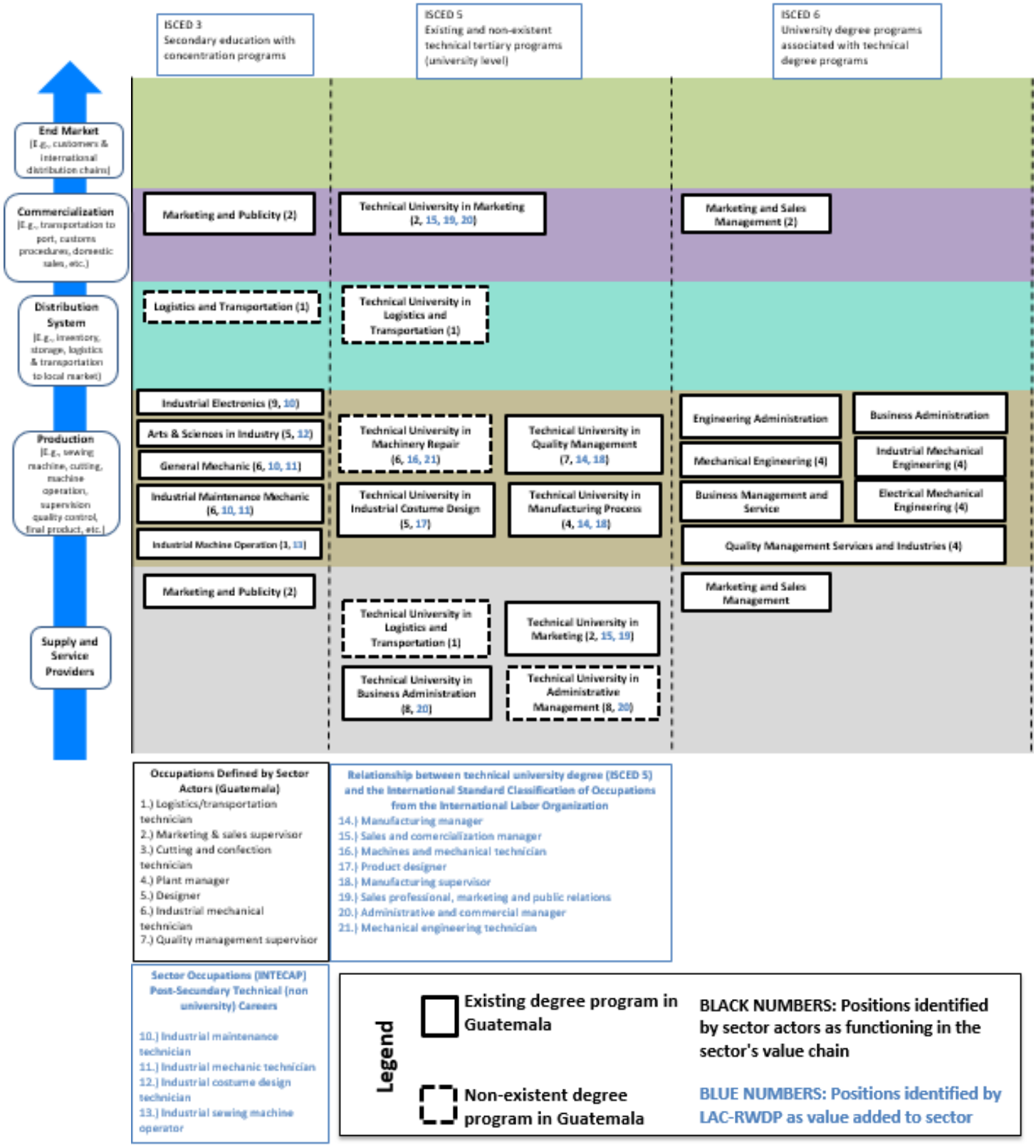
- Electronics and digital devices
- Industrial electronics
- Industrial electricity

These programs are available nationally and are standardized in established curricula defined by the Ministry of Education. While many receive the *Perito* distinction, as noted previously in this study, quality of education is low, and many students struggle to achieve age-appropriate reading and mathematics levels. Those with this specialization are often employed in larger *maquilas* where there is a consistent need for maintenance technicians. Moreover, many workers who have attained this level of education may be overqualified in their roles in the *maquilas;* however, secondary education and skills training are not well-linked to the needs of business.

2. **INTECAP programs:** INTECAP offers a certificate programs for the following specializations:
    - Commercial and domestic electrician
    - Industrial design
3. **Technical tertiary programs (2–3 years):** The following degrees are offered at the technical tertiary level:
    - **Supervision and quality management:** Universidad Galileo, Guatemala City
    - **Electronics:** USAC, Instituto Tecnológico Universitario del Sur, Escuintla
    - **Electronic installment supervision:** Universidad Galileo, Guatemala City
    - **Manufacturing processes:** USAC, Instituto Tecnológico Universitario del Sur, Escuintla
    - **Management:** Universidad Rafael Landívar, Quiché
4. **University degree programs (4 years):** The following degrees are offered at the *licenciatura* level:
    - **Business administration:** University of Mariano Galvez, Huehuetenango, Santa Cruz de Quiché; Quetzaltenango; Galileo University; University of Rafael Landívar, Quetzaltenango, Santa Cruz del Quiché

The “sister” or parallel diagram below depicts information on existing and potential textile-related educational offerings matched to the key positions in the textile value chain. We note a need for technicians in marketing. Actors spoke to a need for positions to create new client relationships in expanding markets such as in the “complete package model” or in artisanal patterns and products, designers who have knowledge of various technologies, and personnel to manage logistics and distributions. Additionally, programs in industrial design (designers) and industrial maintenance (maintenance technicians) are important to consider in this value chain.

FIGURE 40. Technical positions, occupations, and education levels in the textiles and apparel value chain, along with existing and non-existent degree programs



MANUFACTURING: CHOCOLATES, SWEETS, BAKED GOODS AND OTHER PROCESSED FOODS VALUE CHAIN

In recent years, changes in the traditional diets of Guatemalans and those abroad have allowed for diversification of products in the chocolates, sweets, baked goods, and other processed foods subsector. There has been a shift from plant-based to protein-based diets and a new consumer preference for "healthy" products such as whole grain and nut breads. Continuous product research is necessary at the university level to address the needs of local businesses in this subsector. This is particularly important to support MSMEs who do not have the research labs possessed by larger producers and needed to compete in the national and export market. Food processing technicians—with knowledge of food safety and quality production management practices—are essential to remain competitive. Logistics and transportation technicians are also important for MSMEs who sell their products directly in the local market. Knowledge of local markets and geography are necessary for businesses to find new opportunities.

Food security is a concern in Guatemala, especially for indigenous populations. Traditionally, rural, largely indigenous populations have relied on plant-based, low energy-dense foods compared to urban populations, who rely more heavily on animal protein and higher energy foods.[110] However, globalization, urbanization, and advances in technology and communication have begun to alter traditional diets among both Guatemalan and global consumers. Population growth, the rise in GDP per capita in developing countries, a greater demand for protein-based products, and longer life expectancies also contribute to changes in diet.

Those interviewed for this study noted that in Guatemala's subsector of chocolate, sweets, baked goods, and other processed foods, production trends are driven by both local and global food preferences. They noted a trend toward "healthy products" such as whole grain and nut breads, refined pastry processes, and organically produced goods. Diversification of products requires additional training for those across stages of the value chain—particularly because organic production is certified from the input stage to the packaging and distribution stage. Smaller producers and businesses stressed that they are often unable to access technology necessary to compete due to high costs, taxation, and maintenance of technology. Actors in Guatemala City, Quetzaltenango, and Alta Verapaz mentioned the comparative advantage that larger producers have in the subsector, because small businesses are unable to conduct their own research into emerging market trends. Some companies have begun to create strategic alliances with universities to ensure skill and knowledge training for their employees; this is crucial so that producers understand and can explain the nutritional value and benefits of new products and thus remain competitive. However, collaborative efforts between the private sector and universities in this field are isolated. SMEs limited by inadequate facilities, human capital, and financial resources continue to produce traditional goods, thus lagging competitively.

Governance of the value chain is led by the Food and Beverage Export Commission, a division of AGEXPORT. AGEXPORT represents more than 80 companies located in the department of Guatemala and in the western region of the country. The Commission supports its partners through strategic objectives such as promoting innovation, increasing productivity, strengthening quality and safety, and

[110] Tufts University School of Medicine, Department of Public Health and Family Medicine. *Secular Trends in Food Patterns of Guatemalan Consumers: New Foods for Old. Food* Nutrition Bulletin. December 2008 (29:4). Boston, Massachusetts.

promoting companies in markets of interest. Their staff includes a qualified training team.[111] They also represent their members through various guild associations such as sweets, gums, chocolates and related products; bakery industries; packaging companies, sausage, and processed meats; restaurants and food processors; and food manufacturers.

Approximately 70 percent of the companies represented by the Food and Beverage Export Commission and located in either the department of Guatemala or the Western Highlands, are classified as MSMEs.[112] However, small businesses in the subsector are challenged to remain competitive without the necessary technology or research facilities.

Regardless of these challenges, the subsector continues to grow both nationally and abroad. Exports by the processed foods subsector (including beverages) totaled US $410 million in 1995 and grew to US $2.3 billion in 2015. Manufacturing industries including food, beverages, and snuff contributed 3.2 percent to national GDP in 2014.[113] The non-alcoholic beverages and preserved foods subsectors represented 40 percent of national production of the larger processed foods industry, followed by baked goods (15 percent of total exports).[114] Principal destinations of subsector exports include Central America, the Caribbean, Mexico, and the United States.[115] Guatemala has also signed trade agreements with Taiwan, Colombia, and Chile and produces high quality goods to meet the demand of these markets.[116] According to those interviewed, the industry will continue to grow as commercial linkages increase and the demand for high quality organic products increases in both local and international markets.

In 2011, 75,000 people were employed in the food processing subsector, with employment estimated to reach 185,000 by 2021 (an increase of 147 percent).[117] Increased participation of supermarkets in food distribution and efficiency-boosting logistics technology also contribute to growing employment opportunities. Numerically, participation by gender is roughly equal in these business, though for women, traditional gender roles in domestic positions and trades persist.

Understanding the interrelationships among principal actors in the chocolates, sweets, bakery products, and other processed foods value chain

Figure 41 highlights the global and national pressures on businesses in the chocolates, sweets, bakery products, and other processed foods industry in Guatemala. The value chain map includes knowledge and skills needs mentioned by those interviewed in this study. Effectively, the value chain can be divided

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[111] AGEXPORT. "Industry Information. Food and Beverage Commission." Guatemala City, 2016. Accessed September 2016. http://export.com.gt/sectores/comision-de-alimentos-y-bebidas/.

[112] Ibid.

[113] Bank of Guatemala. *Guatemala in Numbers, 2015.* Department of Macroeconomic Statistics. Guatemala City, 2015. Accessed June 2017. http://www.intecap.edu.gt/oml/images/publicos/2016/guatemala_en_cifras_2015.pdf

[114] USDA Foreign Agricultural Service. *Guatemala Food Processing Ingredients 2015.* Guatemala City, 2015. Accessed September 2016. http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Food%20Processing%20Ingredients_Guatemala%20City_Guatemala_12-22-2015.pdf

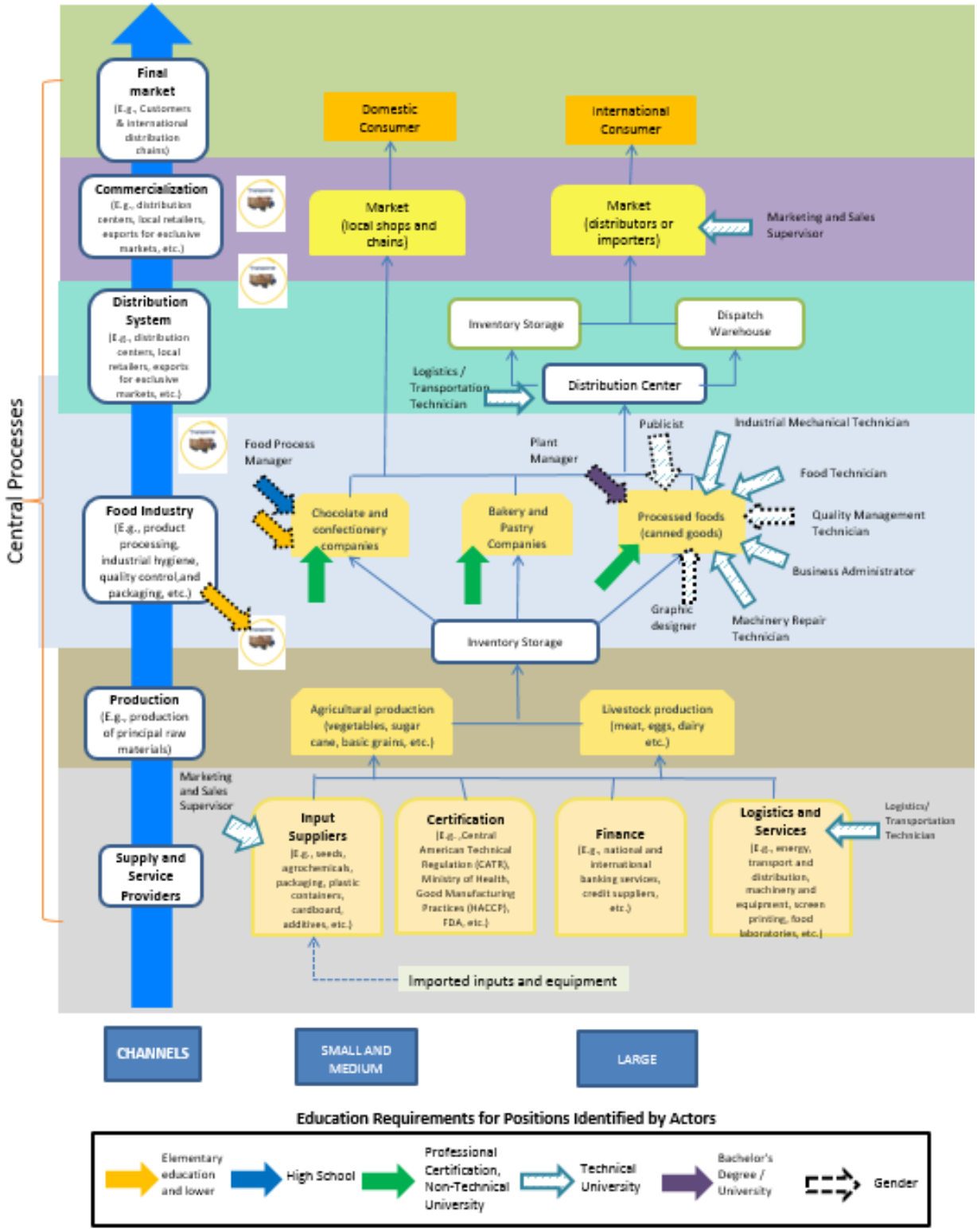
[115] FUNDESA. *Guatemalans Improve Guatemala: A Proposal for a More Prosperous, More Solidary, and Safer Guatemala*. Guatemala, 2012.

[116] USDA Foreign Agricultural Service. *Guatemala Food Processing Ingredients 2015.* Guatemala City, 2015

[117] FUNDESA. *Guatemalans Improve Guatemala: A Proposal for a More Prosperous, More Solidary, and Safer Guatemala*. Guatemala, 2012.

into six stages that make up the core processes of production. These stages include inputs and services, production, food industry, distribution system, marketing, and consumer end markets.

