

Mexico's Private Sector and Innovation for a Sustainable Future

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Mexico's Private Sector and Innovation for a Sustainable Future.

This duality (the existence of two Mexicos, one modern and the other underdeveloped) ... is the result of the Revolution and the development that followed it; thus, it is the source of many hopes and, at the same time, of future threats. Here is the dilemma: either the developed Mexico will absorb and integrate the other, or underdeveloped Mexico by the sheer dead weight of demographics, will end up strangling the developed Mexico.

Octavio Paz, [The Labyrinth of Solitude/ "The Other Mexico"](#)¹

¹ Octavio Paz, *The Labyrinth of Solitude and Other Writings*, Grove Press, 1989. p.260

I. Innovation and the Mexican Economy

In 1968 the economist Albert O. Hirschman, a perceptive student of Latin America², [noted](#) that economies that come to “late-stage industrialization” (based on the transfer of externally-developed technologies) benefit from the availability of complex technologies, but do so “without the sustained technological experimentation and concomitant training in innovation which are characteristic of the pioneer industrial countries.” Thomas Edison famously said that he did not fail 10,000 times in searching for the right material for a light bulb filament. Rather, he discovered 10,000 ways that do not work.

Five and a half decades after Hirschman wrote, Mexico remains stalled in late-stage industrialization. It benefits from the “availability of complex technologies,” but it does not gain from “sustained technological experimentation and concomitant training in innovation” that comes from “finding 10,000 ways that do not work.” The absence of true innovation is a symptom, not the [root cause](#) of Mexico’s productivity problem. Nonetheless, both must be addressed to create a more prosperous, more inclusive, and more sustainable future for all Mexicans.³

In the immediate post-World War II decades Mexico (and much of Latin America) focused on import substituting industrialization; subsequently it moved to a maquiladora model, and with the promulgation of NAFTA in 1994 Mexico became an important supplier to global supply chains. Innovation was not necessary for success in these models, modernization, quality, and efficiency were. The vulnerabilities of this approach became apparent with the 2001 “China shock” when China joined the World Trade Organization, and a more efficient, low-

² Hirschman is also a leading character in the (generally true) [Netflix series “Transatlantic”](#) about a group of intrepid volunteers who extracted prominent intellectuals from occupied France during World War II)

³ For an excellent treatment of the root causes see, [Santiago Levy. Luis Felipe López-Calva” ¿Qué falló? ¿Qué sigue? México 1990-2023”](#) Nexos, August 2023

cost competitor emerged in global value chains. Mexico recovered from the China shock by doubling down on efficiency and quality, but the benefits have been limited to a narrow segment of regions, businesses, and formal workers in the North and Center of the country. The challenge of the coming decades will be to use the opportunity that nearshoring presents to build a truly inclusive, innovative, and sustainable economy that is not solely dependent on global value chains.

Mexico invests 0.3% of its GDP in research and development (R&D). This is low even by the very low standards of Latin America, which invests on average 0.67% of GDP in R&D (second lowest in the world only to sub-Saharan Africa). Among Latin American countries in the [World Bank databank](#), Mexico invests less in R&D than Argentina, Brazil, Chile, Costa Rica, Ecuador, and Uruguay. It invests more than only Peru, which is highly dependent on foreign investment in extractive industries and the Central American nations except Costa Rica. For comparison, its investment in R&D as a percent of GDP is an order of magnitude lower than the OECD average and more than 15 times lower than that of the global innovation leaders, Israel, and South Korea. Since 2020, the administration of Andrés Manuel López Obrador has dramatically curtailed investment in government-sponsored R&D and decimated Mexico's National Science and Technology Council (CONACYT), which had been a major government funder of R&D. Absent changes in its approach, the private sector, which according a [2018 Inter-American Development Bank report](#) contributed only 40% of total R&D investment, is unlikely to fill the gap left by a decline in public investment.

