

Against the Odds. Innovation in Latin American SMEs



Jorge Rodriguez-Martinez

Abstract The popular expression “Necessity is the mother of invention,” means that it may trigger new ways of doing things, in a more economical, faster or easier way. Most innovation theories in the academic and business literature come from advanced countries and examples usually derived from multinational companies. There is little evidence from emerging economies, such as Latin America. This chapter will focus on how innovation may arise even in highly restrictive environments, especially in small and medium-sized enterprises. For the OECD Oslo Manual 2005, there is the innovation of products, processes, business practices, workplace organization, and social improvements. The data of some international and regional indexes were consulted at the country, city, and personal level. They evaluate competitiveness, creativity, human development, and even happiness. Emerging economies that want to get out of the middle-income trap need to have an innovation-driven economy, despite the current constraints. The situation is of lights and shadows; nevertheless, a brighter future is ahead. Latin America is indeed innovating in its own way, sometimes not captured with the traditional indicators.

Keywords Innovation · Latin America · OECD oslo manual · Constraints

1 Introduction

Creativity is the generation of new ideas, which could be how to solve or look at needs in different ways, such as complete a task with less effort or time, or create a user-friendly product. However, for turning creativity into innovation, an economic decision is necessary; the product launch into the market. For the Cox Review Report (2005), innovation is the successful commercial exploitation of a new product or service. Most countries are increasingly paying more attention to it as an

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important source of competitiveness and differentiation in the market place. This section will follow the structure of the OECD Oslo Manual 2005 that defines different types of innovation: product, process, marketing, and organizational.

1.1 How Innovation Appears in the Marketplace. OECD Oslo Manual 2005

The first Oslo Manual is from 1992; its focus was on the different types of improvements at the company level. The second version appeared in 1997. The last version, the current one, appeared in 2005; defines innovation in the product, process, marketing, and organizational level. The OECD strategy offers a wider scope to consider: “It goes far beyond the confines of research labs to users, suppliers and consumers everywhere—in government, business and nonprofit organizations, across borders, across sectors, and across institutions,” (OECD 2017).

A superior product or service. “A good or service that is new or significantly improved. The product presents improvements in technical specifications, components, materials, software in the product, user-friendliness or other functional characteristics,” (OECD 2005: 11). The innovation process may be incremental as it happened with electronic devices to save data, starting with floppy disks \gg diskettes 5 ½ \gg diskettes 3 ½ \gg CDs \gg DVD \gg USB. There is also the radical or disruptive innovation that breaks paradigms, as the radical change of technology in the use of conventional to digital cameras. About 2000, there were more digital cameras sold than conventional ones; however, it was a short-lived victory, as in just over a decade, Smartphones equipped with cameras overtook digital cameras (petapixel.com 2017). The technology used on televisions changed, as well, it went from analog black and white to color TVs; later, they changed to digital TVs \gg to interactive HDTV.

An upgraded production process. “A new or significantly improved production or delivery method. The benefit may bring time reduction and quality improvement by applying new techniques, equipment or software” (OECD 2005: 12). An example is how the production process evolved in the fast food restaurants. McDonald’s® changed the way people in a hurry could have a simple meal, by applying the same concepts of a production line to the restaurant kitchen. Each location is a production cell, with multitasking employees, repeating the same activities and offering a simple menu. Domino’s Pizza® reduced costs by simplifying its processes, and the time to make and deliver a pizza in thirty minutes or less, otherwise, it is free.

Original ways to market a product. “A new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing,” (OECD 2005: 12). For example, the on-demand economy based on online platforms that offer goods or services; and according to the Harvard

Business Review (2016), half of the customers are the millennials (age 18–34). New business models respond to the needs of people who demand transportation on a short-notice (Uber® or Cabbify®) or want to buy books and many other goods delivered to their house (Amazon®). Another example of radical changes in the marketplace is the sharing economy, defined as “an economic model in which individuals are able to borrow or rent underused assets owned by someone else... This is the peer-to-peer (P2P) rental market,” (Investopedia 2017), like houses or apartments for short-term rent (Airbnb®).

New ways to organize work and achieve the group’s objectives. “A new organizational method in business practices, workplace organization or external,” (OECD 2005: 12). In Japan, after World War II, the country was devastated and had no resources. The Toyota® Company developed, out of necessity the just in time, a flexible manufacturing system, adapted to a variety of models in small numbers, by reducing all sorts of waste. A most recent example is the Canvas business model®; a planning tool used by entrepreneurs and managers alike that presents an overall view of the nine main elements of a company by highlighting the value propositions and the core value delivered to the consumer (Strategyzer 2017).

New ways to solve challenging social issues. This is the process to answer social needs by the interaction of citizens or organizations to improve the quality of life. It is not part of the original definitions of the OECD, however, is a recurrent topic of interest to policymakers and citizens alike. “Social innovation is the implementation of new ideas (products, services or models) that satisfy needs, create new relationships and offer best results; of such a way that they generate an answer to social demands that affect the interaction process and aim to raise the level of human well-being,” (Foro Consultivo 2017).

The chapter has six parts. Section 2 offers a brief overview of the Latin American history and its main socioeconomic characteristics. Section 3 presents Latin American countries in different world rankings; these charts are at the country, city, and personal level. To enrich the comparisons two groups of countries are included: the so-called BRICS—Brazil, Russia, India, China, and South Africa; and the MIST group: Mexico, Indonesia, South Korea, and Turkey. Section 4 has examples of the constraints that limit innovation in the region in economic sectors such as agriculture, manufacturing, social, health sector, and other fields. Section five describes Latin American clusters and how small and medium-sized companies innovate. Finally, the conclusions section discusses some of the challenges the region faces to get out of the middle-income trap to move forward from and efficiency to an innovation-driven economy.

2 Overview of Latin America History and Socioeconomic Characteristics

Latin America is the area of the American continent stretching north to south, which includes most of those countries conquered and colonized by Spain or Portugal. It is a region vast in natural resources: mining, agriculture, oil, precious metals, and wood or cattle breeding. It has a rich and diverse history, populated by important civilizations such as the Incas, Mayan or Aztecs, advanced in astronomy, architecture, mathematics, medicine, agricultural techniques, sculpture, and pottery.

Spain and Portugal's kingdoms retained their colonies for nearly three hundred years; any external trade, mostly minerals, and precious jewels needed approval by the Crown, limiting creative activity. Latin America had universities long before the United States: The University of Santo Domingo (1538), The University of San Marcos in Lima (1551) and The University of Mexico (1553), while Harvard University only opened until 1650. The type of education delivered in the Latin American universities was mainly religious-based and focused on Philosophy, Law, Theology, and Engineering, which limited the creation of new knowledge (Maloney et al. 2002). The actual situation is not that different, a review of the 17 Nobel Prizes awarded to Latin Americans reveals the knowledge areas where the region tends to excel: in Literature, six prizes obtained; Peace, six Prizes; in Physiology or Medicine, four Prizes; and in Chemistry only one Prize (Nobel Prize Org 2017).

The entrance to the Spanish colonies of non-Catholics, foreign companies, businesspersons, intellectuals, or their ideas were tightly controlled, limiting the contact with new European knowledge, therefore, constraining the development of innovation. Maloney et al. (2002: 120) describe that the resource-based growth in Latin America had its origins in Europe: "Furthermore, Spain in the eighteenth century was a resource-rich nation that used its fantastic returns from silver and gold mines in the New World to purchase all that was needed. Thus, developing a rentier mentality rather than one of a nation of hands-on tinkers such as appeared in Great Britain or the United States..." In other words, Spain preferred to buy goods, weapons, or ships from England, France, or Germany, therefore, financing their industrial revolutions and not developing its own.

Historically, Latin America has not functioned as a region with shared interests. Jonas and McCaughan (1994: 37–38) describe this situation: "The prevailing tendency led Latin American nations not to develop complementary economies, but to separate and isolate themselves, to turn their back on one another while looking toward Europe and, to a lesser degree, the United States." The Latin region during the late nineteenth and early part of the twentieth centuries, underwent a mostly convulse period: wars, foreign invasions, civil wars, struggles between political parties, weak institutions, lack of respect for the law, Coups *d'état*, privileges for a selected few, and instability—not the best environment to innovate.