FIGURE 41. Map of the chocolates, sweets, bakery products, and other processed foods value chain



1. **Inputs and service providers.** The first stage of the core processes involves providers of inputs and services, namely: (1) companies that supply seed, fertilizers, agrochemicals, and other technology packages; (2) livestock production with suppliers of concentrates, vaccines, prophylactic plan, technology, genetics and other packages; (3) food industry with raw materials suppliers, packaging and machinery; and (4) transport services providers, electric energy, logistics, banks, certifications and other services. Here, actors noted the need for Sales and Marketing Managers and Logistics and Transportation Technicians.

2. **Production.** The second stage consists of small, medium, and large producers who supply the raw materials for production: (1) agricultural products such as sugar, grains, cocoa, flour, vegetables, and so forth; (2) livestock and dairy products such as meat, eggs, and so forth.

3. **Food industry.** The third stage in the value chain, the food industry, transforms raw materials through processing techniques. The main products are: (1) confectionery, including chocolate for hot beverages; (2) bakery products, including bread, cakes and pastries, and (3) other processed foods such as sauces, canned goods, and snacks. Those interviewed noted the need for the following kinds of employees: business administrators, machine repair technicians, quality management supervisors, graphic designers and publicists, and food technicians. The assessment team also identified a potential need for industrial mechanical technicians.

   Firms must comply with certifications that guarantee food safety and good manufacturing practices. Standards and certification processes improve production, working conditions, and reduce long-term damage to the environment. Some important industry standards are the HACCP (Hazard Analysis & Critical Control Points) system of food safety management; S.Q.F. Safe Quality Food (S.Q.F.) system that ensures food safety and quality management; Global G.A.P. voluntary standards (to certify agricultural products); Central American Technical Regulation (RTCA), which regulates food additives and their maximum allowable limits in different products.

4. **Distribution.** The fourth stage, distribution, includes direct actors who engage in product distribution and related logistics. Many companies have created divisions in their businesses to perform this function, while others work with other companies that export and distribute goods. Smaller companies may handle distribution themselves and take their products directly to super markets, local markets, and so forth, while larger companies have warehouses and storage facilities equipped with the necessary infrastructure. Those interviewed noted the need for logistics and transportation technicians.

5. **Commercialization.** The fifth stage, marketing and commercialization, is composed of small and medium sized businesses who operate stores, and distribution centers and importers who are responsible for the logistics of distribution processes and product positioning in the domestic market, as well as legal procedures and transport for the international market. Those interviewed noted the need for sales and marketing managers.

6. **End market.** The final stage of the value chain is the end consumer, either national and international. Nationwide distribution companies oversee purchasing and/or distributing products to convenience stores, bakeries, supermarkets, and shops. Internationally this activity is mainly carried out by import companies that distribute products through distribution centers, supermarkets, branch stores, and neighborhood stores.

Limitations in the value chain

In addition to limited access to technology and the lack of private sector food research, barriers facing the subsector include lack of access to capital, the high price of raw materials, and service costs. Access to capital is a particular challenge for small and medium producers. Financial institutions often require a business to demonstrate that company growth is above average, which is not always possible—particularly for smaller enterprises. Lack of capital prevents companies from adding employees or upgrading infrastructure. Secondly, prices of raw materials are affected by the dynamics of international commodity prices, mainly basic grains and agricultural products, much of which is produced in the United States. As a result, the rising price of raw materials may particularly affect SMEs and there are no incentives or support structures for this type of business investment. This is true for organic and health related products, which, because of stricter regulatory and quality requirements, are more costly. Thirdly, service costs and the costs of food safety affect productivity and competition. SMEs are often not willing or able to make necessary investments to comply with requirements or update processes, which means they entail associated risks.

Additional limitations highlighted by actors include the following:

- Overall insecurity in the country associated with disappearances, theft, and so forth
- Inadequate infrastructure that does not facilitate commercialization
- Lack of potable water and reliable electricity to carry out production processes
- Competition from products imported illegally from Mexico, particularly in the northwest of the country near the border. (Goods brought in from Mexico, while illegal, are competitive in both price and quality).
- Misinformation and the lack of streamlined procedures at the institutional level. (Certain procedures must be carried out at the municipal level, others at the department level, and others in the country's capital.)

Key positions and associated skills in the chocolates, sweets, bakery products, and other processed foods value chain

As traditional diets of Guatemalans and consumers abroad begin to diversify, companies and producers must think about technical positions that will help businesses remain competitive in new markets. These include product research development/ food processing technicians and logistics and transportation technicians. Other positions include quality management and marketing and sales managers.

TABLE 7. Occupations necessary to strengthen the chocolates, sweets, bakery products, and other processed foods value chain

Value Chain Stage	Position
Marketing and Commercialization	- Sales and Marketing Manager
System of Distribution	- Logistics and Transportation Technician
Production	- Business Administrator - Machine Repair Technician - Quality Management Supervisor - Industrial Mechanical Technician* - Graphic Designer and Publicist - Food Technician
Input Suppliers	- Sales and Marketing Manager - Logistics and Transportation Technician

*Source: Interviews with direct and indirect actors in the value chain. * Position identified by the program in consultation with experts.*

Those interviewed said that lack of trained and experienced workers such as these limit the ability of SME employers to assume greater responsibilities and adopt more efficient production processes. Large companies are able to invest in training programs for their middle managers. However, more training is necessary for growth of the subsector as a whole.

Product researchers and food processing technicians need to understand domestic and international health policies and food safety regulations to produce quality goods. Researchers must also understand production processes to analyze the characteristics of processed food under various circumstances. Oral and written communication skills are important for marketing and sales. Logistics and transportation technicians who distribute and sometimes sell products directly for smaller companies need knowledge and skills to fulfill their roles. Additional positions and related skills are outlined in Annex E.

The companies interviewed believed that they would have a greater competitive advantage if they hired people with more technical training. This would ensure product quality, efficiency of resources, improved customer service, expansion into new markets, and reliability and standardization of production processes—and also pass on further skills to other employees, achieving a multiplier effect.

Attitudes

Attitudes described by actors as important for technical positions in the subsector included a commitment to quality, a sense of responsibility, the ability to work well in a group, and honesty. Particularly as the subsector moves into health food and organic production, actors in Quetzaltenango noted that commitment to quality is a priority, as they aim to produce goods according to high standards. Other business owners in Huehuetenango noted that logistics and transportation technicians should be organized and punctual so that goods can be delivered efficiently and to industry standards. Many

companies said a commitment to the environment is important for technicians, so it is important for delivery routes to be carefully planned to avoid wasting time and energy. Additional attitudes are outlined in Annex E.

Chocolates, sweets, bakery products, and other processed foods: how can educational institutions serve the subsector?

Those interviewed mentioned the need for more formal education and training for logistics and transportation workers and food technicians; however, training options are limited at the technical and university level. Companies would be willing to employ young college technical trainees part time because they feel it is a good practice for youth to gain on the job experience while still in school. This would also allow students to develop initiatives and suggest ways the company can make improvements. Options for formal programs are described below.

1. **Secondary education programs** related to food processing include:

    - Food industry
    - Renewable natural resources
    - Agronomy

These programs are available nationally and are standardized according to curricula defined by the Ministry of Education. While many students receive the *Perito* distinction, as noted previously in this study, the quality of education is low, and many struggle to achieve age appropriate reading and mathematics levels.

INTECAP programs:

INTECAP offers various non-tertiary post-secondary technical training programs of short duration in areas such as: confectionery, baking, chef in Guatemalan cuisine, international chef, industrial baker, food safety worker, waiter, and maître d'. INTECAP also offers a secondary degree (*bachillerato*) in Science and Arts with specialization in industrial food processing. It is offered at the INTECAP Training Center in Santa Lucia Cotzumalguapa, Escuintla.

2. **Technical tertiary programs (2–3 yrs):** The following degrees are offered at the technical tertiary level:

    - **Food processing:** University of San Carlos; Centro Universitario del Sur Occidente, Mazatenango
    - **Productive processes and food quality**: Instituto Tecnológico del Sur, Universidad de San Carlos, Palín, Escuintla
    - **Agro-industrial processes:** Rural University, at campuses in Quetzaltenango, Coatepeque, Salcajá, Universidad de San Carlos, Centro Universitario del Sur, Escuintla
    - **Fruit farming production:** Universidad de San Carlos; Centro Universitario del Noroccidente Huehuetenango
    - **Producción agrícola:** Universidad de San Carlos, Centro Universitario de San Marcos

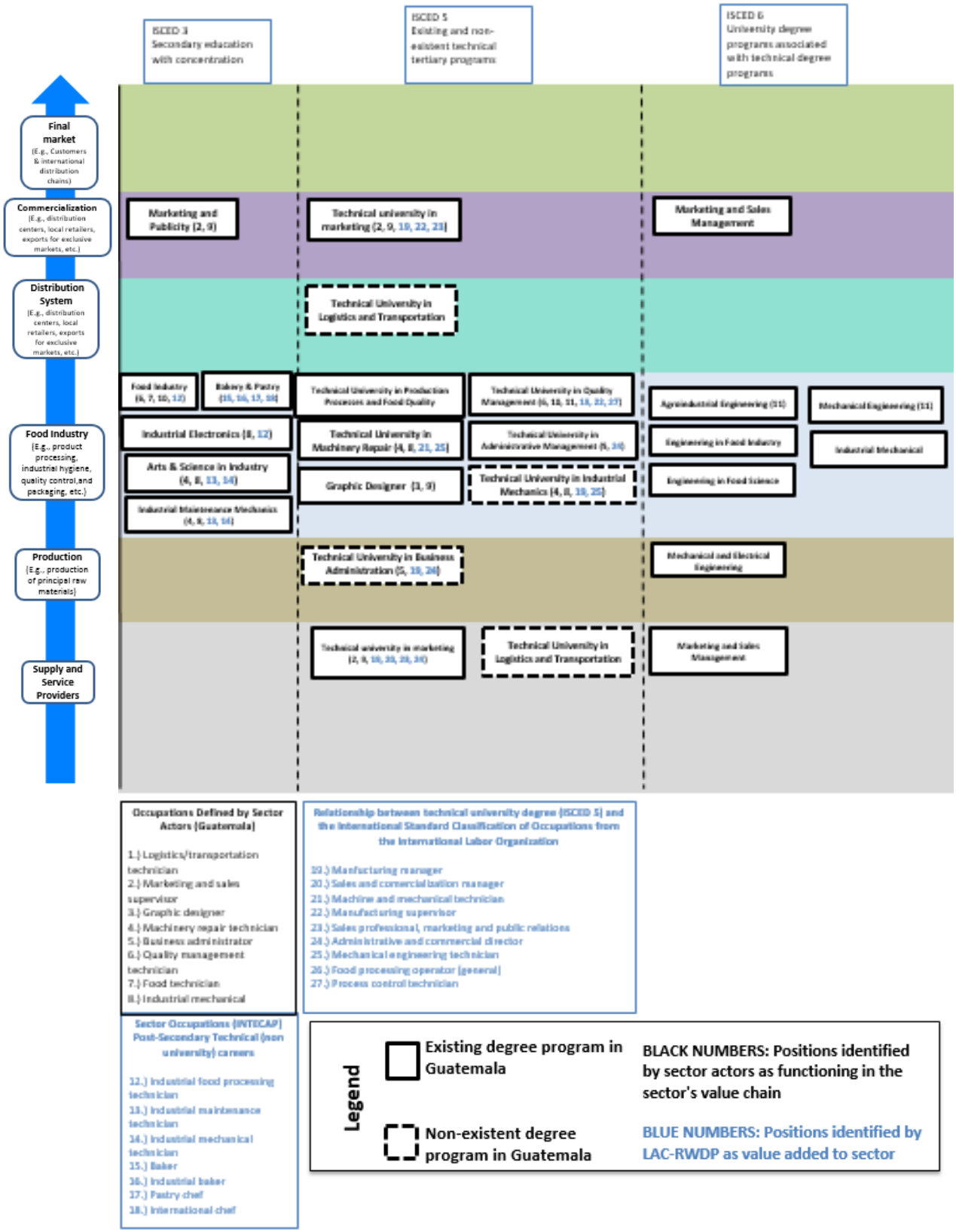
- **Agro-ecology:** Universidad Rural, campuses in La Unión Cantinil, San Pedro Soloma, Nentón, Huehuetenango
- **Agro-industry:** Universidad de San Carlos, Centro Universitario del Sur, Escuintla

3. **University degree programs (4 yrs):** The following degrees are offered at the *licenciatura* level:

- **Food industry engineering:** Instituto Tecnológico Maya de Estudios Superiores, Universidad de San Carlos, San Juan Chamelco, Alta Verapaz
- **Agro-industry engineering:** Universidad de San Carlos, Centro Universitario del Sur, Escuintla. Universidad Rural, sedes, Quetzaltenango, Coatepeque y Salcajá
- **Forestry industry:** Instituto Tecnológico Maya de Estudios Superiores, Universidad de San Carlos, San Juan Chamelco, Alta Verapaz
- **Forestry:** Universidad de San Carlos, Central University of the Northwest, Huehuetenango
- **International agro-business:** Instituto Tecnológico Maya de Estudios Superiores, Universidad de San Carlos, San Juan Chamelco, Alta Verapaz
- **Agronomy:** Universidad de San Carlos, Guatemala City
- **Agronomy, specializing in agricultural production systems:** Universidad de San Carlos; Central University of the Northwest, Huehuetenango
- **Environmental engineer:** Rural University, Quetzaltenango
- **Agronomic engineering:** Rural University, Huehuetenango, Jacaltenango, Santa Cruz Barillas; Santa Cruz del Quiché; Nebaj; Ixcán Playa Grande, Pachalum, San Pedro, Sacatepequez, San Marcos
- **Agriculture and forestry:** Universidad de San Carlos, Guatemala City

The “sister” or parallel diagram below depicts information on existing and potential food processing-related educational offerings matched to the key positions in the value chain. We note a need for the following university technical training programs (with potential occupations): logistics and transportation (logistics technician); production processes and food quality (quality management technician); food industry (researcher).

FIGURE 42. Technical positions, occupations, and education levels in the chocolates, sweets, bakery products, and other processed foods value chain, along with existing and non-existent degree programs in Guatemala



MANUFACTURING: NON-ALCOHOLIC BEVERAGES VALUE CHAIN[118]

The non-alcoholic beverage chain in Guatemala has grown over the past ten years, due in part to production of natural beverages and the country's access to a variety of fruits and vegetable products. This subsector has also responded to the demand for healthy products; it has begun to produce a more diverse array of teas and juices. However, the subsector is led by a demand for sodas, bottled water, and artificial juices. Production is based to a large degree on imports from the United States, including sugars and concentrates. Poor roadways are often problematic and technicians are needed who know suitable delivery/distribution routes.