The problem lies not in a lack of creativity and imagination among the Mexican people. Mexico is far more creative in art, music, literature, architecture, cuisine, and cinematography, and folk art than it is in business. In *The Labyrinth of Solitude*, Octavio Paz suggests that this condition reflects a deep-set duality in Mexico between a solidity and stability rooted in both the Spanish counter-reformation and Toltec and Aztec cultures, and a dynamism born of upheavals in Mexican history. According to Paz, this duality is reflected in the contrast

between stylized, stolid Spanish and Aztec art and monuments and the highly innovative, whimsical, adventuresome poetry of Sor Juana Inez de la Cruz (and we also suggest, Mexican folk art).

The problem lies on the demand side—business models based on adoption of externally developed innovation have not required local innovation and well-meaning government policies have disincentivized progress at home. The problem lies also on the supply side—an education system that rewards rote learning and isolates academic from business endeavors has stymied innovation. While there are important signs of change among businesses, educational institutions, and regional innovation ecosystems, they are faint and fragile. In the coming decades Mexico must access its creative potential to build on and accelerate what has been accomplished, and to develop new approaches for socially beneficial innovation.

Why Innovation is Important.

In his classic 1996 *Harvard Business Review* article [“What is Strategy.”](#) Michael Porter described competitive strategy thus, “[it] is about being different. It means deliberately choosing a different set of activities to deliver a unique mix of value.” If a firm is to achieve a competitive advantage that is sustainable over the long term, it must do things its competitors cannot do. Operational effectiveness is not strategy. Porter wrote, “Operational effectiveness . . . Means performing similar activities *better* than rivals perform them . . . In contrast, strategic positioning means performing *different* activities from rivals’ or performing similar activities in *different* ways.” The Mexican maquiladora companies discovered in the early 2000’s that operational efficiency was insufficient as China was able to provide the same products to global value chains at lower cost and with comparable quality. They did not have a sustainable strategic position. The operations that survived the China shock, such as the

Delphi Automotive Plant in Ciudad Juarez, had developed an R&D capability that enabled them to establish a sustainable competitive position.

Porter argued that true strategy depends on performing unique activities that competitors find difficult to replicate. These unique activities can come from (1) meeting the needs of customers better than their rivals, (2) meeting the needs of a particular set of customers better, or (3) having unique access to specific customers. Today, nearshoring threatens to repeat the mistakes made by maquiladoras of the past by propping up the belief that competing on operational effectiveness and a geopolitically determined privileged access to the US market will create a sustainable long term competitive advantage. Mexico needs to learn from its early 2000's experience, recognizing that it must develop a unique position that differentiates it from its rivals.

None of Porter's three strategies necessarily requires innovation, but innovation is increasingly important to each strategy. Current business models and technologies are insufficient to meet the needs of societies facing unprecedented environmental and social challenges. The strategic winners will be those who are able to supply products and services that both meet human needs *and* do so in a socially and environmentally sustainable manner—those who can serve the needs of new categories of customers who have long been excluded from markets, and those who have the knowledge, skills, and credibility among customers who have long been skeptical of the willingness and ability of business to address their needs. In short, it will no longer be sufficient for business to do the same things better; it will be necessary to do better things.

In this article we couple innovation and sustainability. Not all innovative companies are sustainable, but to be sustainable companies must be innovative. We will discuss an important new book, [Power and Progress, Our Thousand Year Struggle Over Technology and Progress](#), Daron Acemoglu and Simon Johnson of MIT that suggests that innovation can create value for innovators, investors, and owners, but not necessarily for society. From the

earliest days of agriculture to artificial intelligence and automation in our era, technologies have substituted for human effort, eliminating fulfilling jobs. Elites have captured technology's benefits and workers have been marginalized.⁴ Pro-human technologies developed to fulfill human needs, by contrast, have empowered human capabilities, increased incomes, freed humans from backbreaking, degrading tasks, and/or addressed pressing human and environmental needs. Whether innovation is used to promote human well-being is a choice that societies make about how it is used and managed and how its benefits are distributed. With advances in artificial intelligence, biosciences, automation, and social media, all societies will face fundamental questions concerning humans' relationship with technology. Societies that have had experience developing pro-human applications of technologies will be better able to participate in the development of national and international guardrails to manage technology. Mexico has a choice: it can stand to one side accepting technologies and guardrails developed by other societies, or it can engage actively in developing and adapting technologies that will benefit all Mexicans, not just elites, and it can tailor guardrails to its own experience and needs.