The initial efforts to industrialize the larger countries of the region depended, almost entirely, on foreign immigrants or international companies investing and exploiting the internal market because there was little local expertise. At some point

during the last eight or nine decades, the larger economies (Argentina, Brazil, and Mexico) were in a better economic situation than China, Korea or even Taiwan. They were about to take off and achieve a higher level of development. However, this has been a history of disappointment and missed opportunities. Some characters or small groups of power have put their ambitions above the common good (Reid 2010; Maloney et al. 2002).

In the Postwar period, from about 1945 to the 1980s, several of the larger economies embarked on import-substitution industrialization (ISI) policy led by the State to manufacture the goods that a growing middle class was demanding (Dussel-Peters 2000). The ISI had the positive effect of creating the infrastructure and industrializing the larger economies of the region by imposing high import tariffs on foreign goods, and barriers to trade and investment. However, this protectionist period came at a high cost because it created State and private-owned monopolies, a captive local market, and a lack of incentives to improve quality or develop new ideas (Maloney et al. 2002). In Latin America, the larger economies tried to replicate the strategy followed by Italy, Germany, Japan, and other countries, emulating the production and design of the same products manufactured in the developed countries, such as household products, sound equipment, coaches, and cars that required middle-technology. However, the technical innovation was missing (Bonsiepe 1985; Fernández and Bonsiepe 2008).

The economic emergency in the region during the 1980s, also described as “the lost decade,” and early 1990s, consisted of a series of events like the Mexican (tequila) crisis of 1995, the Brazilian (samba) of 1999, and the Argentinean (tango) of 2001 were a watershed. The ingredients were the rising foreign debt, lack of competitiveness of State-owned companies, high inflation rates, and low economic growth among other factors. The unsustainable situation forced the Latin American governments to liberalize their economies, privatize companies, and abandon the ISI model; although there is criticism that it created an increasing economic, social, and even territorial polarization (Dussel-Peters 2000).

A crisis and the collapse of the domestic market forces companies to become innovative out of necessity and either proactively or reactively look for international markets. For example, in 1994, the North American Free Trade Agreement (NAFTA) went into effect between Canada, Mexico, and the United States. The very same year, Mexico suffered a sharp devaluation of its currency. The results were the emergence of “two Mexicos,” one that is modern, productive, and outward-looking that took advantage of these new external markets; coexisting with an old-fashioned, unproductive, and inward-looking sector of the economy (McKinsey 2014).

If the European powers were the dominant foreign figures in Latin America from the sixteenth to the nineteenth centuries, during the twentieth century, the United States played the most influential political, economic, and cultural role. However, starting the early twenty-first century, China has become a major player in the region,

mainly as an exporter of all sorts of products, from consumer to sophisticated goods (gadgets, autos, etc.) but also as an importer of large amounts of raw material and commodities. It is an important foreign direct investor (Dussel-Peters 2015).

One characteristic of the twentieth and twenty-first centuries are the Multinational Corporations (MNCs) that invest, develop products, and services and sells them in multiple countries. MNCs have traditionally come from the called “triad” economic centers: United States, Japan, and Europe (Germany, France, Italy, the United Kingdom, and others). However, new MNCs may come, although in fewer numbers, from large emerging countries, this is the case of Brazil, China, India, Korea or Mexico (Bartlett and Goshal 2000).

The “Multilatinas” are those large Latin American companies that expanded their operations in the region, the term first used by the *America Economía* magazine at the turn of the new twenty-first century. Casanova et al. (2009: 9) came up with an updated term “Global Latina” for those companies venturing beyond the Latin American region; its definition: “a privately owned, Latin American-based multinational firm with operation on at least one other foreign continent and which generates a minimum of US\$500 million in annual revenues.” Some of these Global Latinas are Brazilian companies: Vale® (iron), Petrobras® (oil), Embraer® (mid-range planes), Natura® (cosmetics), and Politec® (IT services); Mexican companies: Bimbo® (bread), Cemex® (cement), and America Movil® (communications). Countries with fewer companies are the Chilean company (Concha y Toro®, wine); and from Guatemala, El Pollo Campero® (chicken).

However, the internationalization of companies is not limited to large ones, since the 1980s, the small and medium-sized enterprises (SMEs) started to have a more active role in foreign markets. In the United States, SMEs contribute with around 30% of total exports; among the OECD country members, is about 25% to 35%. In the Asia Pacific region, it reaches 30%. In the European Union, 18% of SMEs are exporting. In Mexico, SMEs contribute with 9% of Mexican exports (Rodríguez 2013).

2.1 Latin American Economic and Social Indicators According to ECLAC

The Economic Commission for Latin America and the Caribbean (ECLAC 2016, CEPAL in Spanish) publishes that the region is the world’s most unequal, because of its bad income distribution in the population; the most affected sectors are women, children, and indigenous people. The Gini coefficient measures inequality, with “0” = perfect equality, where everyone has the same income, and “1” = the perfect inequality, where one person has all the income, and the rest have no income. The CEPAL (2016) Gini data for the region reveals that Colombia has 0.530, Brazil 0.515, Mexico 0.507, Costa Rica 0.506, Bolivia 0.493, Chile 0.470, Argentina 0.455, Peru 0.447, and Uruguay 0.403. Some highlights of the current economic and social indicators are as follows:

- Nearly half of the economically active population in cities (46%) works in the informal sector, with low productivity, and limited or none access to social security protection and retirement programs.
- Regarding education, 93% of students in the region complete the first 6 years of basic education, and 73% do so at the secondary level. Most Latin American governments have laws to make education compulsory during the first 12 years of education, but it will take years to make it a reality.
- Girls have made significant progress in access to formal education, mainly at the secondary and tertiary education, when compared with boys.
- The ECLAC's statistics show that in the age bracket of 25–59 years of age, 40% of the population has 0–5 years of study; 18% have between 6–11 years of study. The numbers keep decreasing, only 9% have 12–15 years of study, and even less, just 6% have 16 years of study, the equivalent of a university degree.
- In 2017, the total population is over 626 million people. The region's life expectancy is 76 years, 79 for women, and 72 for men.
- Women still earn just 87% of men's wages. In the region, women hold less than 25% of positions in the branches of state power.
- There are 114.6 mobile telephone subscriptions for every 100 inhabitants, and there are 50.1 internet users per 100 inhabitants.

3 Latin America + BRICS + MIST in World Rankings

This section presents economic and social data from Latin America's largest economies: Brazil, Mexico, Colombia, Argentina, Chile, and Peru, which taken together as a group represent nearly three-quarters of the region's gross domestic product and more than 70% of the population. In some cases, there is data of smaller countries, such as Costa Rica, an outlier who scores high in different rankings such as educational, sustainability and happiness aspects. Other interesting case is Cuba that in spite of having an almost closed off economy for over five decades ranks high in health, educational and sports achievements, and in developing medicines and health treatments, with very few economic resources.

The Latin America data comes from a series of international indexes that offer world rankings with a different focus: country, city and personal level. Two other groups of countries are included in the comparison. The so-called BRICS: Brazil, Russia, India, China, and South Africa, and the MIST group: Mexico, Indonesia, South Korea, and Turkey. These two acronyms come from the Goldman Sachs consultancy firm (2003). Brazil and Mexico, the region's largest economies, appear, as members of BRICS and MIST groups, but along with Argentina are also parts of the G20, the top 20 largest economies. Nevertheless, new classifications keep emerging; the A. T. Kearney Global Business Policy Council (GBPC 2015)

analyzed the seven emerging markets with more potential for growth for the 2015–2020 periods. The 2020-Seven: Chile, China, Malaysia, Mexico, Peru, Philippines, and Poland; but this list does not appear in this study.