The subsector has been growing—particularly production of natural beverages and artificial juices, which grew 60 percent over the past ten years.[119] As noted earlier, exports of food products and beverages totaled US $410 million in 1995 and grew to US $2.3 billion in 2015. The main importers of drinks from Guatemala are El Salvador, Honduras, and Mexico.[120]

In 2014, processed food and beverages contributed to 3.2 percent of GDP.[121] The distribution of beverages in Guatemala domestically also grew 43.6 percent between 2005 and 2014; during this time distribution of soft drinks grew 34.9 percent.[122] Growth in both national and international markets is also reflected in the workforce. In 2010, 18,000 people were employed in the subsector; this number is estimated to grow to 48,600 by 2021. This would represent a 172 percent increase in jobs in the subsector.[123]

According to those interviewed, the industry is expected to remain stable with potential to expand, in view of increasing market opportunities. Interviewees noted that growth in the industry is associated with the increase in population and is closely related to water quality; the subsector is growing more in the area of nutritious natural drinks, which are linked to increased purchasing power. Participation of men in the labor force is higher (60 percent) than that of women (40 percent). Perceptions of women's roles in the subsector are the same as mentioned for other subsectors. The value placed on university technical education depends on the size of the company, especially when it comes to wage compensation.

Understanding the interrelationships among principal actors in the non-alcoholic beverages value chain

Figure 43 highlights the global and national pressures on businesses in the non-alcoholic beverage industry in Guatemala. The value chain map includes knowledge and skills needs mentioned by those interviewed in this study. Effectively, the value chain can be divided into five stages that make up the core processes of production. These stages include inputs and services, production, food Industry, distribution system, marketing, and consumer end markets.

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[118] For the purposes of this study, alcoholic beverages were not considered as part of the value chain analysis.

[119] USDA Foreign Agricultural Service. *Guatemala Food Processing Ingredients 2015.* Guatemala City, 2015.

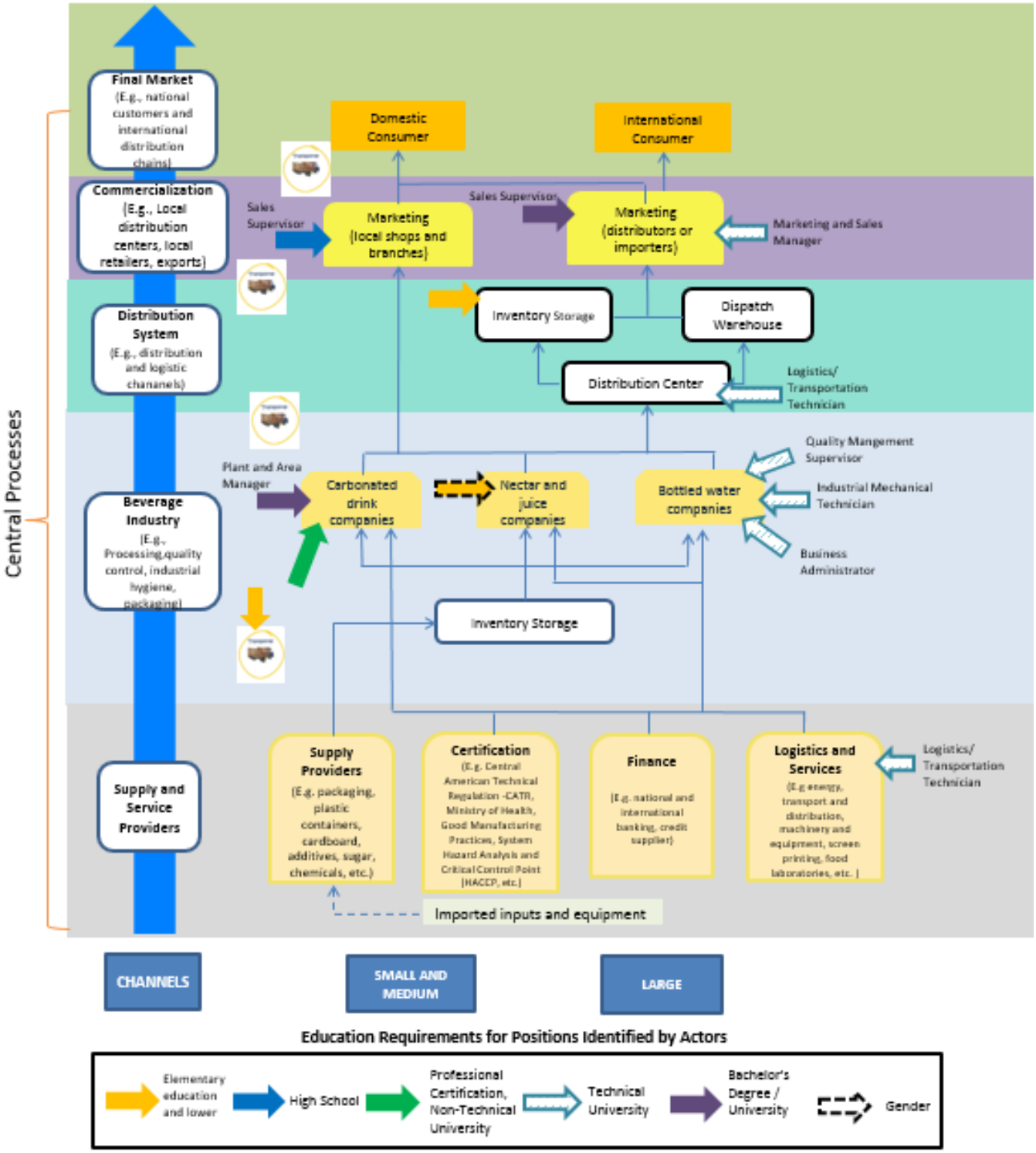
[120] Ibid.

[121] Bank of Guatemala. *Guatemala in Numbers, 2015.* Department of Macroeconomic Statistics. Guatemala City, 2015. Accessed June 2016. http://www.banguat.gob.gt/Publica/guatemala_en_cifras_2015.pdf.

[122] Superintendent for Administration. Statistical Bulletin. Methodological Link. November 2014. Accessed June 7, 2017. http://sat.gob.gt/sitio/index.php/esat/47-estadicas-tributarias/7880-boletin-estadistico.html.

[123] FUNDESA. Guatemalans Improve Guatemala: A Proposal for a More Prosperous, More Solidary, and Safer Guatemala. Guatemala. 2012.

FIGURE 43. Non-alcoholic beverages value chain with workforce overlay



1. **Suppliers and service providers.** The first stage of the value chain includes companies that supply raw materials such as sugars, gases, concentrates, chemicals, machinery, packaging, containers, and other supplies. Service providers associated with these processes include companies that provide transportation, machinery maintenance, cleaning, education and training, and product promotion, among other services. Many larger processors import their raw ingredients directly, while smaller companies rely on importers and distributors to obtain these goods or buy from the local market. Those interviewed said this stage needs sales and marketing managers and logistics and transport technicians.

2. **Beverage industry.** The second stage in the value chain includes SMEs that manufacture beverages. Small businesses generally focus on bottled water, while midsized businesses such as FERSAN SA and the Fountainhead and India Group, Quiché, produce carbonated drinks and market to specific areas of the country such as Quiché, Huehuetenango, Quetzaltenango, and other departments. Large businesses produce a variety of drinks for both national and international markets.

   This stage of the value chain must be responsive to certification systems and standards to improve workforce performance, among other production factors. Some important industry standards are the Hazard Analysis & Critical Control Points (HACCP) system of food safety management; Safe Quality Food (S.Q.F.) system that ensures food safety and quality management; Global G.A.P. voluntary standards (to certify agricultural products); and Central American Technical Regulation (RTCA), which regulates food additives and their maximum allowable limits in different products. Those interviewed said this stage requires business administrators, quality management supervisors; a need for industrial mechanical technicians was identified by the assessment team.

3. **Distribution.** In the third stage of the value chain, direct actors are engaged in product distribution and logistics. Large companies carry out this activity internally, while others work with domestic distribution services and exporters. The assessment team identified a need for logistics and transportation technicians.

4. **Commercialization.** The fourth stage is defined by commercialization and marketing activities carried out by actors who participate in different channels and markets. These include small subsidiaries and warehouses in the case of SMEs; distribution companies responsible for the logistics of distribution processes and product positioning in the domestic market; and bottling companies that have strong distribution systems. Sales and marketing managers are needed at this stage.

5. **End market.** The fifth stage is made up of national and international actors. On the national level, distributors are responsible for the buying and/or distribution of products for supermarket chains, other distributors, local neighborhood stores, recreation centers (zoos, theme parks), etc. On the international level, importers distribute products through distribution centers, supermarkets, and local neighborhood stores.

Limitations of the non-alcoholic beverages value chain

The main limitations or barriers facing the subsector are associated with innovation, infrastructure, and adequate manpower. Innovation is limited by access to technology, opportunity to improve interaction

between academia and the private sector, and investment in research and development by individual businesses and clusters.[124] SMEs need better access to working capital to enable growth.

Infrastructure and available logistics systems are insufficient, including—for many—an unpaved road network, leading to higher packaging and transportation costs. These conditions (which affect most sectors in the country), along with poorly trained workers, translate into competitive disadvantages.

Additional limitations highlighted by actors include:

- Difficulty maintaining competitive prices
- The need to modernize and comply with regulations in an increasingly demanding market
- Constant changes in regulations pertaining to the national market
- Limited access to technologies (such as machinery) available only outside of Guatemala, where import taxes are high
- The need for greater investment in water and solid waste treatment linked to environmental protection

Key positions and associated skills in the non-alcoholic beverage subsector value chain

Important technical positions identified in the non-alcoholic beverage subsector include technicians in logistics and transportation and sales and marketing personnel. Business owners and managers in Quetzaltenango noted the need for logistics and transportation personnel because of the state of road infrastructure in more rural areas, particularly where fruits and vegetables are produced. Farmers are limited as to where and how they can move their product to the processing stage in this subsector. Logistics and transportation specialists are also needed for delivery of final products and must know the geography of the region and how to use software programs that register product delivery. Actors in the Western Highlands and those in Guatemala City also stated that these technicians must understand health and food safety standards and marketing techniques, as smaller producers fill transportation positions themselves rather than using intermediaries.

[124] AGEXPORT. *Roadmap for High Impact to Accelerate the Growth of the Manufacturing Sector*. 2016. Accessed September 2016. http://export.com.gt/wp-content/uploads/2016/04/Doc-Hoja-de-ruta-manufacturas-low.pdf.

TABLE 8. Occupations necessary to strengthen the non-alcoholic beverage value chain

Value Chain Stage	Position
Marketing and Commercialization	- Sales and Marketing Manager
System of Distribution	- Logistics and Transportation Technician*
Production	- Business Administrator - Quality Management Supervisor - Industrial Mechanical Technician*
Input Suppliers	- Sales and Marketing Manager - Logistics and Transportation Technician

*Source: Interviews with direct and indirect actors in the value chain. *Position identified by the Program in consultation with experts.*

As the subsector begins to expand into new markets nationally and internationally (in natural fruit and vegetable juices and teas), marketing and sales staff who understand the nutritional benefits of the products are needed to reach new customers. Knowledge of the development of a product from farm to factory to store shelf is important and can help expand the market to younger customers who are more conscious of what they are drinking. Marketing teams who understand this, and online platforms, will help reach younger consumers who may be more concerned about production practices and the contents of a product (due to concern about their own health and about the environment). Additional positions and related skills are outlined in Annex E.

Attitudes

Those interviewed in the subsector noted that across staff roles and levels, employees must be committed to quality and to the preservation of the environment through safe and responsible farming and production practices. Although most mentioned this as a responsibility of management, those in Guatemala City noted that this is important for all participants in the value chain as roles are distinct and production is decentralized. As companies become more focused on organic production, a commitment to social responsibility and the protection of the environment is necessary for customers to “buy” the idea of buying conscientiously produced goods. Employees in logistics and transportation positions must also be punctual and trustworthy as they are often the face of a company when a product is delivered to a distribution center or directly to a store. Those working in marketing and sales positions should also have a desire to learn not only about new technologies and marketing platforms, but about actual products in order to excel in their positions. Additional attitudes are outlined in Annex E.

Non-alcoholic beverage value chain: how can educational institutions serve the subsector?

Although actors described the need for more formal education and training for those in logistics and transportation and for food technicians, options at the technical and university level remain limited. In this value chain, as in the processed food value chain, companies would be willing to employ young college technical trainees part time. Options for formal programs are described below.

1. **Secondary education** programs focused in tourism include:

- Food industry
- Renewable natural resources
- Agronomy

These programs are available nationally and are standardized according to an established curriculum defined by the Ministry of Education. While many receive the *Perito* distinction, as noted previously in this study, the quality of education is low, and many students struggle to achieve age-appropriate reading and mathematics levels.

2. INTECAP programs: Technician in industrial food processing, industrial maintenance technician, industrial mechanic and technician; Industrial boilermaker. In addition, INTECAP offers a *bachillerato* (secondary degree) in Arts and Sciences with specialization in industrial food processing taught at the training center of Santa Lucia Cotzumalguapa, Escuintla.

3. Technical tertiary programs (2–3 years): The following degrees are offered at the technical tertiary level:

- **Food industry:** Instituto Maya de Estudios Superiores, Universidad de San Carlos; San Juan Chamelco, Alta Verapaz
- **Productive processes and food quality**: Instituto Tecnológico Universitario del Sur, Universidad de San Carlos, Palín, Escuintla
- **Agro-industrial processes:** Rural University, campuses in Quetzaltenango, Coatepeque, Salcajá, Universidad San Carlos, Centro Universitario del Sur, Escuintla
- **Fruit farming production:** Universidad de San Carlos, Centro Universitario del Nor Occidente, San Marcos
- **Agro-ecology:** Universidad Rural, campuses in La Unión Cantinil, San Pedro Solomá, Nentón, Huehuetenango
- **Agro-industry:** Universidad de San Carlos, Centro Universitario del Sur, Escuintla

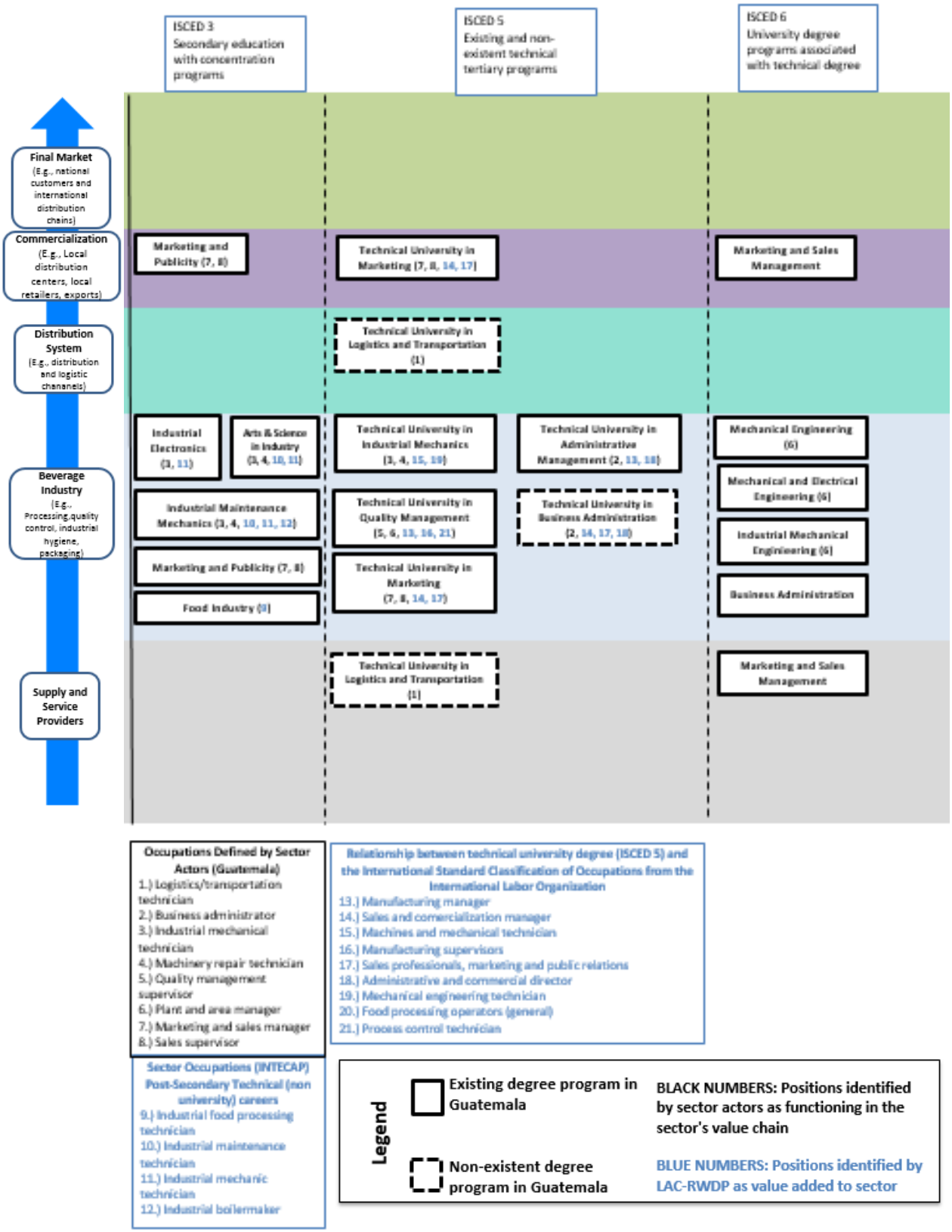
4. University degree programs (4 years): The following degrees are offered at the *licenciatura* or engineer level:

- **Food Industry engineer:** Instituto Tecnológico Maya de Estudios Superiores, Universidad de San Carlos, San Juan Chamelco, Alta Verapaz
- **Agro-industry engineer:** Universidad de San Carlos, Centro Universitario del Sur, Escuintla, Universidad Rural, campuses in Quetzaltenango, Coatepeque y Salcajá
- **Forestry industry:** Instituto Tecnológico Maya de Estudios Superiores, Universidad de San Carlos, San Juan Chamelco, Alta Verapaz Forestry: University of San Carlos, Central University of the Northwest, Huehuetenango
- **International agro-business:** Instituto Tecnológico Maya de Estudios Superiores, Universidad de San Carlos, San Juan Chamelco, Alta Verapaz

- **Agronomy engineering:** Universidad de San Carlos, Guatemala City
- **Agronomy, specializing in agricultural production systems:** University of San Carlos; Central University of the Northwest, Huehuetenango
- **Environmental engineer:** Rural University, Quetzaltenango
- **Agronomic engineering:** Rural University, Huehuetenango, Jacaltenango, Santa Cruz Marillas; Santa Cruz del Quiché; Nebaj; Ixcán Playa Grande, Pachalum, San Pedro, Sacatepequez, San Marcos
- **Agriculture and forestry:** Universidad de San Carlos, Guatemala City

The “sister” or parallel diagram below depicts information on existing and potential relevant educational offerings matched to the key positions in the non-alcoholic beverages value chain. We note a potential need for the following university technical training programs (with potential occupations): logistics and transportation (logistics technician); production processes and food quality (quality management technician); food industry (researcher).

FIGURE 44. Technical positions, occupations, and education level in the non-alcoholic beverages value chain, along with existing and non-existing career options in Guatemala



SERVICES: TOURISM VALUE CHAIN

While Guatemala's tourism industry has traditionally been defined by its richness as a cultural destination, the country boasts a plethora of activities and experiences that not only draw people to various parts of the country, but give tourists a reason to stay. Issues of security have complicated tourism; however, the industry must also overcome its own issues in order to grow. The market strategy of INGUAT (the Guatemalan Institute of Tourism) does not focus on MSMEs, which make up the vast majority of its members. As a result, MSMEs are challenged to grow and be competitive and it will be important for industry leaders to consider these challenges in order to include smaller businesses. The position of marketing and sales manager (with knowledge of web design, graphic design, and publications) can counter some of these challenges to promote tourism and new markets both nationally and internationally. Management of software, social networking, and oral and written communication will be important.

Historically, Guatemala's tourism industry, a subsector of the service sector—which includes hotels, restaurants, and transportation—has been based on the country's attraction as a cultural destination. Tourism revenues accounted for 2.9 percent of GDP during the period from 2009 to 2013.[125] Tourism is the third largest source of foreign exchange. Guatemala has long been an affordable destination for tourists. Major consumers in 2014 included guests from El Salvador, the United States, Honduras, Mexico, Nicaragua, Canada, Costa Rica, United Kingdom, Belize, and Spain.[126] Tourists are drawn to the country of "eternal spring," home to 22 indigenous groups and 14 unique eco-regions.[127] They are also drawn to the country for religious and spiritual reasons, for health reasons, for language schools, and for business reasons—all of these factors contribute to the variety of unique experiences found in Guatemala.

In 1990, INGUAT established a categorization system for tourism in Guatemala, which effectively divided the country into several regions to market tourist destinations and products. Among these is the Altiplano (Highlands), a Living Maya Culture including the departments of Chimaltenango, Sololá, Totonicapán, Quetzaltenango, Quiché, Huehuetenango, and San Marcos. It includes traditional tourist destinations of Panajachel and Chichicastenango.

Insecurity has direct and indirect effects on Guatemala's tourism industry. However, business owners and hotel managers in the departments of Quetzaltenango, Huehuetenango, and Quiché remain cautiously optimistic as they look to adapt to and take advantage of an incremental rise in international tourists.[128] Actors across the tourism subsector stressed the need for qualified staff capable of using technology and social media platforms to connect with new markets; those trained in software programs for administrative and finance purposes; bilingual or multilingual staff; and trained chefs and kitchen personnel to cater to the tastes of international guests. Business managers and owners of hotels of all sizes spoke of the benefits and the competitive advantages of having staff trained at the tertiary technical level. However,

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[125] World Bank. Guatemala Economic DNA: Harnessing Growth with a Special Focus on Jobs. Washington, D.C., 2014.

[126] Guatemalan Tourism Institute. *Tourism Statistic Bulletin: January – December 2014*. Guatemala City, 2014. Accessed September 7, 2016. http://www.inguat.gob.gt/media/boletines/boletin-anual-2014.pdf.

[127] National Council of Protected Areas. Biodiversity of Protected Areas. Guatemala City, 2014. Accessed September 1, 2016. http://www.conap.gob.gt/index.php/quienes/conap-central/direccion-tecnica/planificacion/estadisticas-e-indicadores-ambientales/category/74-estadisticas-conap.html.

[128] Guatemalan Tourism Institute. *Tourism Statistic Bulletin: January – December 2014.* Guatemala City, 2014.

not surprisingly, micro and small businesses said they primarily hire those with a secondary education. Larger businesses are more likely to have staff with technical or *Licenciatura* degrees. The lack of technical knowledge within smaller businesses limits the industry's ability to meet the needs of today's guests. In 2014, 58.8 percent of hotels were categorized as micro enterprises.[129]

Guatemala's main tourism segments include the following:

- **Cultural tourism:** Mayan archeological sites such as Tikal in the Petén, Quiriguá in Izabal, Iximche in Tecpan, Chimaltenango, along with the well-preserved colonial city of Antigua (declared by UNESCO as a Cultural Heritage site) have been the focus of tourism in Guatemala for many years. The importance of the indigenous textile industry and other artisanal products unique to indigenous communities across the country add to the appeal of a visit to various parts of the country for both national and international guests.

- **Religious/humanitarian/spiritual tourism:**

  i) Religious and humanitarian tourism: Guatemala, which is primarily Christian, receives many evangelical Christian missionary groups from Europe and North America; these groups participate in community projects such as the construction of schools, churches, community centers, homes, etc. They work through local non-profit organizations in departments such as Quiché. Foreign medical and dental groups travel to Guatemala for short periods of time to provide free or low cost services and care for those living in rural regions where medical resources are scarce.

  ii) Spiritual tourism: Spiritual tourism in Guatemala is based on the strength and prominence of the Mayan cultures. Tourists often visit Lake Atitlan for this reason, based on the mysticism surrounding the lake, and the many indigenous towns on its shores. Tourists also seek Mayan shamans to perform cleansing rituals.

- **Language tourism:** Spanish language schools in Guatemala are popular for expatriates and foreign visitors alike due to the relatively low cost of classes and the selection of schools in popular areas such as Antigua, Quetzaltenango, and Lake Atitlan. Many schools organize additional activities for students at a discounted rate and operate tours themselves to popular local destinations. Those visiting Guatemala for this purpose also have the option of participating in home-stays, for a unique experience.

- **Health tourism:** Visitors may participate in health tourism by visiting mineral hot springs such as the *Fuentes Georginas*, located in the department of Quetzaltenango and known for its therapeutic effects.

- **Business tourism:** Business tourism is concentrated in Guatemala's largest urban hubs of Guatemala City and Quetzaltenango. Guatemala City's tourism industry is largely focused on business tourists and large conventions or events. The presence of large international hotels depends on this steady stream of guests who come for regional and international conferences,

[129] Research and Social Studies Association (ASIES). *Guatemalan Tourist Sector Situation: 2013-2014.* Guatemala City, 2014. Accessed September 9, 2016. http://www.asies.org.gt/download.php?get=2014_DICE_Encuesta_de_Turismo.pdf.

seminars, and related business purposes.[130] In 2015, the Bureau of Conventions expanded their marketing appeal to the academic community, encouraging universities to bring international events to Guatemala.[131]

In 2000, INGUAT built on previous efforts to establish a National Tourism Strategy, creating local tourism committees to formulate and implement strategic tourism plans.[132] Additionally, in 2004, the ILO convened the first Consultative Meeting of Community Tourism in Guatemala, establishing criteria to promote and stimulate community tourism. INGUAT is the lead agency promoting sustainable tourism in the country; it coordinates across sectors, public, private and civil actors. The Commission for Economic Development, Tourism, Environment and Natural Resources (COFETARN), composed of governmental and non-governmental organizations and civil society, also participates in the value chain's governance. Self-managed tourist committees such as CAT, a legally organized representative that coordinates decentralization of tourism among local civic groups, also have a voice. The business sector is represented by the Chamber of Tourism of Guatemala (CAMTUR), which promotes business development partnerships and national and regional tourism development. Sustainability and respect for the country's cultural diversity and Mayan heritage have become cornerstones of the tourism industry, guided by the country's National Policy for Sustainable Tourism Development 2012–2022.[133]

Since the early 2000s and again in 2012 under the National Policy for Sustainable Tourism Development, INGUAT has prioritized tourism regions within Guatemala, effectively dividing the country into seven sub-regions to market tourist destinations and products. Between 2013 and 2014, the subsector saw a 7.1 percent increase in the number of foreign tourists in the country.[134] Destinations prioritized and contributing to this growth include Guatemala City, the Altiplano, Petén, Izabal, Las Verapaces, the Pacific coast, and the *oriente,* or eastern part of the country.[135] Sites most frequently visited within these regions include Quiriguá, Antigua, and Tikal National Park.

Despite the country's best efforts to strengthen tourism nationally by streamlining national and international marketing campaigns, concentrated efforts have created unintended consequences for some small business owners. Many owners and managers in the subsector blame INGUAT's lack of innovation and its focus on traditional tourism locations. For example, a small hotel owner in the department of Quiché noted that INGUAT's strategy emphasizes certain focal points and does not promote municipalities and tourist destinations other than these. As a result, smaller operators in areas of lower concentration of tourist activities may not feel they are benefitting, despite their proximity to destinations that have been selected for promotion by INGUAT.[136] Another actor in Quetzaltenango noted

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[130] Invest in Guatemala. Tourism. Guatemala City, 2015. Accessed September 6, 2016. http://www.investinguatemala.org/sites/default/files/5-tourism_eng_0.pdf.

[131] Guatemalan Tourism Institute (INGUAT). "Bureau of Conventions Looks to Make Guatemala an Academic Events Destination." Guatemala City, 2015. Accessed August 28, 2016. http://www.inguat.gob.gt/posts/buscan-posicionar-a-guatemala-como-destino-de-eventos-academicos-internacionales-159.php.

[132] Government of Guatemala, Presidential Commission on Tourism Development and National Institute of Tourism (INGUAT). "National Tourism Strategy." 2000. Accessed June 12, 2017. http://www.redturs.org/documentos/guate/estnac.pdf.

[133] Government of Guatemala, President of the Republic. *National Policy on Sustainable Tourist Development in Guatemala, 2012-2022.* Guatemala City, 2012. Accessed September 3, 2016. http://www.segeplan.gob.gt/downloads/clearinghouse/politicas_publicas/Turismo/Politica_Nacional_DTS_Guatemala_2012_2022.pdf.

[134] Guatemalan Tourism Institute. *Tourism Statistic Bulletin: January – December 2014.* Guatemala City, 2014.

[135] Government of Guatemala. *President of the Republic. National Policy on Sustainable Tourist Development in Guatemala, 2012-2022.* Guatemala City, 2012.

[136] Research and Social Studies Association (ASIES). *Moving Toward Modern and Decentralized Tourism.* Guatemala City, 2015. Accessed August 20, 2016. http://www.asies.org.gt/download.php?get=201514aencuesta_turismo.pdf.

that analysis of the tourism industry usually focuses on the needs of larger, strong businesses, and it is necessary to understand needs at all levels and for all sizes of business. The isolation of smaller businesses and those outside of main tourist hubs is concerning, in view of the high percentage of businesses (hotel and other tour operators) considered either micro or small enterprises (table 9).

TABLE 9. Size of tourism businesses, 2014

SIZE	PERCENT OF HOTELS	PERCENT OF TOUR OPERATORS
Micro (1-4 Workers)	58.8 percent	55.8 percent
Small (5-19 Workers)	23.6 percent	33.7 percent
Medium (20-49 workers)	3.2 percent	4.7 percent
Large (50+ workers)	14.4 percent	5.8 percent

Source: Research and Social Studies Association (ASIES). Guatemalan Tourist Sector Situation: 2013-2014. *Guatemala City. 2014.*

In 2011, the tourism industry accounted for 132,000 jobs and it is predicted to increase to 222,000 jobs by 2021—a growth of 68 percent. Tourism revenues accounted for 2.9 percent of Guatemala's GDP in the period from 2009 to 2013. Tourism is the third greatest source of foreign exchange. Guatemala has become a relatively affordable destination for major senders of tourists like the United States, Canada, and Europe.

Direct jobs in the subsector include those generated by hotels, travel agencies, airlines, restaurants, and other leisure activities.[137] Several of those interviewed confirmed the potential for employment growth within their own businesses. Factors that businesses saw as boosting growth included improvement in strategic planning, more hotels, private investment, improved infrastructure, and rehabilitation of the Los Altos airport, which is now receiving international flights. Constraints mentioned included the limited number of tourists, lack of tourism promotion and public investment, and increased costs (especially associated with new hires).

According to the companies interviewed, 49 percent of employees in the subsector are women. In general, the companies expressed interest in giving part-time opportunities to young trainees. If a trainee is absent, any other employee can fill in for them.