Innovation and Mexico's Productivity Problem

Today, Mexico risks doubling down on an economic model that has concentrated benefits in the North and Center of the country. It has not addressed the fundamental problems of slow and inequitable growth as well as increasing vulnerability to future labor displacement by robotization and artificial intelligence. In the long run, sole reliance on nearshoring prolongs a path of "late-stage industrialization" and slow growth, and it relegates Mexico to dependence

⁴ Perhaps the extreme case of this type of innovation was the cotton gin which made cotton processing exponentially more efficient, but in doing so greatly increased the needs for slaves to harvest cotton in the American South

on global value chains. It will do little to address Mexico's real problems of, low productivity, labor informality, extreme inequality, regional disparities, and environmental degradation.

In a 2019 Wilson Center Report, [Mexico Facing the Future](#) we argued that demand for innovation is weak in Mexico. Its private sector does not invest in innovation because its prevalent business model does not require innovation. In a recent [article in Nexos](#), Santiago Levy and Luis-Felipe López Calvo provide a complementary perspective: institutional structures discourage innovation by penalizing the hiring of formal workers, making it difficult for firms to hire and fire workers and close unsuccessful ventures, all the while disincentivizing formal work through generous social benefits.

Business elites have evolved a business model that integrates their businesses into global value chains without significant innovation. They and their workers in the formal enterprises of the advanced manufacturing clusters have done well with a business model that adapts technologies developed abroad. Formal economy workers accept routine, sometimes unfulfilling, work in return for acceptable wages and government mandated benefits. Critical of wage work, Octavio Paz writes in *The Labyrinth of Solitude*:

The modern worker lacks individuality . . . That is the greatest mutilation when he transforms himself into an industrial wage earner . . . Capitalism deprives him of his human nature . . . by reducing him to an element in the work process *i.e.*, to an object.⁵

This model has worked in northern and central Mexico, but it has not worked in the south. Workers, who in Paz's terms are merely "an element in the work process," are also vulnerable to replacement by automation or artificial intelligence.

⁵ In *The Labyrinth of Solitude* Paz also points to the inherent conservatism of Mexican elites that emerged in the early 18th century, "The conflict within them . . . was not so much faith against reason as the petrification of certain beliefs, which had lost all their freshness and fertility . . ."

The Other Mexico

Following Octavio Paz, numerous studies have described what McKinsey calls, "[*A Tale of Two Mexicos.*](#)" A 2022 in depth World Bank study, [*Productivity Growth in Mexico: Understanding Main Dynamics and Key Drivers*](#) is worth citing at length:

For three decades Mexico has been an economy in slow motion. Despite reforms, between 1990 and 2019, Mexico's economic growth averaged only 2.2 percent a year and gross domestic product (GDP) per capita relative to the United States declined from close to 30 percent to less than 20 percent. Growth has been driven by labor force growth from the demographic dividend, and to a lesser extent by capital investment. Yet this factor accumulation has been offset by negative productivity growth. In sum, GDP per worker (in constant US dollars calculated at purchasing power parity) increased at an annual rate of 0.1 percent between 1991 and 2020. This is well below the growth seen in other economies that started from broadly comparable income levels, such as the Republic of Korea (3.3 percent) and the Czech Republic (2 percent), or even OECD and Latin American averages of 1.1 and 0.8 percent, respectively.

The report goes on to say the story of productivity growth in Mexico is, "A story of forking paths: Nuevo Leon is as productive as Korea; Chiapas and Oaxaca remain as productive as Honduras." But it is important to recognize that the "Other," less productive Mexico is also the locus of enormous creative talent that is a critically underutilized resource for the country's future.