The methodology consisted in reviewing databases of international and regional organizations: United Nations (UN), United Nations Educational, Scientific and Cultural Organization (UNESCO), World Trade Organization (WTO), World Intellectual Property Organization (WIPO), and the Organization for Economic Co-operation and Development (OECD). In the Latin American region: ECLAC, CEPAL, and the Network for Science and Technology Indicators (in Spanish RICYT), among others. Academic databases and journals published in the Web of Science, Scopus, Springer publications, Redalyc, Latindex, Dialnet, Scholar Google, Scimago, and others. Some data comes from additional searches in international and regional economic and financial publications, either academic or practitioner-oriented, and visits to the web pages of relevant companies and organizations.

3.1 Rankings for LATAM, BRICS, and MIST, at the Country Level

Total Trade in Relation to Gross Domestic Product (GDP) and Percentage Invested in R and D.

The World Bank (2015) reports that in all the Latin American, BRICS and MIST groups, the external trade activity increased during the 1960–2016 period. The percentages represent the sum of imports and exports of to the gross domestic product (GDP). The most open large countries are Korea and Mexico, both with 78%, Costa Rica 64%, South Africa 60%, Chile 56%, Turkey 47%, and Russia with 46%. The total trade activity of Brazil of 25% is weak for international standards, reflecting a closed and protected market.

The investment in research and development (R and D), as a percentage of the Gross Domestic Product, is one of the most common indicators used to measure the innovation of an economy. In the 2000–2014 period, the overwhelming majority of analyzed countries have increased their invested percentage. The two outstanding of the rest are Korea that almost duplicated the investment from 2.18 to 4.29%, and China that more than doubled the amount from 0.89 to 2.02%. Thus, it does not come as a surprise when WIPO (2016) reports that Korea and China, have two of the top five offices, along with the United States Patent and Trademark Office (USPTO), the European Union and Japan. The world's average of the top 40 countries is 1.70%, and none of the Latin Americans is even close. The leading country is Brazil with only 1.21%, and the rest are a long distance away from the group average.

It is possible to observe in Table 1 that Korea and China are ahead in this ranking, in position number 26 and 28, respectively; this puts them very close to the top 25 developed countries. Of the Latin American countries, Chile is the best

Table 1 The Global Competitiveness Index 2016–2017 for LATAM and some selected countries (WEF 2017)

Country	Overall index Out of 138 Economies		Basic Requirements –Institutions –Infrastructure –Macroeconomics –Health and education		Efficiency enhancers –Higher educations and training –Infrastructure –Macroeconomics –Health and education		Innovation–sophistication –Business sophistication. –Innovation	
	Rank of 138	Score (1–7)	Rank of 138	Score (1–7)	Rank of 138	Score (1–7)	Rank of 138	Score (1–7)
Korea	26	5.03	19	5.71	26	4.88	22	4.81
China	28	4.95	30	5.34	30	4.79	29	4.22
Chile	33	4.64	37	5.08	31	4.77	56	3.73
India	39	4.52	63	4.62	46	4.41	30	4.22
Indonesia	41	4.52	52	4.78	49	4.38	32	4.16
Panama	42	4.51	34	5.15	51	4.36	44	3.93
Russia	43	4.51	59	4.68	38	4.56	66	3.62
South Africa	47	4.47	84	4.37	35	4.62	31	4.18
Mexico	51	4.41	71	4.56	45	4.41	50	3.83
Costa Rica	54	4.40	57	4.70	52	4.34	45	3.93
Turkey	55	4.39	56	4.70	53	4.32	65	3.63
Colombia	61	4.30	85	4.35	48	4.38	63	3.65
Peru	67	4.23	77	4.43	57	4.26	108	3.30
Brazil	81	4.10	103	4.0	61	4.2	72	3.60

Source Jorge Rodríguez-Martínez with information from Global Competitiveness Index 2016–2017(WEF)

ranked, in the 33 position, doing well in the Basic Requirements and Efficiency Enhancers section, but needs to improve in the Innovation section. However, the same applies to all the economies of the region. The challenge for these efficiency-driven countries is to move up the economic ladder with unique products and services.

The Global Innovation Index (GII) started in 2007, uses about 80 key indicators, divided into two parts. Innovation Input: Institutions and its Environment, Human Capital and Research, Infrastructure, Market and Business Sophistication. The second section deals with the Innovation Output: Knowledge and Technology Outputs and Creative Outputs. In this study, the higher ranked country is Korea in 11th place out of 128 countries, scores high in all, but the Institutions and its Environment criteria. Korea already has all the ingredients of a developed country. China comes in 25th place; its highest score is in the Innovation Output section, precisely the weakness of all the Latin American countries. The objective of China to move from manufacturer to innovator is in the making. In 2013 China overtook the US as the more active country in registering and obtaining patents, trademarks, and industrial designs (WIPO 2013). The Latin countries start to appear at the bottom of the upper half, with Chile in 44th place, followed by Mexico in 61st, Uruguay 62nd, and Colombia in 63rd. Also, Brazil 69th and Argentina 81th are in the lower half (Table 2).

The Global Creativity Index (GCI) measures economic growth and sustainable prosperity based on the so-called 3Ts: Talent, Technology, and Tolerance. The hypotheses of Richard Florida, dean of the Martin Prosperity Institute, at the University of Toronto, is that the countries that score higher have more balanced societies, where the wealth is better distributed. Florida states that creativity, as measured by the GCI, influence the economic development, competitiveness, and its prosperity. And besides, it has an impact on productivity, entrepreneurship and human development. From about 30% to 40% of the population of the advanced economies, fall in the category of the creative class, comprised by knowledge workers, who may be professionals in technology, education, health service, business, or science. In Table 3, two South American nations score higher than even Korea or China. Uruguay is in 26th, and Argentina 27th thanks to the very high scores in the tolerance index; however, they score low in the Global Talent and Global Technology Indexes. Some countries have low scores in the first index, linked to educational achievements and lack of good university graduates, related to economic growth. This is the case with Brazil, China, and Mexico, revealing a disadvantage if they aspire to an innovation-led economy (Table 3).

Table 4 lists a classification by the stage of development:

The three classes are given as follows:

- **Factor-driven economies.** It is composed of the poorest countries. Its focus is on agriculture and extraction business as mining. It depends on low-paid unskilled labor.

Table 2 The global innovation index 2016, LATAM, BRICS and MIST countries (WIPO,2016), (GII 2016)

Rank out of 140	Country/ economy score (0-100)	INNOVATION INPUT Score (1-100) rank out of 128 countries						INNOVATION OUTPUT Score (1-100) rank out of 128 countries		
		Institutions and its environment -Political -Regulatory -Business	Human capital/ research -Educational -Tertiary education -Research and development	Infrastructure -ICT -General infrastructure -Ecological sustainability	Market sophistication -Credit -Investment -Trade -Competition -Market scale	Business sophistication -Knowledge workers -Innovation linkages -Knowledge absorption	Knowledge and technology outputs -Knowledge creation -Knowledge impact -Knowledge diffusion	Creative outputs -Intangible assets -Creative goods and services -Online creativity		
11	Korea-57.1	31	3	9	14	13	5	21		
25	China-50.6	79	29	36	21	7	6	30		
42	Turkey-39.0	82	43	62	46	86	45	31		
43	Russia-38.5	73	23	60	63	37	40	66		
44	Chile-38.4	36	62	38	47	41	59	55		
54	South Africa-34.9	46	55	85	17	56	63	77		
61	Mexico-34.6	65	53	67	51	77	70	62		
62	Uruguay-34.3	47	78	37	104	95	80	56		
63	Colombia-34.2	71	80	35	40	70	82	68		
66	India-33.6	96	63	87	33	57	43	94		
69	Brazil-33.2	78	60	59	57	39	67	90		
71	Peru-32.5	66	81	57	35	54	109	73		
81	Argentina-30.2	106	47	65	106	69	97	83		
82	Indonesia-29.1	122	92	80	62	106	71	85		

Table 3 The Global Creativity Index (GCI) 2015/LATAM, BRICS and MIST countries (GCI 2015)