Understanding the interrelationships among principal actors in the tourism value chain

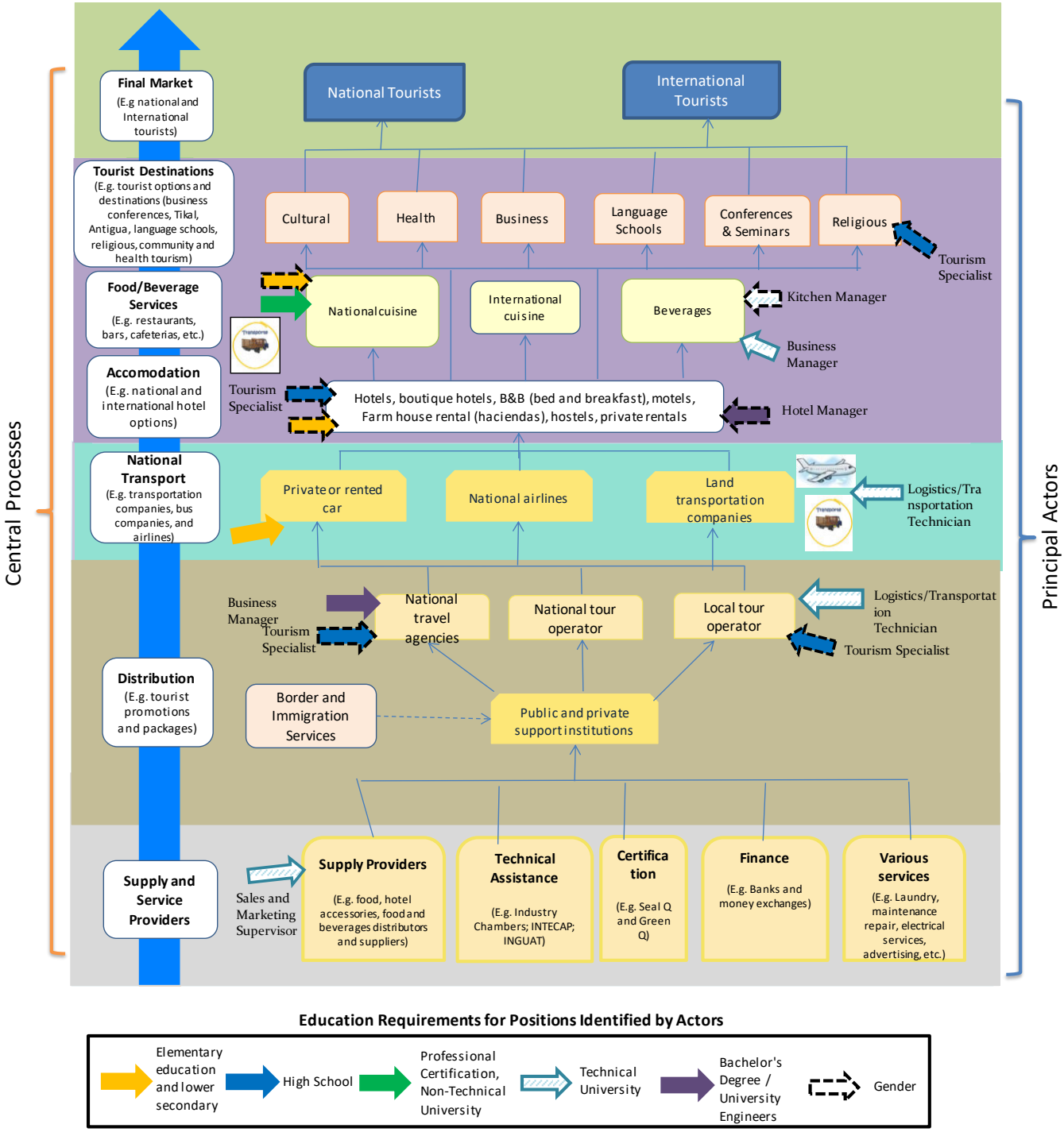
To understand the stages in the tourism chain, it is necessary to distinguish between two types of tourists—domestic and international—as well as the reasons for a trip (leisure, business, visiting family and friends, religious/spiritual purposes, language study, conferences and seminars, and health, among others).

Figure 45 highlights the global and national pressures on businesses in the tourism industry. The value chain map includes knowledge and skill needs mentioned by those interviewed in this study. Effectively, the tourism value chain can be divided into six stages that make up the core processes of a tourist's experience. These stages include input suppliers and various services; sales and promotion; national

[137] World Travel and Tourism Council. *Travel and Tourism: Economic Impact 2015 Guatemala.* London, 2015. Accessed August 25, 2016. https://www.wttc.org/-/media/files/reports/economic%20impact%20research/countries%202015/guatemala2015.pdf.

transport; accommodation, food, and beverage services; tourist destination; and finally, the end market which the chain serves.

FIGURE 45. Map of the tourism value chain



1. **Input suppliers and service providers.** The first stage includes input suppliers—companies that supply cleaning products, hospitality accessories (linens, furniture, equipment), restaurant accessories (glassware, kitchen, equipment and machinery), and food distributors and suppliers. The first stage also includes companies that supply laundry services, equipment maintenance, electrical maintenance, electricity, security, and other services. Actors across the tourism subsector noted that while laundry and cleaning services are generally hired in-house by hotels and tour operators, security professionals are contracted out. Respondents mentioned the need for logistics and transportation technicians, while the assessment team identified a need for marketing and sales managers.

2. **Distribution.** In the distribution stage, actors include national and local tour operators and travel agencies. Large companies are located in the departments of Guatemala (51.7 percent) and Sacatepequez (14.7 percent). Local tour operators and travel agencies are generally located near multiple tourist destinations. Many small and medium operators are family operated. Respondents mentioned the need for logistics and transportation technicians, while the assessment team identified a need for marketing and sales managers, consistent with each of the value chains examined in this document.

3. **National transport.** Transport is divided into land and air transportation, although a few international cruise operators include Guatemala among their destinations. Land transport is the main means of tourist mobility to more rural departments. Options include local tour operators who provide their own transportation services; companies with established routes throughout the country; car rental companies; and private vehicles. A study by INGUAT in December 2014 found that approximately 70 percent of non-residents entered Guatemala via land routes, with 44.8 percent crossing from El Salvador.[138] Guatemala City's La Aurora airport saw an 8.3 percent increase in travelers in the period of 2013–2014.[139] Those interviewed identified a need for logistics and transportation technicians.

4. **Hospitality.** The fourth stage of the value chain consists of direct actors operating in hotel companies, food and beverage services, and activities that draw tourists to Guatemala—such as culture, health, business, Spanish schools, conferences or seminars, and religious activities. Those interviewed noted that the hotel business is more developed and decentralized than that of tour operators; in addition, hotels focus on domestic tourists, while tour operators focus on foreign tourists. Additional actors in this stage are those who offer food and beverage services (namely restaurant and food stores) but also include food services within hotels such as bars, clubs, informal food sales (street vendors), and food stores and kiosks located at most tourist attractions. Actors identified a need for kitchen and restaurant managers, hotel managers, business administrators, and tourism technicians.

5. **End market.** Finally, the fifth stage of production is the end market—the tourist (national or international). Prior stages and activities of the value chain aim to capture these two distinct markets.

[138] Guatemalan Tourism Institute. *Tourism Statistic Bulletin: January – December 2014.* Guatemala City, 2014.

[139] Ibid.

Limitations of the tourism value chain

One main limitation or barrier facing the subsector is the global economic environment, which may affect individuals' ability to travel and associated costs. Other limitations include local and global disease outbreaks, natural disasters, and insecurity.

Guatemala has no tax incentives for tourism investment. According to the Tourism Competitiveness Index of the World Economic Forum (2013), the least favorable indicators for tourism are public safety, environmental sustainability, and land and air transport infrastructure; price competitiveness is the most favorable factor. There is marked seasonality and dependence on the behavior of specific foreign markets, particularly since the country is not in a good position to open new markets. This is reflected in the operation and interests of INGUAT as it is markedly traditional and not very innovative.

According to respondents, major constraints to the development of the subsector are:

Security issues. Beyond the prevalent security issues in Guatemala, actors across the departments of Quiche, Huehuetenango, and Quetzaltenango described limitations that challenge the tourism subsector. Deeply rooted security issues in Guatemala have had grave effects on tourism (not only from North America and Europe, but also from other Central American countries).

Political uncertainty. One issue is the fragile state of Guatemalan institutions. This manifests itself in ways that directly and indirectly affect the quality of services and the participation of businesses outside of large urban hubs. Hotel associations and actors who manage large conventions, international events, etc., often face this problem when organizing government functions; government procedures for organizing events on the national, departmental, and municipal level are time-consuming. Hotels in Quetzaltenango who compete to hold such events stated that they were often strained financially by the slow government timeline. Most medium and larger hotels therefore contract temporary workers when needed and in general keep fewer people on full-time staff. The limited financial resources of the government also affect public sector events at hotels.

Infrastructure. Another constraint is the lack of adequate basic infrastructure in many areas. This includes not only roads safe for larger delivery trucks, but also the availability of clean, safe water. The lack of adequate road infrastructure principally affects businesses outside of or between urban centers; this limits the interest of tourists in these areas. Potable water is a problem nationally, as noted by a medium sized business in Quetzaltenango. Water safety measures are supposed to be taken on by municipalities, one informant stated; however, there are no departmental or national safety standards, and there is no authority to regulate water services in the country. Larger hotels are more likely to create their own safety standards. This may not be possible for smaller businesses. This issue is more prevalent in rural areas where mining practices exploit and contaminate local water sources. Those most directly affected are indigenous communities, who, having little control over resources on their ancestral lands, often live without access to clean water.

Traditional gender roles. An additional barrier as noted by those interviewed is the existence of strict, traditional gender roles and limitations to full gender participation in the value chain. Managers and owners' perception of female participation was noted as limited, particularly at the tertiary technical level. The subsectors suffer from *machista* attitudes, although less so in recent years according to a hotel owner in Quetzaltenango. There is a general preference for men to study (according to a general manager of a hotel in Quetzaltenango), and, specifically, parents do not believe that education for females is necessary at the tertiary technical level (hotel association, Quetzaltenango).

Other limitations. In addition, the interviewees noted insufficient access to technology due to high prices, a complex process to apply for Certification Q (INGUAT's quality certification), and the perception that

although there are development plans with a long-term vision for tourism in Guatemala, they are not fully implemented.

Key positions and associated skills in the tourism subsector value chain

Those interviewed said the most sought-after skills for positions in hotel management, business administration, and marketing and sales were those related to the use of technology. The ability to connect with potential guests via electronic communication and marketing methods is crucial for both national and international markets, but particularly for the U.S. market. In 2014, internet was identified as the most common travel-planning tool for U.S. citizens.[140] According to a study done by ASIES, 35 percent of hotels in Guatemala had a webpage that year while 61 percent of tour operators stated they had a webpage. This difference may be due to the fact that hotels rely heavily on national tourism (77 percent of the market) while tour operators focus on international guests (70 percent of the market). Guatemalans may continue to rely on local advertisements in newspapers, etc., and the recommendations of friends, family, and local travel agencies.[141] Hotel and tour operator owners confirmed this, noting that use of social media is crucial to reach wider markets. However, those interviewed said technical programs focusing on these skills are not available (for example in Huehuetenango) and access to technology is limited by high prices.

Managers and business owners identified the need for professionals in kitchen services including those with an understanding of nutrition and seasonality of products and knowledge of international food culture, kitchen administration, safety, and food preparation. Because the Ministry of Health requires restaurants to meet certain standards, restaurant managers regarded previous experience in restaurant hygiene (handwashing procedures; washing of utensils, pots, pans, etc.) as desirable in candidates. Others in Quetzaltenango commented that while the food industry in restaurants and hotels is moving toward international cuisine, it is hard to find workers with relevant education—particularly outside of Guatemala City. A manager stated that programs that do exist in universities are expensive, limiting programs to those with the financial means. INTECAP offers certification in international cuisine, but trainings are for short periods and offer limited information and depth. Human resource managers hope to find candidates with experience working in these areas.

In the same vein, those interviewed mentioned that Guatemala has become a recruitment area for cruise ships and carriers coming into main hubs such as Puerto Barrios on the Caribbean Sea and Puerto Quetzal on the Pacific Ocean. English skills are important, as cruise ship passengers are most often from the United States, Canada, and the United Kingdom. These passengers often leave ships to visit Antigua from Puerto Quetzal and Quiriguá from Puerto Barrios and require trained tour guides with English skills. Additional positions and related skills are outlined in Annex E.

[140] Research and Social Studies Association (ASIES). *Moving Toward Modern and Decentralized Tourism.* Guatemala City, 2015.

[141] Ibid.

TABLE 10. Occupations necessary to strengthen the tourism value chain

Stage of Value Chain	Position
Hospitality and Food and Beverages	Kitchen and Restaurant Manager Hotel Manager Business Administrator Tourism Technician
Transportation	Logistics and Transportation Technician
Distribution	Marketing and Sales Manager* Logistics and Transportation Technician
Input Suppliers	Marketing and Sales Manager * Logistics and Transportation Technician

*Source: Interviews with direct and indirect actors in the value chain. * Positions identified by the Program in consultation with experts.*

Attitudes

Those interviewed in the tourism industry in the Western Highlands said staff attitudes are particularly important because a tourist's experience is based on the quality of service received from hotels, tour operators, restaurants, and guides—in short, everyone they encounter. They also noted that Guatemalans are known for being dedicated, hard workers and are therefore seen as ideal for cruise ships and restaurants catering to international customers. Managers in Quiché and Huehuetenango stressed that employees' self-esteem was important as it affects how comfortably and effectively they speak with customers. Similarly, customer service requires being proactive, responsible, trustworthy, and patient—particularly when working as part of a larger team. Actors mentioned that good teamwork is based on members sharing knowledge and experiences, so that team members can learn from one another on the job. Staff in hotel management, business administration, marketing, kitchen administration, and food preparation services must be adaptable to meet the needs of their guests and to manage their teams properly. Moreover, respect for cultural differences is important to provide guests with enjoyable experiences. Additional attitudes are described in Annex E.

Those interviewed noted some limitations in current attitudes. A hotel owner in Quetzaltenango stated that staff do not always have a desire to excel on the job or to go above and beyond for customers. Other actors outside of Quetzaltenango stated that this may be because "many are accustomed to the conditions of their family." According to a hotel manager in Quetzaltenango, discipline is necessary to be consistent on the job. For these reasons, those interviewed described good customer service as a "gift" that cannot necessarily be taught in the classroom or on the job.

Tourism: How can educational institutions serve the subsector?

Although those interviewed said kitchen and administrative staff need more formal education and training, options remain limited at the technical and university levels. Formal programs are described below.

1. **Secondary education programs** focused in tourism include:

- Tourism and sustainable development
- *Bachillerato* in sciences, oriented toward tourism.
- Marketing and advertising

These programs are available nationally and are standardized according to an established curriculum defined by the Ministry of Education. While many receive the *Perito* distinction, as noted previously in this study, quality of education is low, and many students struggle to achieve age-appropriate reading and mathematics levels. Actors noted that *Peritos* often work in smaller tourism businesses where employers are less likely to have the financial means to pay for those with higher levels of training.

2. **INTECAP programs:** INTECAP offers a certificate program in Hotel Industry and Tourism. While all private businesses are welcome to participate in INTECAP programs, larger businesses have the power to request training specific to their needs, whereas smaller hotels with the need to train just a few people cannot request specialized training without paying additional costs. This is a barrier for MSMEs looking for training solutions outside of their companies.