The World Bank report highlights the many factors that contribute to Mexico's low productivity growth and disparities between the north and the south: weak institutions and rule of law; burdensome regulation and a bankruptcy regime that does not facilitate the exit of low performing firms; limited access to finance, particularly for young and small firms and for firms seeking to invest in productivity improvements; inadequate and unequal education; high levels of informal work; low female labor force participation in the south and southeast of the country; uneven distribution of strong regional universities that can act as anchors for regional clusters; uneven distribution of regional clusters themselves and links among

municipalities; uneven regional access to global value chains; and uneven adoption of advanced management practices.⁶

No single factor explains the totality of Mexico's productivity problem, but addressed holistically they can contribute to a solution. Levy and López Calva focus on perverse incentives that have emerged as Mexico has sought simultaneously to integrate itself into a global economy and to address the problem of poverty. We suggest, additionally, that Mexico must address very low demand for investment in innovation and productivity in an obsolete business model, and it must increase opportunities for young people with a passion for innovation, in particular accounting for profound regional disparities in economic performance.

Disparate Regional Clusters

Beginning with Monterrey, which grew from a fortuitous mix of industries, and transportation and communications inks followed by the founding of a private university in the early 20th century, clusters have been an important component of Mexico's growth. The cluster model must be extended if it is to work of all Mexicans. A 2022 Banco de México (Banxico) study, [“The Role of Clusters in the Performance of the Mexican Economy,”](#) examines the role of 24 clusters in Mexico (organized by sector not by geographic region). The sectors examined account for 78% of employment and 81% of gross value added to the economy. They range from high tech (medical equipment and supplies, semi-conductors and electronic), automotive, financial services, and oil and gas with high value added per worker, to footwear, forestry, education, agriculture, and health services with very low value per worker.

Five of the 24 clusters studied contribute the highest value added per worker with about 10% of employment, but 40% of value added. Three of these clusters are in industries tied to

⁶ It is important to note that in the last three of these areas there has been notable progress, mostly in Northern and Central Mexico

energy production and mineral extraction. They contribute less than two percent of employment but 25% of value added. This is because their “value added” consists primarily of extracting resources from the earth, but it does not account for the negative consequences of environmental degradation and diminished resources. The other two high value-added clusters, automotive manufacturing, and financial services, contribute 8% of employment and more than 18% of value added.⁷ The remaining 16 clusters, with 86% of employment represent less than 56% of value added.

What is most evident about the Banixco study is the geographic concentration of high value added and high potential clusters. The high value added automotive and financial clusters are heavily concentrated in only six states in northern and central Mexico.⁸ Potential future innovation-driven sectors, (medical equipment, pharmaceuticals, semi-conductors, and aerospace) are also concentrated in the same six states.⁹ The latter, however, contribute only 4% of employment with less than 4% of value added, indicating that, at present, they compete on low cost labor, not innovation. By contrast, only two sectors, oil and gas extraction in Tabasco and Vera Cruz and tourism and hospitality services in Quintana Roo, exhibit concentration in the south. As Monterrey, Guadalajara, Guanajuato, and Mexico City have demonstrated, industrial clusters can be a route to value added growth. Today, however, few of Mexico’s economic clusters leverage local determinants of growth. This weakness will be exacerbated as Mexico faces a rapidly changing global economy.

⁷ The Banixco study does not separate out the emerging aerospace industry likely because it is too small, but its characteristics in value added are likely similar to those of the automotive industry.

⁸ In a 2019 Wilson Center study, [Mexico Facing the Future](#), we examined the vulnerability to technological displacement of jobs by sector and found that outsourced routine manufacturing jobs were highly vulnerable.

⁹ Oddly aerospace is included under “medical equipment,” but it constitutes only a miniscule percentage of total employment and value added.

Mexico and the “Economies of the Future.”