Total/Rank out of 139 countries	Global Technology Index -R and D investment -Patents/per capita -Technology index	Global Talent Index -Creative class -Educational Attainment -Talent Index	Tolerance -Racial and ethnic minorities -Gays and lesbians -Tolerance index	Global creativity index
26- Uruguay	48	45	7	0.688
27-Argentina	48	35	19	0.681
29-Brazil	27	68	15	0.667
31-South Korea	1	50	70	0.660
34-Chile	56	39	31	0.611
36-Costa Rica	47	61	20	0.607
38-Russia	30	62	57	0.579
39-South Africa	30	62	22	0.564
41-Cuba	94	17	37	0.556
62-China	14	87	96	0.462
69-Peru	62	79	60	0.418
71-Colombia	89	75	36	0.410
73-Mexico	54	94	56	0.407
88-Turkey	58	53	123	0.348
99-India	52	92	108	0.292
115-Indonesia	67	108	115	0.202

Table 4 Classification by each stage of development: LATAM, BRICS, and MIST countries (WEF 2017)

Stage 1 Factor-driven (35 economies) <\$2,000 US dollars	Transition from Stage 1 > Stage 2 Factor-driven \$2,000- \$2,999	Stage 2 Efficiency-driven (30 economies) \$3,000-\$8,999	Transition from Stage 2 to Stage 3 (19 economies) \$9,000- \$17,000	Stage 3 Innovation-driven (37 economies) >\$17,000
Nicaragua	Bolivia	Brazil	Argentina	Canada
India	Honduras	Colombia	Chile	Germany
	Venezuela	Peru	Costa Rica	Japan
	Russia	China	Mexico	Korea
		Indonesia	Uruguay South Africa Turkey	United Kingdom United States

- Efficiency-driven economies.** The economy is more competitive, the production processes are more efficient, and with good quality. The country is a platform for manufacturing; they may be tier 1 suppliers for Original Equipment Manufacturers (OEM). They are under constant pressure from other countries that may offer similar products at a lower cost.
- Innovation-driven economies.** The economy moves up to higher value-added activities, which are more knowledge-intensive. Their activities of research + development + innovation links with the market to develop products and services that have value added. Thus, knowledge-based services are technologic and economic factors in the innovation-driven economies.

The Shih Smile Curve in Fig. 1 presents the value distribution along the global chain. The highest value is on the left and right extremes. Their focus is on intangible activities with high value-added and economic benefits, such as R and D, design, logistics, marketing, sale, and post-sale. On the other hand, the efficiency-driven companies are in the center; they concentrate on tangible activities such as manufacturing, where the economic benefit is lower.

One example is the maquiladora industry (in-bond) located mainly on the Mexican side along the US border. They face international challenges from other low-cost countries. The companies that survive go through an industrial upgrading. The first maquila generation consisted of simple manual assembly activities. The second generation had a higher technological level and automation. The third generation includes not only manufacturing but also design, research, and development of products. Finally, the fourth generation coordinates the logistics and manufacturing chain of factories not only in Mexico but also in other countries (Carrillo and Gomis 2003; Carrillo and Lara 2003).

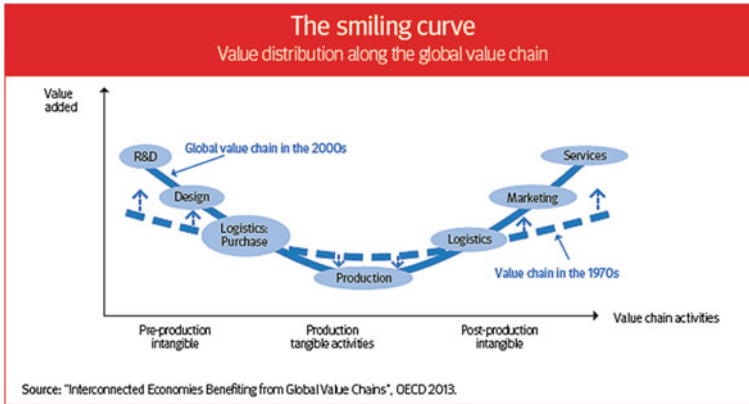


Fig. 1 Stan Shih Smile Curve. The value distribution along the global value chain (OECD 2013)

3.2 Data from Other Indexes, but Information not Displayed in Tables, Key Findings

Global Manufacturing Competitiveness Index (GMCI) (2016) The Deloitte Touche Ltd. publishes the GMCI. Out of a total score of 100, there are four Latin American countries among the top 40. Mexico appears in the 8th place, scores 69.5, in the 2020 forecast it will occupy the 7th place with 75.9 points. Mexico is the largest exporter in the region and the fifteenth globally; it is climbing up the economic ladder exporting technologically complex products. Brazil is ranked in the GMCI 2016 in the 29th place with 46.2 points; the prediction for 2020 is that it will ascend to 23rd place with 52.9 points. Colombia in 2016 is in 36th place with 35.7 points, for 2020 it will move up to 34th place with 40.9 points. Argentina in 2016 occupies the 39th place, with 22.9 points, and for 2020, it will remain in the same 39th place but with 24.6 points.

The Economic Complexity Index, Harvard-MIT Media Lab Cimoli et al. (2009) describe the technological specialization index (TSI) that helps to explain why the Asian economies have consistently increased their TSI since the 1980s. It analyzes the manufacturing value added; in this period, the Latin countries only achieve marginal increments. The exception is Mexico, which obtained a better performance than the other Latin American countries, as the bulk of its exports are high and medium complexity manufactures. The Atlas of Economic Complexity Index measures the quantity of knowledge that each country uses. It includes data from 128 countries. In the 2015 edition, the best performers of the analyzed countries in this article are Korea, 4th; Mexico is in 21st; China, 26th; Turkey, 42nd; Russia, 45th; Brazil, 47th; Costa Rica, 51st; Uruguay, 55th; Colombia, 60th; and South Africa is in 64th.

3.3 *Rankings for LATAM + BRICS + MIST: City and Natural Heritage*

UNESCO, World Heritage List

The United Nations Organization for Education, Science, and Culture (UNESCO) has compiled the World Heritage List (UNESCO 2017). The criteria are that the site must represent a masterpiece, exhibit, and be an outstanding example of a type of a building, or a natural setting of exceptional beauty or importance. UNESCO has to date 1,073 locations; the Latin America region contributes with 139 locations, which represent 13% of the total. The top countries are Italy, 51; China, 48; Spain, 44; France, 41; Germany, 41; India, 35; and Mexico with 34 sites. In Latin America, Mexico is the country with more world heritage positions, followed by Brazil 21, Cuba, 9; Colombia, 8; Chile, 6; and Costa Rica with 4. Some countries in the region (Brazil, Colombia, Costa Rica, Ecuador, Mexico, and Peru) are megadiverse for the richness of the animal, plant variety, and cultural diversity. The UNESCO Universal Declaration of 2001 proclaims the respect for biological diversity and cultural diversity as sources of innovation, creativity, and exchange.

UNESCO Creative Cities Network (UCCN) 2017

The UCCN network (2004) “aims to strengthen cooperation with and among cities that have recognized creativity as a strategic factor of sustainable development as regards economic, social, cultural and environmental aspects,” (Unesco.org 2017). There are 116 city members, from 54 countries (see Table 5). It covers seven

Table 5 Creative cities network—seven creative fields (UNESCO 2017)

Creative field	Quantity	City	Country	Member Since:
Crafts and folk art	4	Nassau	Bahamas	2014
		San Cristóbal	México	2015
		Duran	Ecuador	2015
		Jacmet	Haiti	2014
Design	3	Buenos Aires	Argentina	2005
		Curitiba	Brazil	2014
		Puebla	Mexico	2015
Film	1	Santos	Brazil	2015
Gastronomy	4	Belem	Brazil	2015
		Ensenada	Mexico	2015
		Popayan	Colombia	2014
		Florianopolis	Brazil	2014
Literature	1	Montevideo	Uruguay	2015
Music	4	Bogotá	Colombia	2012
		Medellín	Colombia	2015
		Kingston	Jamaica	2015
		Salvador	Brazil	2015
Media Arts	0	–	–	–

creative fields: crafts and folk art, design, film, gastronomy, literature, music, and the media arts. There are currently 17 Latin American cities in the UCCN. Brazil is the most active country with five cities, followed by Mexico and Colombia, both with three; Argentina, Bahamas, Ecuador, Haiti, Uruguay, and Jamaica all have one metropolis.