3. **Technical tertiary programs (2–3 years):** The following degrees are offered at the technical tertiary level:

    - **Technical degree in Tourism and Hospitality:** University of Mariano Galvez, Huehuetenango
    - **Hotel Administration:** University of Mariano Galvez, Huehuetenango
    - **Gastronomy:** Universidad del Istmo, Guatemala City
    - **Marketing:** University of Rafael Landívar, Quetzaltenango, Santa Cruz del Quiché
    - **Marketing and Sales:** University of Rafael Landívar, Quetzaltenango, Santa Cruz del Quiché
    - **Business Management and Administration:** Universidad del Istmo, Guatemala City
    - **Business Management:** University of Mariano Galvez, Huehuetenango, Santa Cruz del Quiché, Quetzaltenango; Galileo University; University of Rafael Landívar, Quetzaltenango, Santa Cruz del Quiché.

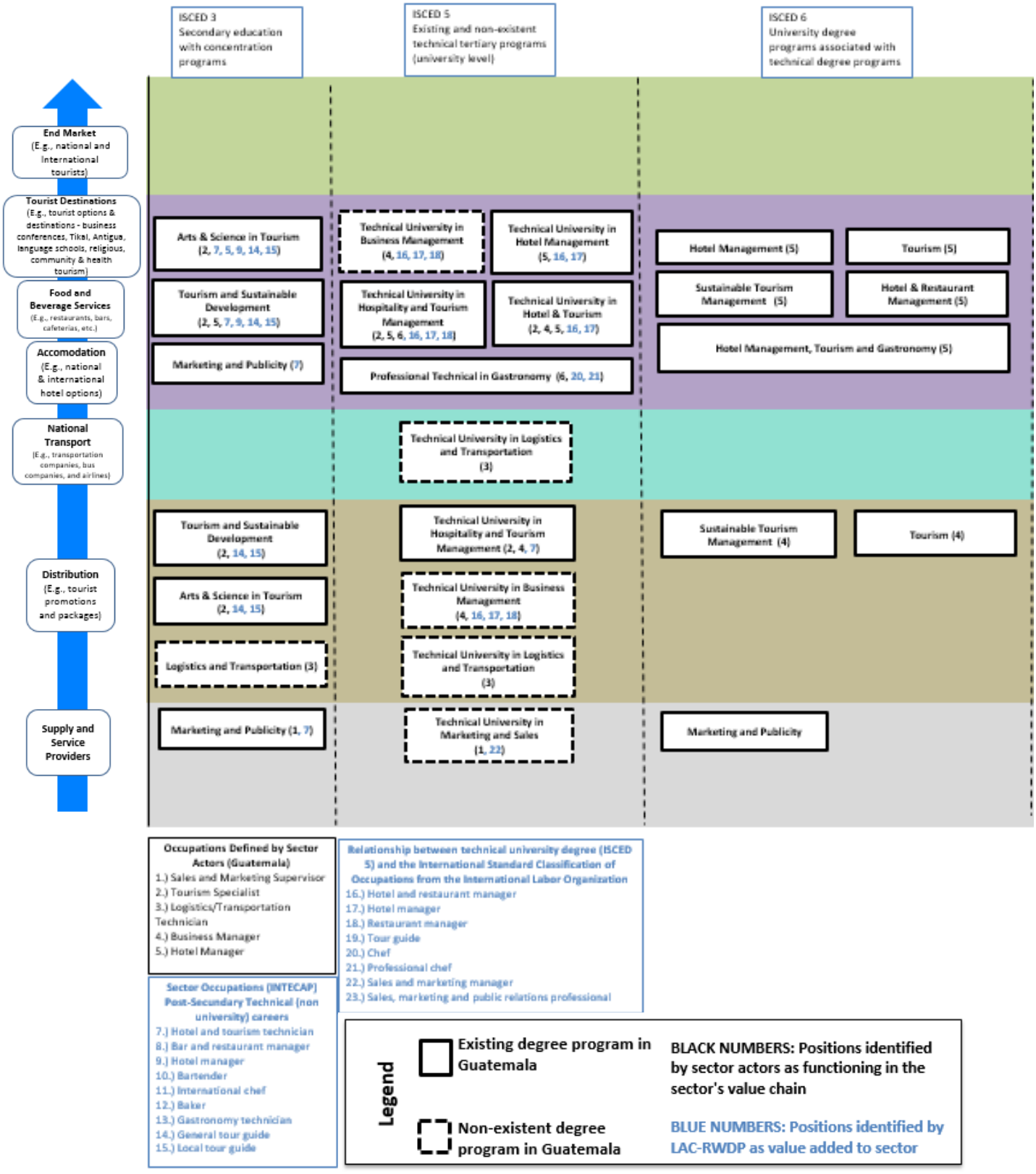
4. **University degree programs (4 years):** The following degrees are offered at the *licenciatura* level:

    - **Hotel Administration:** University of Mariano Galvez, Huehuetenango
    - **Tourism and Gastronomy:** University of Mariano Galvez, Huehuetenango
    - **Hotel and Restaurant Administration:** University of Rafael Landívar, Quetzaltenango
    - **Tourism:** Universidad del Istmo, Guatemala City

- **Marketing:** University of Rafael Landívar, Quetzaltenango, Santa Cruz del Quiché
- **Business Administration:** University of Mariano Galvez, Huehuetenango, Santa Cruz del Quiché, Quetzaltenango; Galileo University; University of Rafael Landívar, Quetzaltenango, Santa Cruz del Quiché

Figure 46 depicts existing and potential tourism-related educational offerings matched to the key positions in the tourism value chain. We note a potential need for the following university technical training programs (with potential occupations): marketing and sales (marketing managers); business management (administrative staff); logistics and transportation (professional drivers); and gastronomy (chefs focused on international cuisine).

FIGURE 46. Technical positions, occupations, and education levels in the tourism value chain, along with existing and non-existent degree programs in Guatemala



CONCLUSIONS

A COMMITMENT TO ECONOMIC AND HUMAN DEVELOPMENT

While progress has been made on social issues over the past decade, many social indicators in Guatemala have stagnated or even declined. Although economic growth in the years since the global economic recession has been moderate and sustained, it has not been inclusive or significant, given population growth. Economic growth has been insufficient to provide the market with enough jobs to create decent work for the majority of the population; the informal sector predominates, dragging down both incomes and productivity.

Public spending on education, health, and welfare is another route for addressing human poverty. But in Guatemala, such spending has not kept pace with the needs of the younger population. Poverty has increased in the country over the last 15 years and the net primary school enrollment rate has deteriorated significantly. As a result, Guatemala has been unable to reduce its severe, systemic inequalities. It is one of the most economically unequal countries in Latin America[142]—the most unequal region in the world.[143]

Inclusive economic growth is necessary to improve the health, education, and living conditions of the population and bring the country to a higher level of development. Economic growth can generate a virtuous circle of both economic development and improvement in human development.

In this document, we have identified dynamic economic subsectors with potential for future growth. These subsectors can provide economic opportunities via higher-quality employment. We suggest that educational offerings consider the needs of the labor market to improve employment opportunities for young people, particularly those living in disadvantaged conditions.

This assessment focused on identifying subsectors where economic competitiveness can be boosted by strengthening the workforce. Truly equipping the workforce with the potential to positively change their own and their country's trajectory, however, requires that post-secondary, technical university education, as well as non-technical university programs, are aligned with the needs of the labor market. Countries with successful workforce systems—such as Germany and Singapore—do so around a vision shared by the private sector, educational institutions, and government. Although Guatemala is not yet at this point, there is some hope that it is moving in that direction. To advance the human capital of the workforce of today and tomorrow, we suggest that the major actors in this system, particularly the private sector and academia, work to institutionalize a communication bridge that creates a better understanding of the needs, opportunities, and challenges for both.

The five selected value chains considered here—legumes and vegetables, textiles and apparel, processed foods, non-alcoholic beverages, and tourism—present distinct opportunities and challenges for Guatemala.

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[142] Gini Index (World Bank Estimate). http://data.worldbank.org/indicator/SI.POV.GINI?contextual=region&end=2014&locations=GT&start=2014&view=bar.

[143] Bárcena Ibarra, Alicia, and Winnie Byanyima. "Latin America is the World's Most Unequal Region. Here's How to Fix It." Accessed June 1, 2017. https://www.weforum.org/agenda/2016/01/inequality-is-getting-worse-in-latin-america-here-s-how-to-fix-it/

- In legumes and vegetables, as market demand shifts towards organic and eco-friendly products, certification is increasingly required. Workers needed include food processing technicians to regulate production practices; logistics and transportation technicians to ensure the safety and quality of goods being delivered to market; and marketing and sales specialists to create opportunities in new and existing markets. Employers said the top skills needed for these positions are in research and analysis, communication, social media, and graphic and web design.

- In textiles and apparel, as indigenous textiles find niche markets abroad, production will require designers familiar with international trends and marketing specialists to sell innovative designs. MSMEs and *maquilas* require machine maintenance technicians to support "speed to market" production. Top skills for these positions include cost and product analysis; design; use, maintenance, and repair of technology and machinery; and business and sales skills.

- In processed foods as well as non-alcoholic beverages, as international and Guatemalan consumers increasingly demand healthy products, the value chain will require technicians who can carry out continuous product research relevant to local businesses as well as logistics and transportation technicians whose knowledge of local markets and geography can help businesses take advantage of new opportunities. Top skills for these positions include research, communication, and sales skills.

- Finally, MSMEs in the tourism subsector wishing to grow and become competitive find that they are increasingly in need of marketing and sales managers with knowledge of web design, graphic design, and publications for local and international marketing. Top skills for these positions include software and social media skills, oral and written communication skills, and English language skills.

Economic growth can help the poor either through the creation of decent jobs and income-generating opportunities or through social services expenditures that are dependent on government revenues. Today, however, neither is occurring in Guatemala to the extent necessary to reverse recent increases in poverty. Educational enrollment at the primary level has decreased, and nationally, only 23 percent of the out-of-school youth population has completed upper secondary school (although this is an improvement over past generations).

This analysis has identified specific subsectors of potential economic growth. The sector selection undertaken for this assessment was a rigorous exercise, and one which calls for iteration: as the economy grows and changesand new information becomes available, the analysis will need to be updated. Furthermore, the assessment is far from exhaustive. There are additional promising subsectors in Guatemala beyond those analyzed here.

Our goal was to understand the specific functional and skills needs of businesses in these subsectors in the Western Highlands. Across all value chains, the need for logistics and transport technicians was noted; logistics is both a constraint and a major potential opportunity as Guatemalan businesses must operate in the context of a limited and deteriorating road infrastructure. Especially in legumes and vegetables and food and beverage production, there is a need for researchers—people who understand what is happening in the global and Guatemalan markets vis-à-vis these products (how tastes are changing etc.,) and who have the technical capability to reformulate, repackage, or remarket products to better appeal to consumers.

For educational institutions to address the needs of these businesses better, however, they must first talk to each other. Currently, the connections between academia and the private sector in the target region are few and weak. This assessment can provide a roadmap to begin the discussion.

ANNEXES

ANNEX A. ADDITIONAL TABLES

TABLES A1-A2. Youth populations by participation in the educational system and in the labor market

<table>
<tr><td rowspan="2"></td><td colspan="23">Population 7–29 years old</td></tr>
<tr><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td></tr>
<tr><td>Outside of the education system</td><td colspan="6">9.0 percent
207,000</td><td colspan="7">1,247,000

356,000 lower secondary
891,000 upper secondary</td><td colspan="10">90.1 percent
2,459,000</td></tr>
<tr><td rowspan="2">In the educational system</td><td colspan="6" rowspan="2">Primary Education</td><td colspan="7">Secondary Education</td><td colspan="10" rowspan="2">University Education</td></tr>
<tr><td colspan="4">Lower Secondary</td><td colspan="3">Upper Secondary</td></tr>
<tr><td colspan="6">91.0 percent
2,101,000</td><td colspan="4">71.3 percent

886,000</td><td colspan="3">41.1 percent

622,000</td><td colspan="10">9.9 percent
270,000</td></tr>
</table>

		Working-age youth: 15–29 years old
In the labor market	Working and in school	8.2 percent (382,000)
	Only working	47.5 percent (2,213,000)
Outside the labor market	Only in school	16.3 percent
	Neither working nor studying	28.0 percent (1,302,000)

Source: FHI 360 calculations based on ENCOVI 2014.

TABLE A3. Population by sex, age group, work and education status (percentages)

Categories	Percentage Structure			Percentage Distribution		
	Men	Women	Total	Men	Women	Total
Population 15 years and older						
Total	**100**	**100**	**100**	**47.2**	**52.8**	**100**
Only in school	7.03	7.91	7.5	44.26	55.74	100
In school and working	5.49	3.25	4.31	60.17	39.83	100
Only working	78.56	36.81	56.52	65.61	34.39	100
Neither in school nor working	8.91	52.03	31.68	13.28	86.72	100
Population 15–29 years						
Total	**100**	**100**	**100**	**47.9**	**52.1**	**100**
Only in school	15.16	17.34	16.29	44.56	55.44	100
In school and working	10.59	6.03	8.21	61.76	38.24	100
Only working	67.1	29.53	47.52	67.62	32.38	100
Neither in school nor working	7.15	47.11	27.97	12.24	87.76	100

Source: FHI 360 calculations based on ENCOVI 2014.

ANNEX B. GUATEMALA INTERVIEW GUIDE FOR SECTOR ACTORS

Nombre:

Empresa:

Puesto Empresa:

Correo electrónico: **Teléfono:**

INFORMACIÓN DE LA CADENA

1. ¿Cómo están organizados (gremial, asociaciones, cooperativas) y quien se considera la estructura más alta?
2. ¿Podría mencionar quienes son los actores clave dentro de la cadena, los que mueven el sector?
3. ¿Cuáles son los principales productos que ofrece como empresa?
4. ¿Cuáles son los principales productos o destinos que ofrece el sector?
5. ¿Las relaciones dentro de la cadena son como las que se presenta en el mapa, indique? (mostrar mapa)
6. ¿De dónde procede el productor o servicios y a donde está destinado? (De donde viene lugares, sitios, departamentos y donde va de acuerdo a su mercado nacional o internacional)
7. De la red de socios (proveedores insumos o servicios)
8. ¿La empresa o sector carece de algún insumo o servicio?

INFORMACION DE LA CADENA

9. Sector de la actividad:

☐ Agrícola	☐ Manufactura (textil, confección y calzado)
☐ Manufactura (bebidas)	☐ Servicios (turismo)
☐ Manufactura (alimentos procesados	☐ Otro:

10. Años de operación de la empresa:

- ☐ Menos de 1 año
- ☐ 1 a 5 años
- ☐ 6-10 años
- ☐ 11-20 años
- ☐ >21 años
- ☐ Otro:

11. Departamentos donde opera empresa:

- ☐ Guatemala
- ☐ Retalhuleu
- ☐ Huehuetenango
- ☐ Chimaltenango
- ☐ Sacatepéquez
- ☐ Suchitepéquez
- ☐ Quiché
- ☐ Alta Verapaz
- ☐ Quetzaltenango
- ☐ San Marcos
- ☐ Totonicapán
- ☐ Baja Verapaz
- ☐ Izabal
- ☐ El Petén
- ☐ Escuintla
- ☐ Sololá
- ☐ Otro:

12. Empleos directos que genera la empresa (No. _____)

- ☐ Microempresa (1 a 10 empleados)
- ☐ Pequeña Empresa (11 a 25 empleados)
- ☐ Mediana Empresa (26 a 60 empleados)
- ☐ Grande Empresa (> a 60 empleados)

Porcentaje de Mujeres: (_____)

Porcentaje de hombres: (_____%)

13. ¿Cómo se ve el crecimiento de los colaboradores en los próximos años?:

- ☐ Disminuir número de empleados
- ☐ Mantener mismo número de empleados
- ☐ Incrementar número de empleados

14. ¿Cuál es la razón de esta tendencia?