Mexico, like other Latin American countries with economies based heavily on resources and efficiency, with weak innovations and outdated education systems, will be poorly positioned to compete in a knowledge-based global economy. In two of the four scenarios that we examined in a project for Mexico’s Business Coordinating Council (Consejo Coordinador Empresarial, CCE) the global economy is characterized by rapid technological change where a key factor in national competitiveness and well-being is the ability to innovate and create new businesses. As we noted in *Mexico Facing the Future*, four interlocking “economies” will prevail (Figure 1):

1. *A knowledge economy will make knowledge and ideas more important to economic competitiveness than physical assets.* What you know will be more important than whom you know (as is often the case in Latin America), or what assets you control. Human intelligence will be challenged by (or collaborate with) artificial intelligence. Widespread digital technologies and artificial intelligence will bring about [increasing returns to scale](#) rather than traditional decreasing returns. [This will upend business strategies.](#)
2. *A shared economy will foster shared “stuff, space, and skills.”* Individual workers and customers will be connected through ubiquitous apps and share knowledge, skills, data, working and living spaces, and possessions. They will build trust through ratings in sharing platforms (but these will be subject to manipulation) and work in new ways in the “gig economy.” Access to shared technology will undermine the competitive advantage of assets, scale, and resources in many businesses.¹⁰

¹⁰ Since our 2019 study, several important shared economy businesses such as WeWork, Airbnb, and Uber have encountered economic and regulatory problems. This is consistent with the [Gartner Hype Cycle](#) which suggests that new technologies go through an “initial technology trigger,” “a peak of inflated expectations,” and a “trough of disillusionment,” before they reach a “plateau of productivity.” Many shared economy technologies are currently in the trough of disillusionment, but we expect they will reemerge with decreased expectations.

3. *A distributed economy will decentralize economic activity with new technologies.*

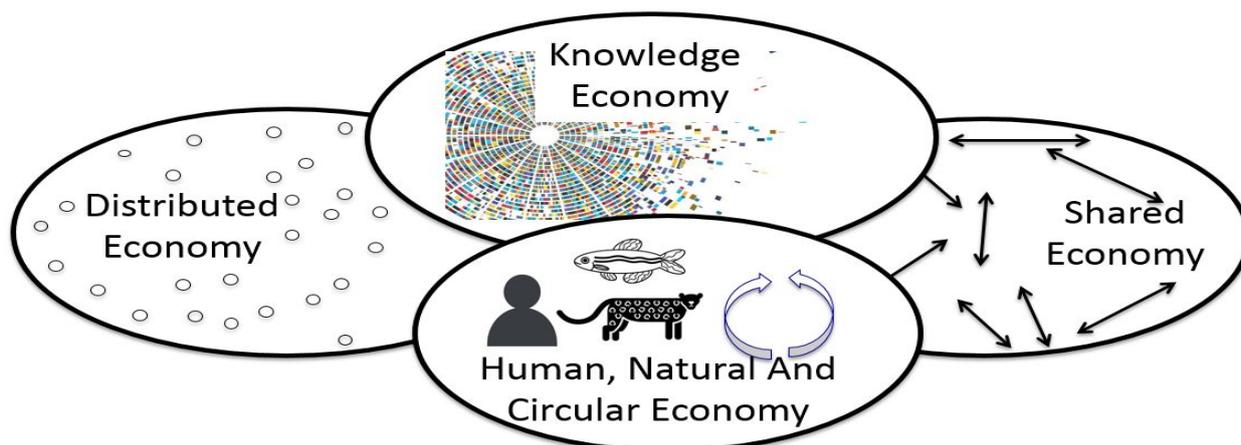
Remote work will prevail. Renewable, distributed energy generation and storage, manufacturing (3-D printing and synthetic biology), transportation (drone vehicles and airplanes), and record keeping, and storage (blockchain) will make scale less important than resiliency and agility. Creativity and diversity will become more important than consistency and homogeneity.