The list of the different creative fields is composed of Crafts and folk art: four; Gastronomy: four; Music: four; Design: three; Film: one; Literature: one; and none for Media Arts (UNESCO 2017). Nevertheless, one natural candidate is Guadalajara in Mexico, a digital city. The media city has its headquarters at *Mexico Innovación y Diseño* (MIND 2017). However, as this chapter is about to go to press, UNESCO announced on October 31, 2017, that 64 new cities join the UCCN NETWORK, and eleven are from Latin America. Gastronomy, four; music, two; crafts, two; design, two; and media, one city: Guadalajara. This will make a total of 28 Latin American cities on the list (UNESCO 2017).

UNESCO Intangible Cultural Heritage of Humanity

The term “cultural heritage” goes beyond monuments and collection of objects. “It also includes traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts,” (UNESCO 2017). The intangible cultural heritage has certain characteristics: traditional and living, inclusive, representative and community-based. This program started in 2008, to date there are 429 intangible heritage initiatives. The larger countries have the most registers: Mexico, and Colombia, both with nine; Brazil, eight; the Dominican Republic and Ecuador with three; Argentina, Guatemala, Cuba, and Chile they all have two; while Costa Rica only has one. The Latin American countries are protecting their heritage, such as traditional music and dance: Tango (Argentina), Capoeira (Brazil), Mariachi (Mexico), Marimba (Ecuador), Rumba (Cuba) or the Merengue dance (Dominican Republic). The intangible heritage is an important source of innovation.

3.4 *Rankings for LATAM, BRICs, and MIST at the Person Level*

Human Development Index (HDI) (2014), United Nations (see Table 6) The HDI is part of the United Nations Development Program (UNDP 2017); formed in 1990; it includes data of 188 countries. “It was created to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone.” The human development index consists of life expectancy at birth, expected number of the schooling years, and Gross National Income (GNI) per capita in US dollars. In the rank of “very high human development,” there are three countries in the Table: Korea in 18th,

Table 6 Human development index 2014, LATAM, BRICS and MIST countries (UN 2014)

HDI Rank	Country	Human development index	Life expectancy at birth	Expected years of schooling (years)	Mean years of schooling	GNI Gross national income per capita	GNI per capita rank minus HDI rank 2015	2014
<i>Very high human development</i>								
18	Korea	0.901	82.1	16.6	12.9	34,541	12	18
38	Chile	0.847	82.0	16.3	9.9	21,665	16	38
45	Argentina	0.827	76.5	17.3	9.9	20,945	12	45
<i>High human development</i>								
54	Uruguay	0.795	77.4	15.5	8.6	19,148	8	54
66	Costa Rica	0.776	79.6	14.2	8.7	14,006	14	66
68	Cuba	0.775	79.6	13.9	11.8	7,455	48	69
71	Turkey	0.767	75.5	14.6	7.9	18,705	-7	72
77	Mexico	0.762	77.0	13.3	8.6	16,383	-9	77
79	Brazil	0.754	74.7	15.2	7.8	14,145	-1	79
87	Peru	0.740	74.8	13.4	9.0	11,295	6	89
90	China	0.738	76.0	13.5	7.6	13,345	-7	91
95	Colombia	0.727	74.2	13.6	7.6	12,762	-10	95
<i>Medium human development</i>								
113	Indonesia	0.689	69.1	12.9	7.9	10,053	-8	113

followed by Chile, 38 and Argentina, 45. In the following section “High human development,” the best ranked is Uruguay, 54; Costa Rica, 66; Cuba, 68; Turkey, 71; Mexico, 77; Brazil, 79; and Peru, 87. In the rank of “medium human development,” there is only one country, at a great distance from the leaders, Indonesia, 113.

Happy Planet Index (HPI) 2016, New Economics Foundation The New Economics Foundation has the slogan: “economics as if people and the planet mattered.” The HPI evaluates 140 countries. The data comes from assessing how efficient are countries at using environmental resources, and if their citizens may lead long and happy lives. The four elements are well-being, life expectancy, inequality of outcomes, and ecological footprint. Most of the advanced and wealthy countries tend not to score well in the HPI. Instead, the leaders are countries from Latin America and the Asia Pacific, as they have a more balanced life and the ecological footprint that leaves behind is smaller. Latin American countries, tend not perform very well in the competitiveness, innovation, and manufacturing indexes; appear in mid-table, or in the bottom half. They start to improve in the creative cities, world heritage, and intangible heritage. However, in this ranking, they are the absolute leader. The first overall three out of 140 countries are from Latin America: Costa Rica, first; Mexico, second; and Colombia, third; followed at a distance by Uruguay in 14th place. Indonesia comes in 16th position. The next four countries are also from the Latin region: Argentina, 19; Peru, 21; Brazil, 23; and Chile in the 25th place. It is ironic that in this data the roles of China and Korea change, previously in all other Tables they had the top positions and here are the laggards; China occupies the 72nd place and Korea the 80th position.

4 Constraints that Limit Innovation in Latin America

A highly restrictive environment limits innovation in Latin American. It is a region formed by emerging economies, with complex political, economic, social, and technological issues. This situation limits the capacity of governments, companies, and individuals to improve products or services at the local scene. However, due to neoliberal policies, most Latin countries have their domestic markets open to foreign competitors and are part of Free Trade Agreements. This section will attempt to highlight some of the main problems and constraints.

The Corruption. Transparency International (2017), a Non-Governmental Organization, present in over 100 countries, defines: “Corruption is the abuse of entrusted power for private gain,” (Transparency.org. 2017). Their research reveals there is a strong connection between corruption and inequality. The Latin America region scored very low in the 2016 Corruption Perceptions Index, as it only obtained 44 points out of a maximum score of a 100. It calls the attention that the larger economies are the ones that scored the lowest in a ranking of 176 countries: Uruguay (21), Chile (24), Costa Rica (41), Cuba (60), Brazil (79), Colombia (90),

Argentina (95), Peru (101), México (123), and Venezuela (166). The challenge for the governments is not only to implement transparency but also to attack the impunity of those who break the law. A current problem with corrupt companies is that they prefer to take shortcuts instead of investing and innovating for the long term.

The Poverty. The ECLAC (2016) reported that 12% of the Latin American population, or about 70 million, live in extreme poverty. In rural areas, the situation is worse as it affects one-third of the people. High levels of inequality may affect growth negatively by causing a lack of investment in human capital among low-income families.

The Most Relevant Worries for Latin American Citizens. One study revealed the perceptions of Latin American citizens (Latinbarometro 2016), their biggest concern, for 37%, were economic (general economy and employment). For 25%, relates to violence (drug trafficking and urban gangs). Other problems are corruption with 7%, politics 5%, education 4%, and health-related issues with 4%.

The Informality. The problem is so common that about 55% of workers in the region are in the informal sector. In Mexico, the second largest Latin economy, the situation is very similar. The National Institute of Statistic (INEGI 2017) published that about 29 million people, more than half of the labor force, are in the informal sector. Nevertheless, despite its low level of productivity, they contribute with 26% of the country's GDP. A drawback is that employees in the informal sector are vulnerable to any work-injury or illness and do not have social security.

The Preoccupant Low levels of Education. The United Nations (2011) reported that in the age bracket 15–29, there were 156 million young people, of which only 9% completed university education. Most countries in Latin America have passed laws that the expected years of schooling for their young people are twelve years; however, the reality is different. The country with the highest mean years of schooling is Cuba with 11.8, followed by Argentina and Chile both with 9.9; Peru, 9; Costa Rica, 8.7; and Mexico and Uruguay both with 8.6 years.

The weak rule of law and the lack of compliance. The International Property Rights Index (IPRI 2017) measures the protection of property rights in 127 countries, either physical or intellectual (patents, trademarks, and industrial designs); it also evaluates the legal and political environment. In the 2017 edition, Latin America as a region increased its IPRI score from 4.747 to 5.234, on a scale of 10. The rankings come in five quintiles. In the first quintile, there are the top 17 countries, but none of the countries in this study appears there. The second quintile has 22 countries, of the Latin: Chile (28) and Uruguay (36), and from Asia and Africa: South Africa (26), and Korea (34). In the third quintile, there are 25 countries: Costa Rica (45), Brazil (58), Colombia (62), China (52), and India (54). In the fourth quintile, there are 29 countries: Peru (65), Mexico (67), Indonesia (68), Turkey (78), and Argentina (97).