DEL PERSONAL CONTRATADO DE LA EMPRESA

15. De acuerdo a los puestos actuales de la empresa:

_____	Porcentaje maestría y doctorado	_____	Porcentaje Licenciatura
_____	Porcentaje Técnico universitario	_____	Porcentaje Diversificado
_____	Porcentaje Primaria y básicos	_____	Porcentaje Técnico no universitario

16. ¿Existen puestos de trabajo dentro de la empresa que requieren de colaboradores técnicos universitarios/técnicos no universitarios?:

☐ SI ☐ NO

Técnico Universitario	Técnico No Universitario
_____	_____
_____	_____
_____	_____

17. ¿Cuáles son las principales barreras o limitaciones de participación de mujeres en puestos técnicos universitarios?:

18. ¿Cuáles son las principales barreras o limitaciones de participación de hombres en puestos técnicos universitarios?:

IR MAPEO

19. Desde su percepción, ¿existe alguna(s) carrera técnica universitaria necesaria para la empresa o para el sector, que no exista o que hay que reforzar (Ej. Técnico producción frutícola, técnico procesos manufactura, técnico procesamiento alimentos)?

20. ¿La empresa donde labora podría recibir a jóvenes en formación a nivel técnico universitario de tiempo parcial, en alianza con las universidades?:

☐ SI ☐ NO

¿Porque?

HABILIDADES Y COMPETENCIAS

21. ¿Cuáles son los principales conocimientos requeridos para el técnico(s) universitario(s) identificado(s)?:

22. ¿Cuáles son las principales habilidades requeridas para el técnico(s) universitario(s) identificado(s)?:

23. ¿Cuáles son las principales actitudes requeridas para el técnico(s) universitario(s) identificado(s)?:

24. ¿Existe alguna otra competencia que quiera mencionar?

25. ¿Cuál cree que serían las ventajas competitivas que tendría la empresa o el sector de contar con el personal técnico universitario apropiado?

26. Si el sector académico o de formación, adecuara las carreras técnicas universitarias, acorde a los requerimientos de competencia profesional de la empresa o el sector, cree que la empresa contrataría a jóvenes bajo esta formación:

☐ SI ☐ NO

DEL SECTOR EN EL QUE TRABAJA

27. ¿Cuáles son las principales limitaciones o cuellos de botella de la empresa o el sector en el que se desarrolla?

a. ¿Ámbito Económico?

b. ¿Ámbito social cultural?

c. ¿Ámbito tecnológico?

d. ¿Ámbito Político legal?

e. ¿Ámbito Ambiental?

28. ¿Cuál es la tendencia del sector?

COMENTARIOS ADICIONALES (ALGÚN ACTOR IMPORTANTE A ENTREVISTAR)

ANNEX C. ELECTRONIC SURVEY

Instrucciones

Indique las competencias más importantes requeridas para los empleados de la empresa (si es vía electrónica). Si es personal el entrevistador anotará las respuestas que indique el entrevistado.

7.2.4 DESARROLLO HUMANO	IMPORTANTE
1. Capacidad de adaptarse a nuevas situaciones	☐
2. Capacidad de comunicación oral y escrita	☐
3. Capacidad creativa	☐
4. Capacidad para tomar decisiones	☐
5. Habilidad para trabajar de forma autónoma	☐
6. Capacidad crítica y autocrítica	☐
7. Capacidad de formular y gestionar proyectos	☐
8. Capacidad de autoformación y actualización permanente	☐
9. Tener iniciativa	☐
10. Compromiso ético	☐

7.1.5 INTERPERSONALES	IMPORTANTE
1. Habilidad en resolución conflictos	☐
2. Liderazgo que permita establecer y mantener la cohesión del equipo de trabajo para alcanzar las metas de la empresa	☐
3. Capacidad de trabajar en equipo	☐
4. Capacidad de comunicación en un segundo idioma	☐
5. Capacidad para motivar y conducir hacia metas comunes	☐
6. Capacidad de comunicación oral y escrita	☐
7. Capacidad de comunicarse en idioma local	☐

7.1.6 VALORES	IMPORTANTE
1. Responsabilidad social	☐
2. Compromiso con la calidad	☐
3. Valoración y respeto por la diversidad y multiculturalidad	☐
4. Compromiso con su medio sociocultural	☐
5. Compromiso con la preservación del medio ambiente	☐

7.1.7 TECNOLÓGICAS	IMPORTANTE
1. Habilidad en el uso de tecnologías de la comunicación e información	☐
2. Hacer análisis efectivo en Excel	☐
3. Hacer presentaciones efectivas en PowerPoint	☐
4. Identificar tecnologías actuales y emergentes y evaluar si son aplicables	☐
5. Capacidad de utilizar redes sociales para comunicar o informar oportunamente	☐

6. Habilidad para buscar, procesar y analizar información procedente de fuentes diversas	☐
7.1.8 TÉCNICAS RELACIONADAS AL PUESTO	**IMPORTANTE**
7. Demostrar conocimiento y comprensión del contexto en el que desarrolla su trabajo	☐
8. Capacidad para toma decisiones oportunas	☐
9. Capacidad para identificar, plantear y resolver problemas dentro de su área	☐
10. Capacidad para organizar, priorizar y ejecutar el trabajo	☐
11. Capacidad de análisis y propuesta de mejoras para el sector	☐
12. Planificar, dirigir y coordinar las actividades de producción	☐
13. Uso apropiado de procedimientos y herramientas para el logro de objetivos de la empresa	☐
14. Comprensión y lectura del idioma inglés	☐
15. Capacidad de investigación para la mejora continua de la empresa	☐
16. Manejo de maquinaria específica	☐

ANNEX D. STRATEGIES FOR GUATEMALA

The following three strategies are ways to categorize subsectors in Guatemala in which the country is not already a strong exporter (defined as having an RCA < 1):

- "Jobs, jobs, jobs" (JJJ): the highest priority placed on immediate expansion of employment in the short term, prioritizing subsectors that are closely associated with products that are already strong exports for Guatemala and giving lower priority to potential spillover effects and product sophistication
- Parsimonious Transformation: a judicious midpoint between the two extremes of "Jobs, jobs, jobs" and "Strategic Bets"
- Strategic Bets: subsectors with high potential payoff in terms of greater spillovers and product sophistication and that will maximize growth of per capita income in the medium term (five to ten years)—aiming for a more economically diverse industrial structure

The following table shows the top subsectors (defined here as one of 41 "product groups" aggregated from global commodity trade data) ranked according to the three above strategic approaches.

TABLE D1. Economic complexity strategies for Guatemala

	Jobs, Jobs, Jobs			Parsimonious Transformation			Strategic Bets		
Rank	Product Group	Fill	Score	Product Group	Fill	Score	Product Group	Fill	Score
1	Horticulture	66%	60	Beverages	44%	52	Precision Instruments	0%	59
2	Seafood	29%	58	Cocoa	0%	52	Plastics & rubber	21%	55
3	Beverages	44%	57	Furniture	17%	49	Articles of Iron or Steel	14%	55
4	Construction Materials	24%	56	Seafood	29%	49	Machinery	2%	55
5	Apparel	55%	54	Construction Materials	24%	48	Electrical Machinery	2%	53
6	Cocoa	0%	53	Horticulture	66%	48	Glass & Glassware	11%	53
7	Footwear	33%	52	Articles of Iron or Steel	14%	47	Vehicles & Parts	0%	51
8	Fertilizers	20%	51	Stone & Ceramics	3%	46	Other Chemicals	18%	51
9	Other Agriculture	14%	51	Plastics & rubber	21%	46	Cocoa	0%	50
10	Coffee	50%	51	Dairy	10%	46	Furniture	17%	50

Source: FHI 360. Based on methodology developed by Ricardo Hausmann, Harvard University & African Development Bank "Comparative Study on Export Policies in Egypt, Morocco & Tunisia," 2012.

Table D1 shows the ten subsectors that align best with each strategy, out of a total of 41 subsectors considered (product groupings created by FHI 360). The column marked "Fill" is the percentage of products within that product group with an RCA > 1, indicating the percent of the product categories in that group for which Guatemala is already a strong exporter. For example, Guatemala shows a Fill of 66 percent for the Horticulture (legumes and vegetables) group because it exports with a comparative advantage (RCA > 1) in 22 of the 32 products included in that group. The product groups in the top ten items in the JJJ strategy list have significantly higher Fill ratios than those on the Strategic Bets list, with those in the Parsimonious Transformation list falling somewhere in between.

For Guatemala, it makes sense that subsectors such as horticulture, seafood, beverages, construction materials, and apparel rank highest according to the JJJ strategy. Guatemala is already strong in many products within those subsectors, so it would be relatively easy for companies and associated support

entities to diversify slightly into highly related products, using existing skills and capabilities. However, all of these subsectors have relatively low product complexity and value-added, and while some of them appear (generally lower down) on the Parsimonious Transformation list, they disappear entirely from the Strategic Bets list. Cocoa & chocolate is the only product group that appears on all three lists, mainly because chocolate itself has a relatively high product complexity (for a food product) and yet Guatemala is on the verge of becoming an established exporter (with RCA = 0.6).

In the Parsimonious Transformation list, products such as furniture, articles of iron or steel, and plastics and rubber appear among the top ten subsectors, in part because the "distance" or difficulty is moderately low, while the payoff in terms of product complexity is moderately higher. These are judicious bets to add employment while boosting economic diversity and income growth in the medium term. Each of those three products also appears on the Strategic Bets list, although the ranking of furniture falls (economic complexity not very high) while the ranking of both articles of iron or steel and plastics and rubber have climbed to the #3 and #2 positions, respectively. Along with precision instruments and machinery, these subsectors all share a high economic complexity, while still being 'within shooting distance' for Guatemala within the medium term.

METHODOLOGY

This methodology has been designed to select subsectors for focus. The scores are calculated as the weighted average, for all products at the 4-digit Harmonized System (HS) code[144] level with RCA<1, using the following formula:

$$Score_i = a_{Distance}\left(\frac{Distance_i - \min(Distance)}{\max(Distance) - \min(Distance)}\right) + a_{PCI}\left(\frac{PCI_i - \min(PCI)}{\max(PCI) - \min(PCI)}\right) +$$

$$a_{wtshare}\left(\frac{wtshare_i - \min(wtshare)}{\max(wtshare) - \min(wtshare)}\right) + a_{StratValue}\left(\frac{StratValue_i - \min(StratValue)}{\max(StratValue) - \min(StratValue)}\right)$$

Where

a_x	is the weight associated with a particular indicator
Distance$_i$	is the degree of difficulty for a country to begin exporting good i with RCA>1. It can also be seen as "the proportion of knowledge necessary for a product that the country does not have." By definition, if the country is already exporting the product with RCA>1, this distance is negligible. (For this formula, 100-Distance is used, as lower distance is desirable.)
PCI$_i$	is the Product Complexity Index, an indicator of the relative sophistication of capabilities necessary to produce good i
wtshare$_i$	is the country's share of the total world trade in good i

[144] The Harmonized System (HS) of tariff nomenclature is an internationally standardized system of names and numbers to classify traded products.

StratValue$_i$ measures how much a country could benefit from manufacturing a specific new product i in terms of raising the country's Economic Complexity Index

RCA is the Revealed Comparative Advantage. Countries for which exports of good i are a greater share of their total exports than the share that product represents in world trade have an RCA>1.

The weights used to produce the scores in Table D1 are the following:

TABLE D2. Weights for economic complexity strategies

INDICATOR	STRATEGIES		
	Jobs, Jobs, Jobs	Parsimonious Transition	Strategic Bets
Strategic value	0.1	0.2	0.4
Trade share	0.1	0.1	0.1
PCI	0.1	0.2	0.3
Distance	0.7	0.5	0.2

For the JJJ strategy, the most important factor is the short-term feasibility of reaching an RCA>1 for that subsector; thus, the Distance indicator is the most important (the lower the Distance, or the greater the Proximity, the more feasible it is to fill in exports in that product group). For the Strategic Bets strategy, the product complexity and the strategic value are weighted much higher.

ANNEX E. IDENTIFIED POSITIONS, SKILLS, AND ATTITUDES BY SUBSECTOR

LEGUMES AND VEGETABLES SUBSECTOR COMPETENCIES

POSITION IDENTIFIED IN THE VALUE CHAIN	SKILL / KNOWLEDGE IDENTIFIED	Attitude identified
Sales Manager	Product commercialization; Marketing; Business strategy; Commercial processes; Understanding national and international business context; English language skills; Leadership; Ability to plan, prioritize, organize, and execute work; Persuasive; Analytical and problem solving capabilities; Ability to delegate activities; Ability to formulate and manage projects; Oral and written communication skills; Use of communication, information technology, and social networks; Data analysis; Creativity	Professional ethics; Social responsibility; Dedication to preserve the environment
Agronomist	Crop management and cultivation; Ability to prioritize, organize, and execute work; Analytical and problem solving capabilities; Ability to delegate activities; Ability to work autonomously	Strong character; Professional ethics; Social responsibility; Determination; Desire to improve; Dedication to preserve the environment
Agronomy Engineer	Crop management and cultivation; English language skills; Leadership; Ability to plan, prioritize, organize, and execute work; Analytical and problem solving capabilities; Ability to delegate activities; Ability to formulate and manage projects	Strong character; Professional ethics; Social responsibility; Dedication to preserve the environment
Logistics and Transportation Technician	Product commercialization; Marketing; Commercial processes; Understanding national and international business context; Ability to prioritize, organize, and execute work; Persuasive; Analytical and problem solving capabilities; Ability to work autonomously	Strong character; Professional ethics; Desire to improve; Dedication to preserve the environment
Agro-ecology Technician	Crop management and cultivation; Ability to prioritize, organize, and execute work; Analytical and problem solving capabilities; Ability to work autonomously	Strong character; Professional ethics; Social responsibility; Determination; Desire to improve; Dedication to preserve the environment
Agricultural Production Technician	Crop management and cultivation; Ability to prioritize, organize, and execute work; Analytical and problem solving capabilities; Ability to work autonomously	Strong character; Professional ethics; Social responsibility; Determination;

		Desire to improve; Dedication to preserve the environment
Production Manager	Production processes; Financial administration and business administration for agriculture; English language skills; Leadership; Ability to plan, prioritize, organize, and execute work; Persuasive; Analytical and problem solving capabilities; Ability to delegate activities; Ability to formulate and manage projects; Oral and written communication skills; Data analysis; Ability to manage individuals and groups	Strong character; Professional ethics; Social responsibility; Dedication to preserve the environment
Agro-industry Technician	Production processes; Ability to prioritize, organize, and execute work; Analytical and problem solving capabilities; Ability to work autonomously	Strong character; Professional ethics; Social responsibility; Determination; Desire to improve; Dedication to preserve the environment
Food Processing Technician	Production processes; Product commercialization; Leadership; Ability to plan, prioritize, organize, and execute work; Analytical and problem solving capabilities; Ability to delegate activities; Ability to work autonomously; Oral and written communication skills; Data analysis; Creativity	Strong character; Professional ethics; Social responsibility; Determination; Desire to improve; Dedication to preserve the environment
Product Quality Supervisor	Production processes; Leadership; Ability to plan, prioritize, organize, and execute work; Analytical and problem solving capabilities; Ability to delegate activities; Ability to formulate and manage projects; Oral and written communication skills; data analysis; Ability to manage individuals and groups	Strong character; Professional ethics; Social responsibility; Dedication to preserve the environment
Marketing and Sales Supervisor	Product commercialization; Marketing; Business strategy; Commercial processes; Understanding national and international business context; English language skills; Leadership; Ability to plan, prioritize, organize, and execute work; Persuasive; Analytical and problem solving capabilities; Ability to delegate activities; Ability to formulate and manage projects; Oral and written communication skills; Use of communication, information technology, and social networks; Data analysis; Creativity	Professional ethics; Social responsibility; Dedication to preserve the environment