4. *A human, circular, and natural economy will make sustainability a strategic necessity.*

Once considered a “nice to have” matter for corporate social responsibility, public relations and philanthropy programs, sustainability will become a business imperative. The survival of firms, nations, societies and, indeed of humanity itself as we know it today, will depend on it. Circular business models will become the new normal.

In Schumpeterian creative destruction, new businesses will be created, and old businesses will be destroyed. Products (vehicles, computing capacity and applications, lightbulbs, residences, workspaces, fashion items, music, data storage and analysis) will become shared services. The “gig economy,” remote work, and automation will transform the nature of work. Talent will replace assets and resources as the key source of competitive advantage, and it will flow freely (and often virtually) to where it is most rewarded. This is not a world in which most Mexican or Latin American companies with business models designed for efficiency and diminishing returns to scale can easily compete. New ways of thinking are needed. Most of all, new business models will be needed to address the business opportunities that sustainability will create.

Figure 1. The Economies of the Future



The Demand Side—Limited Demand for the Right Kind of Innovation

It is not the *amount* of innovation, as measured by conventional metrics such as R&D investment as a percentage of GDP or number of patents issued or even economic complexity, but the *type* of innovation that leads to sustainable growth. Drawing on the work of the late Clayton Christensen of Harvard Business School and recent work cited above by Darron Acemoglu and Simon Johnson of MIT, we suggest that not all innovations are equal. Successful innovation generates profits for firms and their owners, otherwise innovation would not exist, but only pro-human innovation contributes to societal well-being.

Clayton Christiansen and his colleagues [argued in 2014](#) that there are three types of innovation.¹¹ The first two of these improve efficiency and/or existing products to compete by gaining incremental market advantages. Some companies have excelled at these two types of innovation. They have established production and innovation clusters around the great industrial centers in northern and central Mexico where they have coupled a well-trained, low cost, labor force with high quality production processes and incremental process

¹¹ Christensen has since extended the argument in a book) [The Prosperity Paradox: How Innovation Can Lift Nations out of Poverty](#). New York, New York, USA: HarperBusiness,

and product improvements to become efficient participants in global value chains. They “do things better” in “late-stage industrialization” through:

1. *Process efficiency improvements.* The World Bank Report cited above notes that “Productivity growth in Mexico has been driven mainly by changes in the technical efficiency of operating firms.” Mexican firms in global value chains compete on quality and cost. To do so, in the best cases they have aggressively reengineered their processes to eliminate non-value-added steps and waste. Many have adopted advanced, sophisticated quality management processes based on the ISO 9000 (quality) and 14000 (environmental) management standards. Some firms have achieved compelling results in “continuous improvement” in financial, quality, and environmental performance.

Even small firms have identified and addressed cost savings in energy, water, and materials waste and to reduce toxic emissions. With funding from the World Bank, the InterAmerican Development Bank, USAID, and the large firms themselves, we have had opportunities to work with hundreds of small and mid-sized enterprises (SME’s) in Mexico, Central America, and Peru. These projects demonstrated that quality management techniques can be applied successfully in a form of “ISO Lite” by small and even micro enterprises. They also demonstrated that when trusted and empowered to make suggestions, line workers contribute substantially to process improvements.¹² Today some Mexican companies are participating in “circular economy” initiatives. These involve both process (improvements in inter-firm collaboration) and product improvements (redesign of products for reuse and recyclability).

¹² Interestingly, we found that the technical expertise of large enterprise staff is often better applied to the “low hanging fruit” issues facing SME’s than to the more complex issues facing their own companies.

The results are more mixed when it comes to the labor impacts of efficiency improvements. As the work of David Autor of MIT and others has pointed out, routine midlevel labor tasks in the United States were most vulnerable to outsourcing in the 1990's. Job tasks will continue to be eliminated and created by automation and artificial intelligence (the latter particularly in clerical, professional and management tasks). As demonstrated in a [recent paper by Autor](#), in the United States 60% of employment in job tasks that existed in 1940 has been displaced by new job tasks.¹³ By far the largest component of this displacement has been in agriculture and production. Today, these post-1940 jobs (in Octavio Paz terms, "jobs that reduce humans to an element in the work process"), many now in Mexico, are vulnerable to elimination by automation in the name of efficiency.¹⁴ We can anticipate that in Mexico, the influx of additional labor demand from nearshoring will ultimately be countered at least in part by automation.