The Protectionism. There is a growing level of tariff protection in areas of export interest to the region, Europe, and United States, preventing exporters from taking full advantage of tariff-free access. There are nontariff barriers as well that may go from sanitation criteria to standardization requirements.

The Demographics and Shifts in the Demand in International Markets. There are two trends, on one extreme there is a declining fertility rate, and in the other, the growth of the aging population. There is a shift in the international demand that brings an end of the commodities boom during the first decade of the twenty-first century (McKinsey 2017).

5 Latin American Clusters and Types of Innovation

This section presents two perspectives of innovation, from an overall view of clusters, and to the company level. A cluster is a place where companies, universities, research centers, public institutions, and finance centers are in proximity to create new products or processes. Some of the Latin American most representative Clusters appear in Table 7 (Giulani, Petrobelli, and Rabellotti 2005). Traditional manufacturing centers, such as textiles, shoes, furniture, tiles or jewelry. Natural resource-based locations, such as wine, sugar, salmon, and milk-dairy; other products are mangoes, grapes, melons, and apples. Complex products may come

Table 7 Overall view of some Latin America's Clusters: traditional, manufacturing and others (Giulani, Petrobelli, and Rabellotti 2005), PROMEXICO Clusters (2017), Bortogaray (2000)

Traditional manufacturing clusters	Natural resource-based clusters, wine, sugar, copper, salmon, fruit, etc.	Complex products automobile assembly, aircraft, consumer electronics	Specialized suppliers software
Textiles	Wine	Aircraft	Software videogames
Medellín (Col) Itaji, Santa Catarina (Br)	Colchagua (Ch)	Sao Paulo (Br)	Joinville (Br)
Itaji, Santa Catarina (Br)	Serra Gaucha RGS (Br)	Querétaro (Mx)	México City (MX)
Central American Countries (CR, Gt, Hon)	Valle Guadalupe, BC (Mx)	Chihuahua (Mx) Baja California (Mx)	Guadalajara (Mx) Monterrey (Mx)
Shoes	Sugar	Automotive	Buenos Aires (Ar)
Sinos valley (Br)	Valle del Cauca (Co)	Nova Serrana (Br)	Creative industries
Campina Grande (Br)	Marble	Caixa do Soul (Br)	México City (Mx)
León (Mx)	Espíritu Santo (Br)	Ciudad Juárez (Mx)	Guadalajara (Mx)
Guadalajara (Mx)	Salmon	Ramos Arizpe (Mx)	Buenos Aires (Ar)

(continued)

Table 7 (continued)

Traditional manufacturing clusters	Natural resource-based clusters, wine, sugar, copper, salmon, fruit, etc.	Complex products automobile assembly, aircraft, consumer electronics	Specialized suppliers software
Furniture	Region Austral (Ch)	Guanajuato (Mx)	Medical devices
Serra Gaucha (Br)	Milk-dairy	Aguascalientes (Mx)	Baja California (Mx)
Uba, Minas Gerais (Br)	Boaco-Chontales (Nic)	Puebla (Mx)	Chihuahua (Mx)
Espíritu Santo (Br)	Mangoes/Grapes	Pharmaceutical	Electronics
Sao Bento do Soul (Br)	Petrolina-Juazeiro (Br)	México City (Mx)	San Jose (Costa Rica)
Segusino-Chipilo (Mx)	Quinta Región (Ch)	Mar del Plata (Ar)	Guadalajara (Mx)
Tiles	Melons/Grapes	Household appliances	Biotechnology
Santa Catarina (Br)	Rio Grande Norte (Br)	Nuevo León (Mx)	La Habana (Cu)
Jewelry	Apples	Processed food	Montevideo (Uy)
Guadalajara (Mx)	Santa Catarina (Br)	México City, Puebla, Oaxaca-Veracruz (Mx)	Film making
Taxco (Mx)	Chihuahua (Mx)	Metal-mechanical	México City (MX)
		Monterrey (Mx)	Buenos Aires (Ar)

from industrial areas, such as auto-parts and automobile assembly, aircraft, pharmaceutical, or household products. Specialized suppliers compose the last one; some examples are software, video games, medical devices, electronics or biotechnology.

Latin America, with its growing middle classes, is an important market for multinational companies that establish manufacturing facilities, but lately, its growing well-educated workforce and relatively low costs have made it attractive for research and development activities (Boutellier, Gassmann, and von Zedtwitz 2000). The policymakers are paying attention to clusters, for example, the Mexican Government through the National Statistics Institute and the National Institute of the Entrepreneur (INADEM 2017) created a cluster mapping of the country to attract foreign direct investment (FDI).

At the company level, there are different types of innovation in Latin America. The criteria to choose the cases was to show that in Latin America, in spite of hurdles, restrictions, and lack of human and material resources, there are success stories, most not well known. They are the fruit of talented individuals or companies who persevered against the odds. The traditional academic literature tends to

have an American or European focus, thus, neglecting the rich, different and diverse experiences that come from emerging economies, such as Latin America. The examples follow the OECD classifications from the 2005 Oslo Manual. That is a new product, process, marketing method, and organizational methods. In addition, due to its increasing importance, the topic of social improvements is part of the analysis. The objective is to offer a better perspective of how improvements take place in the region.

5.1 New or Significantly Improved Product (Good or Services)

- Tridilosa (MX), Heberto Castillo created a tridimensional construction system that uses a combination of iron and concrete. The innovation consisted in the lightness of the structure, savings of about 66% in the material. These types of structures appear in roofs that cover large areas and even bridges. He obtained a patent for this invention in the seventies (Conacyt 2017).
- Algramo® (Ch) vending machine that sells items such as beans, lentils, rice or sugar in bulk at lower prices. The product targets consumers that belong to the bottom of the pyramid who buy small quantities of food but end up paying up to 40% more. Local stores offer consumers the option of the Algramo vending machines, profits are split with store owners (Allchile 2017).
- The contraceptive pill (Mx), Luis E. Miramontes coined the first birth control pill in 1956. The pill made possible the sexual revolution of the 1960s allowing couples to plan how many children they wanted (WEForum 2016).
- Color TV (MX), Guillermo Gonzalez-Camarena filed in 1942 for a patent in Mexico and in the United States; although color TVs became popular until the 1960s (WEForum 2016).
- The ballpoint pen (Ar), the Hungarian Lazlo Biro, designed the pen that used fast drying oil-based ink and a tungsten ball that allow the ink to flow into the paper. He fled to Argentina just before the World War II, where he obtained a patent and during several years he was the leading producer of pens (WEForum 2016).
- The automatic tortilla machine (Mx), the tortillas were handmade until the first machines appeared in the 1940s; they utilize rollers to shape the tortilla and wires to separate them. The tortilla is a basic ingredient of Mexican food, either flat, folded or roll up as in tacos (Prodiamex 2017).

5.2 *New Process*

- The Colombian Association of Flower Exporters (Asocolflores®) represent Colombian-owned farms that grow flowers. It is the country's second-leading agriculture export. The logistics include cutting flowers, dethroning, refrigerating, packaging, and sending them by plane to 89 international destinations (PMA 2015).
- (Mx) Juan Celada is the inventor of the direct reduction system for the iron, or sponge iron, patented by Mexican corporation Hylsa, Monterrey, in 1957. The company used imported scrap iron from the USA; however, in the 1950s, due to the Korean War, this was no longer possible. Therefore, Hylsa had to change its technology process, the resulting Hyl-Process, improved quality and reduced costs. It is Mexico's number one tech contribution to the world steel industry (Siyabolá, et al. 2012).
- (Mx) The International Agricultural Research Center (CIMMYT 2017) it grew out of a pilot program sponsored during the 1940s and 1950s period, with the objective of raising farm productivity in Mexico. It is an important research institution, which contributes to the Green Revolution and to an increase in the production of maize and wheat (Innovalatino 2011).
- (Br) The agricultural research institute, EMBRAPA®, played an important role in the green revolution and it contributed to an increase in productivity. Brazil is the largest exporter of coffee, sugar, orange juice, and tobacco. And it is the second biggest producer of soya (Innovalatino 2011).