CHOCOLATES, SWEETS, BAKERY PRODUCTS, AND OTHER PROCESSED FOODS SUBSECTOR COMPETENCIES

POSITION IDENTIFIED IN THE VALUE CHAIN	SKILL / KNOWLEDGE IDENTIFIED	ATTITUDE IDENTIFIED
Sales and Marketing Supervisor	Sales and marketing techniques; Understanding national and international business context; Commercial geography; Commitment to customer service; Ability to plan, prioritize, organize, and execute work; Understanding national and international business context; Oral and written communication skills; English language skills; Understanding of national and international laws and standards; Spreadsheet management; Creativity; Use of communication, information technology, and social networks; Leadership; Analytical and problem solving capabilities; Ability to work on a team	Commitment to quality; Responsible; Honest; Social responsibility; Organized; Committed; Dedication to preserve the environment
Logistics and Transportation Technician	Health policies and food safety; Quality control; Machine maintenance; Sales and marketing techniques; Understanding national and international business context; Commercial geography; Commitment to customer service; Ability to prioritize, organize, and execute work; Understanding national and international business context; Oral communication skills; Use of communication, information technology, and social networks; Understanding machinery and equipment operation; Analytical and problem solving capabilities; Ability to work on a team	Commitment to quality; Responsible; Honest; Social responsibility; Organized; Punctual; Self-motivated; Self-motivated; Committed; Proactive; Dedication to preserve the environment
Food Production Supervisor	Health policies and food safety; Quality control; Ability to prioritize, organize, and execute work; Understanding of food production processes; Oral communication skills; Understanding machinery and equipment operation; Analytical and problem solving capabilities; Research abilities; Ability to work on a team	Commitment to quality; Responsible; Honest; Social responsibility; Organized; Committed; Dedication to preserve the environment
Plant Manager	Health policies and food safety; Quality control; Machine maintenance; Ability to plan, prioritize, organize, and execute work; Understanding of food production processes; Oral and written communication skills; Spreadsheet management; Leadership; Understanding machinery and equipment operation; Analytical and problem solving capabilities	Commitment to quality; Responsible; Honest; Social responsibility; Organized; Committed; Dedication to preserve the environment
Graphic Designer	Sales and marketing techniques; Understanding national and international business context; Ability to prioritize, organize, and execute work; Oral and written communication skills; Creativity; Analytical and problem solving capabilities; Ability to work on a team; Ability to work autonomously	Commitment to quality; Responsible; Honest; Organized; Punctual; Self-motivated; Committed; Proactive
Publicist	Sales and marketing techniques; Understanding national and international business context; Ability to prioritize, organize, and execute work; Oral and written communication skills; English language skills; Creativity; Analytical and problem solving capabilities; Ability to work on a team; Ability to work autonomously	Commitment to quality; Responsible; Honest; Organized; Punctual; Self-motivated; Committed; Proactive

Machine Repair Technician	Quality control; Machine maintenance; Ability to prioritize, organize, and execute work; Oral communication skills; Understanding machinery and equipment operation; Analytical and problem solving capabilities; Ability to work autonomously	Commitment to quality; Responsible; Honest; Social responsibility; Punctual; Self-motivated; Committed; Self-aware; Helpful; Proactive
Business Administration	Sales and marketing techniques; Understanding national and international business context; Commercial geography; Commitment to customer service; Human resource management; Ability to plan, prioritize, organize, and execute work; Understanding national and international business context; Oral and written communication skills; English language skills; Understanding of national and international laws and standards; Spreadsheet management; Creativity; Use of communication, information technology, and social networks; Leadership; Analytical and problem solving capabilities; Ability to work on a team	Commitment to quality; Responsible; Honest; Social responsibility; Organized; Committed; Dedication to preserve the environment
Quality Management Technician	Health policies and food safety; Quality control; Ability to prioritize, organize, and execute work; Understanding of food production processes; Oral and written communication skills; Understanding machinery and equipment operation; Analytical and problem solving capabilities; Ability to work on a team; Ability to work autonomously	Commitment to quality; Responsible; Honest; Social responsibility; Punctual; Self-motivated; Committed; Self-aware; Helpful; Proactive

NON-ALCOHOLIC BEVERAGE SUBSECTOR COMPETENCIES

POSITION IDENTIFIED IN THE VALUE CHAIN	SKILL / KNOWLEDGE IDENTIFIED	ATTITUDE IDENTIFIED
Sales and Marketing Manager and Supervisor	Ability to plan, prioritize, organize, and execute work; Oral and written communication skills; Spreadsheet management; Leadership; Analytical and problem solving capabilities; Commercialization and marketing techniques; Ability to work on a team; Life-long learning; Ability to self-train; Data analysis; Numerical calculations; Use of communication, information technology, and social networks	Desire to learn; Collaborative; Responsible; Punctual; Organized; Social responsibility; Commitment to quality; Dedication to preserve the environment
Logistics and Transportation Technician	Health policies and food safety; Quality control; Ability to prioritize, organize, and execute work; Oral communication skills; Understanding machinery and equipment operation; Analytical and problem solving capabilities; Understanding of national and international laws and standards; Basic knowledge of electronics; Commercialization and marketing techniques; Ability to work on a team; Life-long learning; Ability to self-train; Numerical calculations	Desire to learn; Collaborative; Responsible; Trustworthy; Punctual; Organized; Social responsibility; Commitment to quality; Dedication to preserve the environment
Business Administrator	Health policies and food safety; Quality control; Ability to plan, prioritize, organize, and execute work; Oral and written communication skills; Spreadsheet management; Leadership; Analytical and problem solving capabilities; Understanding of national and international laws and standards; Computer Programming; Understanding of supply and value chains; Ability to work on a team; Life-long learning; Ability to self-train; Data analysis; Numerical calculations; Use of communication, information technology, and social networks	Desire to learn; Collaborative; Responsible; Trustworthy; Punctual; Organized; Social responsibility; Commitment to quality; Dedication to preserve the environment
Industrial Mechanical Technician	Quality control; Machine maintenance; Ability to prioritize, organize, and execute work; Oral communication skills; Understanding machinery and equipment operation; Analytical and problem solving capabilities; Basic knowledge of electronics; Ability to work on a team; Life-long learning; Ability to self-train;	Desire to learn; Collaborative; Humble; Responsible; Trustworthy; Punctual; Organized; Social responsibility; Commitment to quality; Dedication to preserve the environment
Quality Management Technician	Health policies and food safety; Quality control; Ability to prioritize, organize, and execute work; Understanding of food production processes; Oral and written communication skills; Spreadsheet management; Leadership; Understanding machinery and equipment operation; Analytical and problem solving capabilities; Understanding of national and international laws and standards; Ability to work on a team; Life-long learning; Ability to self-train	Desire to learn; Collaborative; Humble; Responsible; Trustworthy; Punctual; Organized; Social responsibility; Commitment to quality; Dedication to preserve the environment
Plant and Area Manager	Health policies and food safety; Quality control; Ability to plan, prioritize, organize, and execute work; Understanding of food production processes; Oral and written communication skills; Spreadsheet management; Leadership; Understanding machinery and equipment operation; Analytical and problem solving capabilities; Understanding of national and international laws and standards; Understanding of supply and value chains; Ability to work on a team; Life-long learning; Ability to self-train; Numerical calculations;	Desire to learn; Collaborative; Humble; Responsible; Trustworthy; Punctual; Organized; Social responsibility; Commitment to quality; Dedication to preserve the environment

TEXTILE AND APPAREL SUBSECTOR COMPETENCIES

POSITION IDENTIFIED IN THE VALUE CHAIN	SKILL / KNOWLEDGE IDENTIFIED	ATTITUDE IDENTIFIED
Sales and Marketing Supervisor	Understanding trends; Production Costs; Sales and marketing techniques; Understanding business processes; Ability to collaborate with others; Ability to plan, prioritize, organize, and execute work; Understanding national and international business context; English language skills; Creativity; Persuasive; Analytical and problem solving capabilities; Use of communication, information technology, and social networks; data analysis; Leadership; Oral and written communication skills; Ability to formulate innovation solutions for the subsector	Social responsibility; Responsible; Punctual; Honest; Visionary; Kind; Loyal to business; Dedication to preserve the environment
Logistics and Transportation Technician	Machine maintenance; Ability to prioritize, organize, and execute work; Understanding national and international business context; Life-long learning; Analytical and problem solving capabilities; Oral communication skills	Responsible; Proactive; Respectful; Punctual; Honest; Disciplined; Kind; Loyal to business; Dedication to preserve the environment
Plant Manager	Understanding machinery and equipment operation; Quality control; Machine maintenance; Understanding industry regulations and policies; ability to collaborate with others; Ability to plan, prioritize, organize, and execute work; Life-long learning; Analytical and problem solving capabilities; data analysis; Leadership; Oral and written communication skills	Social responsibility; Responsible; Proactive; Respectful; Honest; Patient; Kind; Loyal to business; Commitment to quality; Dedication to preserve the environment
Designer	Understanding trends, colors, and fit; Understanding production costs; Understanding machinery and equipment operation; Quality control; Ability to collaborate with others; Ability to plan, prioritize, organize, and execute work; Use of design programs and related technology; Creativity; Life-long learning; Analytical and problem solving capabilities; Oral and written communication skills; Ability to formulate innovation solutions for the subsector	Social responsibility; Responsible; Honest; Disciplined; Visionary; Kind; Loyal to business; Commitment to quality
Industrial Mechanical Technician	Understanding machinery and equipment operation; Machine maintenance; ability to collaborate with others; Ability to prioritize, organize, and execute work; Life-long learning; Fine motor skills; Analytical and problem solving capabilities; Oral communication skills	Responsible; Proactive; Respectful; Punctual; Honest; Disciplined; Patient; Kind; Loyal to business
Quality Management Supervisor	Understanding machinery and equipment operation; Quality control; Understanding industry regulations and policies; Ability to collaborate with others; Ability to plan, prioritize, organize, and execute work; Life-long learning; Analytical and problem solving capabilities; Data analysis; Leadership; Oral and written communication skills	Social responsibility; Responsible; Proactive; Respectful; Honest; Patient; Kind; Loyal to business; Commitment to quality

Business Administrator	Understanding production costs; Sales and marketing techniques; Understanding business processes; Understanding industry regulations and policies; ability to collaborate with others; Ability to plan, prioritize, organize, and execute work; Understanding national and international business context; English language skills; Life-long learning; Persuasive; Analytical and problem solving capabilities; Use of communication, information technology, and social networks; Data analysis; Leadership; Oral and written communication skills; Ability to formulate innovation solutions for the subsector	Social responsibility; Responsible; Honest; Patient; Visionary; Kind; Loyal to business; Dedication to preserve the environment; Commitment to the community
Industrial Technician	Understanding machinery and equipment operation; Quality control; Machine maintenance; Ability to collaborate with others; Ability to prioritize, organize, and execute work; Life-long learning; Fine motor skills; Analytical and problem solving capabilities; Oral communication skills	Responsible; Proactive; Respectful; Punctual; Honest; Disciplined; Kind; Loyal to business; Commitment to quality
Cut and Confection Technician	Understanding machinery and equipment operation; Quality control; Ability to prioritize, organize, and execute work; Life-long learning; Fine motor skills; Analytical and problem solving capabilities; Oral communication skills	Responsible; Proactive; Respectful; Punctual; Honest; Disciplined; Patient; Kind; Loyal to business; Commitment to quality

TOURISM SUBSECTOR COMPETENCIES

POSITION IDENTIFIED IN THE VALUE CHAIN	SKILL / KNOWLEDGE IDENTIFIED	ATTITUDE IDENTIFIED
Sales and Marketing Manager	Knowledge of local and regional culture; Knowledge of geography; Administration practices and policies; Understanding of national and international standards; Ability to work autonomously; Oral and written communication skills; Leadership; Ability to work on a team; Numerical calculations; Proficiency in a second language; Use of technology and software programs; Use of communication, information technology, and social networks; Research abilities	Adaptable; Responsible; Collaborative; Social responsibility; Value and respect for diversity and other cultures; Dedication to preserve the environment; Professional ethics
Business Manager	Knowledge of local and regional culture; Food manufacturing and safety norms; Quality control; Kitchen administration practices; Knowledge of geography; Administration practices and policies; Understanding of national and international standards; Ability to work autonomously; Oral and written communication skills; Conflict-resolution skills; Leadership; Ability to work on a team; Numerical calculations; Proficiency in a second language; Use of technology and software programs; Use of communication, information technology, and social networks; Research abilities	Adaptable; Collaborative; Social responsibility; Value and respect for diversity and other cultures; Dedication to preserve the environment; Professional ethics
Tourism Specialist	Knowledge of local and regional culture; Knowledge of geography; Administration practices and policies; Understanding of national and international standards; Ability to work autonomously; Oral and written communication skills; Conflict-resolution skills; Leadership; Ability to work on a team; Proficiency in a second language; Use of technology and software programs; Use of communication, information technology, and social networks; Research abilities	Adaptable; Responsible; Collaborative; Proactive; Trustworthy; Honest; Loyal; Patient; Social responsibility; Value and respect for diversity and other cultures; Dedication to preserve the environment; Professional ethics
Logistics and Transportation Technician	Knowledge of local and regional culture; Knowledge of geography; Understanding of national and international standards; Ability to work autonomously; Oral communication skills; Conflict-resolution skills; Ability to work on a team; Proficiency in a second language; Use of technology and software programs	Adaptable; Responsible; Collaborative; Proactive; Trustworthy; Honest; Loyal; Social responsibility; Value and respect for diversity and other cultures; Dedication to preserve the environment; Professional ethics
Hotel Manager	Knowledge of local and regional culture; Quality control; Knowledge of geography; Administration practices and policies; Understanding of national and international standards; Ability to work autonomously; Oral and written communication skills; Conflict-resolution skills; Leadership; Ability to work on a team; Numerical calculations; Proficiency in a second language; Use of technology and software programs; Use of communication, information technology, and social networks	Adaptable; Responsible; Collaborative; Social responsibility; Value and respect for diversity and other cultures; Dedication to preserve the environment; Professional ethics
Kitchen Manager	Nutrition; Understanding seasonality of products; Knowledge of local and regional culture; International cuisine; Food manufacturing and safety norms; Quality control; Kitchen administration practices; Administration practices and policies; Understanding of national and international standards; Ability to work autonomously; Oral and written communication skills; Conflict-resolution skills; Leadership; Ability to work on a team; Numerical calculations; Use of industrial kitchen equipment;	Adaptable; Responsible; Collaborative; Proactive; Trustworthy; Honest; Loyal; Patient; Social responsibility; Value and respect for diversity and other cultures; Dedication to preserve the environment; Professional ethics

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