5.3 *New Marketing Method*

- (Br) Natura Cosméticos® it is “a pioneering manufacturer of eco-friendly personal cosmetics, fragrance and personal hygiene products.” The ingredients for the sustainable products of the company come from local communities. It has a direct sales network with over one million sales representatives or consultants (Natura 2017).
- (Col) Colombia's Federation of Coffee Producers, instead of competing in international markets on its own, they teamed together and agreed on having one premium brand, Juan Valdez®, for its coffee products. The brand represents 500,000 coffee producers' families; they have successfully applied marketing, and diversified into retailing with its international chain of coffee shops (Juan Valdez 2017).
- (Mx) the retail unit Elektra®, and Banco Azteca® (store, and bank), target customers from the bottom of the pyramid (BOP), most of them work in the informal economy and are not eligible to commercial credit. They may buy household products in small installments. Elektra offers a foreign remittance service with

money transfers from the USA, paid in their facilities, which are open seven days a week. They have stores in Mexico, Central, and South America (Elektra 2017).

- (Mx) OXXO® Convenience stores, they are small and open 24/7. The customer may buy dairy products, snacks, drinks and pay for city services, telephone or credit cards. In 2016, Oxxo had 15,525 stores in Mexico and Latin America, making it the leading retailer in the region by number of units (Femsa 2017).

5.3.1 New Organizational Methods in Business Practice

- (Br) Doctor Solution®, offers the formal service of plumbers, electricians and construction workers, with quality, warranty, and even an invoice. These types of employees tend to work in the informal sector and are usually unreliable. Brazil is the fourth largest market in the world in number of franchises and it is now exporting business models that respond to the specific needs of Latin American countries (Doctor Solution 2017).

- (Ar) Guerra Creativa®, provides design services by crowdsourcing. If a client wants a new Web page, they will host a design contest for a few days, better design, quick responses and reduced costs. A participative digital community offers a variety of options and the client selects the one that better fits his purpose (Guerra Creativa 2017).

- (Ar) Mercado Libre®, it was the Latin answer to eBay®. It is the largest and most visited e-commerce Web site in the region, serving 15 countries and over 30 million customers that buy all sorts of goods, sell and pay using this platform (Mercado Libre 2017).

- (Mx) Insitum®, is a leading innovation-consulting firm in Latin America that help companies to solve complex problems. It uses user-centered methodologies such as Design Thinking, User Experience Design (UX) and lean innovation. It specializes in strategic design, service design, organizational design, and product design (Insitum 2017; Fastcompany 2017).

5.4 New Workplace Organization or External Organization

- (Ar) Los Grobos®, it is one of the largest grain producers and agricultural services providers in the world, even though it does not own any land, or tractors or harvesters. It is a global company, which provides food and energy production, risk management, human and social capital (Los Grobo 2017).

- (Co) Colombian Parquesoft® is a Technology Incubator in Medellín's Innovation District. A cluster that works as an ecosystem; it has more than 400 companies of digital art, science, and ITC. There are 12 technology centers, in Cali, Medellín, and other cities, providing ITC service to 42 countries (Parquesoft 2017).
- (Ar) Centro Metropolitano de Diseño® (The Metropolitan Design Center), is a public institution part of the General Direction of Creative Industries in Buenos Aires. "This is the place where design and innovation come together; it promotes meetings of design professionals, companies, institutions and a system to generate value". Its vision is to become the main public promoter of the social, economic, and cultural importance of design (Buenos Aires gob 2017).

5.5 *New Social Innovation—Social Benefits*

- (Br) The Curitiba Bus Rapid Transit (BRT) System. This is a low-cost mass transit system that is an attractive alternative to the most expensive subway option. It has a dedicated lane in the avenues, use bus stations for boarding, and a smart card for payments. There are now more than 50 BRT systems in North and South America, Europe, and Asia (Hensher and Golob 2008).
- (Br) The Center for Digital Inclusion® (CDI). Its key concept is helping low-income communities to help themselves. "CDI community centers are: self-managed, self-sustainable, and implement the CDI pedagogy." There are 842 schools in Brazil and 15 countries and about 1,640,000 certified people (Innovalatino 2011).
- (Ch) Un Techo para mi País® (A roof for my country), founded in Chile by a group of young people that build houses together with the families living in slums. There are about 104 million people living in these conditions in Latin America. TECHO has expanded to 15 countries in the region. The program has involved 723,178 volunteers that work with the family to build in a couple of days a simple, but decent house, by promoting social development, fostering social awareness and local action (Techo 2017).
- (Co) The urban transformation of Medellín. In 1992, it was one of the most dangerous cities in the world. Today, this city of 2 1/2 million people is a laboratory of progressive architectural and urban interventions, for social integration. The city has undergone a spatial, social, economic and cultural transformation. In 2012, it was recognized as one of the world's most innovative cities (WEF 2016).
- (Ch) Recycla Chile®, it is the first and only electronic recycling company in the country. It disarms appliances by extracting and separating the raw materials. The employees are people with criminal records. In 2008, it obtained the Energy Globe Award (Recycla 2017; Innovalatino 2011).

6 Conclusions and Final Remarks

This essay attempts to present an overall view of Latin America's innovation, a region of promises, with a young population that aspires to obtain a better quality of life. The task is overwhelming but fascinating, as information is scattered. Innovation may arise even in highly restrictive environments, in a region plagued by economic, social, and technological problems. This is in spite of high informality, bureaucracy, corruption, low-skilled work, weak productivity, and out-of-date technologies that characterize large parts of the regional economy. In this group of countries, small and medium-sized enterprises (SMEs) represent nearly 99% of the total number of companies, the majority fighting for their own survival, therefore, improvement activities are not their chief concern. However, there is a small group of SMEs, albeit growing that are the unsung heroes, nimble, creative, smart, and close to the market. Their target may be the bottom of the pyramid or the growing middle local classes. They may also target niches in international markets with demanding consumers seeking products of high-quality and design, attractive price, reliable service, and delivery.

There is a need for regional public policies that may create a shift from natural resources to a knowledge-society. Nevertheless, this will not happen overnight, as it is necessary to improve human capital through investments in quality education, R and D, ICT, innovation systems, better infrastructure and enforcing the rule of law and protection of Intellectual Property (de Ferranti et al. 2002). The aim of most Latin American countries is to move out from the so-called middle-income trap, based on efficiency to an innovation-driven economy. And to move away from commodity-type markets that are price-sensitive to market-niches that demand design, novelty, technology, service and a better experience. Nevertheless, the race is on, as several other countries, from Asia or East Europe, with a comparable level of development, have similar aspirations.

Of the regional studies of innovation, the best known, more complete and probably the best, is the European Innovation Scoreboard. In Latin America, the OECD Oslo Manual, already described in a previous section, was the reference to come up with and adapted version that better reflects the reality of the region. The Network for Science and Technology Indicators (RICYT in Spanish) published the Bogotá Manual in 2001, as a guide to the national innovation surveys in the region.

Some key recommendations from Casanova et al. (2016: 82) are: "... A national vision and a drive for partnerships, innovation related to natural resources, human capital as a catalyst of innovation, supporting SMEs through cluster policies, innovation information ecosystems beyond traditional measures, and support for innovation leading to social inclusion and sustainability [...] Latin America is innovating, albeit in its unique way. It is redefining innovation, giving new paradigms and facets to innovation and, thus, charting its own growth story, tailor-made to tackle its weaknesses and build on its core strengths. Thus, the economies are becoming better equipped to seize their opportunities, even with the backdrop of the scarcity of resources and low R&D expenditure."

Cassoni and Ramada-Sarasola (2012) argued that standard innovation output indicators are unable to account for new procedures and the great variety of improvements and novelties in the Latin American market, as there are imperfections and high degrees of uncertainty. Lourdes Casanova (2011) has a similar point of view: “We [tend to] measure innovation in very traditional ways. We measure regarding investments in R&D, patents registered, the number of Ph.D. holders, and in the quantity and quality of published work.” The InnoVaLatino report demonstrates that the use of those indicators is not adequate to create an accurate picture of the actual potential of Latin America. And in spite of the fact of occupying low positions, there is a high level of improvements that do not appear in the rankings. “Capturing innovation [in Latin America] does not come from traditional sources,” (Innovation Excellence 2011).

There is a growing use of Information Communication Technologies in Latin America, among the younger generations. There is a link between higher education, socioeconomic level, age, and the more intense use of social networks (Latin Barometer 2016). Facebook is the most popular option with 50%, followed by WhatsApp with 49%, and Youtube with 28%. These are potential tools not only for irrelevant social issues but also for work and innovation-related activities; according to ECLAC, the Latin region is already the top user of social networks.

The job situation, especially among Latin American young people is precarious, as result of several factors, such as the continuous downsizing of companies that try to reduce their fixed costs by outsourcing activities. However, there are opportunities as well with the surge of ICT technologies, social networks, Smartphones, and the restless attitude of millennials with new ideas, such as the movement called “the makers” that use 3D printing in small-scale laboratories.

The combinations of these factors contribute to the creation of a start-up culture. Johnson, Christensen, and Kagermann (2008) suggest by starting to detect an unfulfilled market opportunity to satisfy a customer who needs to have a job done, which is to solve a problem that needs a solution, through a better customer value proposition. One example is the Startup Mexico initiative opened a few years ago to coach entrepreneurs through the first period of incubation of their business. Campus Party attracts university students for a weekend to present new ideas, take workshops, attend conferences, and create networks, etc. Another example is Innovation Match MX that aims to attract and “be an innovative meeting point where companies, researchers, and students will be able to share knowledge, experiences, and explore opportunities of technological-based products or services. The forum aims to reunite Mexican talent; regardless of in which country they live, with Mexican companies and institutions to arrange technological projects that boost the innovation in the country (Innovationmatch 2017).

In a knowledge-society, advanced learning plays a central role. The OECD (2017) points out that “the potential for higher education remains unrealized in Latin America.” Although enrolment of university students has improved, graduation rates are still low; these institutions face quality and adequacy problems. On average, only 14% of the population aged 15–64 completes the tertiary education (2017: 152). There is an insufficient number of Latin American students interested

in science, only 6%; on the other extreme, the most popular programs are social sciences, law, and business with an average of 39%. In the field of engineering, manufacturing, and construction, the Latin America data of 17% is similar to the OECD countries with 15%. Mexico with 115,000 graduates per year is the country in the region with the largest number of alumnae in engineering and technology. The same OECD in his book *Skills for Innovation and Research* (2011) defined two sets of skills: hard skills are necessary for science, mathematics, ability to learn a new language. On the other hand, soft skills facilitate multicultural collaboration between people and companies from different countries, ability to solve problems, to communicate, and to lead, and complete a project.

International students and migrant networks are reshaping the world; they have increased mobility and intense flow of information thanks to ICT, which helps to disseminate new concepts. Many of the emerging world's brightest minds attend Western universities. As opportunities arise in their native countries, students go back home with the knowledge acquired and the contacts made. "Diasporas create connections that help people with good ideas to collaborate with each other..." (Economist 2011: 13 and 72). There is no lack of talent in Latin America. The Small Business Administration (SBA) publishes that Hispanic-Americans are the fastest growing population group in the USA, with nearly 55 million people; they have opened 3.3 million businesses. Foreign-born American starts businesses at a ratio of three to one when compared with non-foreign born. The Hispanic entrepreneurs have acquired a new name "Latinovators" (Small Business Administration 2016).

The World Economic Forum 2017 on Latin America revealed that there is an acute skills shortage. Companies in the region complained that about half (50%) of formal firms could not find the candidates fulfilling the skills they need; especially in the most advanced sectors of the economy, such as automotive or aerospace. (WEForum 2017). The ironic situation is that there are groups of young people who are neither studying nor working; thus, the region is wasting its more precious resource.

In a speech delivered by the former president of Ecuador, Alfredo Palacio (AFESE.com, May 22, 2006), he presents the economic dependency of a country when its future is subject to the exploitation of its natural resources and has no other option if only sells crude oil at market prices: "...This is how the Ecuador's Budget is composed, it comes fundamentally from oil, with no value added, there are no neurons, no work, the oil that we obtain from over there; we send it abroad regardless of what they pay, we send it, because we live out of that ..."

Another example is the speech by the former Brazilian Ministry of Industry, Commerce, and Trade, Mr. Fernando Pimentel (August 30, 2011), who illustrates the gravity of not doing anything to change the actual situation of a Latin America, selling raw materials and importing finished goods: "If the government let the markets act alone, South America will become the farm and the mine of the world, while Asia, the (manufacturing) plant of the world (Canacero.org.mx 2011)."

This work attempts to present the myriad examples and initiatives of how innovation is happening in Latin America, it is ubiquitous, adapting to changing

circumstances; however, the actual official and private indicators are not considering. New products, services, and processes are emerging in the region, despite the lack, or insufficiency, of financial, human, or technological resources. The essential elements are already there. As paradigms are changing, new opportunities arise with the 3D printing technology, or with the on-demand economy and sharing economy. A different type of consumption model that is inclusive and with a better distribution of wealth is urgently necessary. The stakeholders are in place: private firms, universities, government research institutions, ministries, and the citizens; however, it is essential to work together, cocreate and add not rest.

However, new ideas may flourish in a culture that is tolerant of failure, promote entrepreneurship at an early age, and disseminate the achievements, but also the lessons learned of those that initiate new things and fail. Innovation also requires resources, therefore, is advisable to create a support networking with venture capital funding, angel investors and risk capital. Niccolo Machiavelli wrote in *The Prince*, “It ought to be remembered that there is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things.”

The Latin American countries, with their rich cultural history, have an international opportunity in the Creative Economy. As is the case of design, as mentioned earlier, the first schools in Latin America opened during the 1960s during the import-substitution period. It is a discipline that applies to different sectors, such as transportation, education, manufacturing, health and domestic appliances. More than half a century later, the design has started to mature, although still should achieve recognition among company owners who may use it as a strategic tool; on the other side, consumers deserve well-designed products regardless of the price they pay.

There are hundreds of schools and thousands of graduates working in the region, the USA, Europe or Asia. Latin American designers have received many international design prizes and awards. The store of the Museum of Modern Art (MoMA) in New York City celebrated a Destination series (2005–2012 period), to discover design concepts from around the world. It showed the work of Argentinean, Brazilian, and Mexican designers. In Mexico, during the 1970–1976 presidential periods, there was a national design prize geared to the international markets. A new design prize started in 2016. In Brazil, they have a design award since 1988, and several other countries followed the example. Three Latin America’s cities are in the UNESCO Design category: Buenos Aires, Curitiba, and Puebla. As this chapter is about to go to press, the UNESCO announced in 2017 the designation of two new design cities: Brasilia and Mexico City. Also, Mexico City was designated World Design Capital© for 2018.

There is a touristic, social, and economic opportunity in the creation of collective marks to identify the world heritage sites, the immaterial heritage, or the title of creative cities that some countries have obtained from UNESCO. A pending subject is the creation of a culture of registration of intellectual property of patents, utility models, trademarks, and industrial designs. Katelhöhn and Ogliastri (2013) concluded that innovation in Latin America is geographically more concentrated than

economic activity; the evidence is that even though Latin America contributed in 2012 with 8.7% of the world's Gross Domestic Product, it only generated 0.19% of the patent production registered in the USPTO.

It is a daunting job, but if Latin America wants to control its destiny, it must develop ideas and turn them into new business models, and not wait to receive it from elsewhere. Innovation is probably the best option for the region to improve the standards of living and level of education, reduce the income disparity, and compete in the world markets with environmentally friendly products. The World Economic Forum 2017 declared the three biggest challenges for the region: corruption, education and skills development, and reducing inequality. The Latin American dream envisions products and services that proudly will bear not just the "Made in Latin America" mark but rather the "Innovated" or "Created in Latin America" brand.

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