2. *Product improvements.* Some, but many fewer, Mexican firms or subsidiaries of foreign firms in Mexico engage in product improvements. In the late 1990's we visited the Research, Design, and Development Center of Delphi-General Motors, established in 1995 in Ciudad Juárez, Mexico. It was what [has been characterized](#) as a "third generation maquiladora." Unlike other suppliers to global value chains, the Delphi plant incorporated an R&D function. It did not design new-to-the-market products and businesses, but it did engage in extensive product improvement innovation. The Delphi plant survived the China shock in large part because it had a strong, integrated R&D capability. More recently, as reported in [Mexico Business News](#), Pirelli has located an R&D center in Silao, Guanajuato focused on virtual design,

¹³ David Autor, "The labor market impacts of technological change: from unbridled enthusiasm to qualified optimism to vast uncertainty," National Bureau of Economic Research, Working Paper 30074 <http://www.nber.org/papers/w30074>

¹⁴ As an example, I recently had the opportunity to visit a plant in Monterrey, Mexico that I had known well ten years earlier. In what had previously been a work-space bustling with people, I did not encounter a single worker.

testing, and recyclability. In the aerospace sector Mexico's National Science and Technology Council (Conacyt) established a collaborative National Center for Aeronautics Technologies to support the growing aerospace sector in Mexico. Product improvement R&D leverages Mexico's abundant engineering talent to create important clusters in key sectors as suppliers to top tier foreign companies.

3. *New business creation.* Lastly, Christensen and his colleagues argue that true, sustainable, high value-added growth comes from a third type of innovation, "doing better things" rather than "doing things better." New market and business creation results from addressing unmet customer needs. It requires Hirschman's "sustained technological experimentation and concomitant training in innovation which are characteristic of the pioneer industrial countries,"—namely, creativity, innovation, experimentation, failure, and learning. Shortly after one of us, Richard, read Christensen and his colleagues' book, [Competing Against Luck](#), we facilitated a work session with representatives of thirteen of the largest companies in Mexico. We asked if any of those present could name a new-to-the-world business that their company had created. Not a single firm could. The list of the [largest companies](#) in Mexico today confirms this perception. It has barely changed in 50 years, consisting of the same, very large Mexican companies or subsidiaries of foreign companies. By contrast, most of the largest businesses in the US and globally did not exist, were in their infancy, or are in markets that did not exist 50 years ago.

Three Typologies of Innovation

A.O. Hirschman, Clayton Christensen, and Daron Acemoglu and Simon Johnson, have all developed typologies of innovation. They are not mutually exclusive; rather, they provide different and potentially mutually reinforcing perspectives on an important issue facing Latin America (as well as other regions).

1. Writing in the late 1960's Hirschman focused on the dynamic, learning effects of an innovation culture. Late industrializing nations that adopted the "import substitution" strategy (as did many in Latin America), could adapt externally developed technologies and jumpstart their economies by benefitting from global, technological advances. The problem was that this strategy did not develop the innovation capacity that first movers developed through a process of training, experimentation, and failure. Hirschman foresaw the problem that bedevils innovation in Latin America today. Firms participate in technologically complex global value chains, but invest little in fundamental R&D. This strategy has resulted in substantial benefits, but unlike the case in Korea, Taiwan, and other nations, it has increased dependency on foreign direct investment and failed to foster a capacity to develop high value-added businesses.
2. Christensen focused on how businesses develop "disruptive innovations" that upend incumbent businesses. His primary focus was on business rather than national strategies. Toward the end of his life, he shifted focus to the sources of economic growth. Incremental process efficiency and product improvement (like Hirschman's import substituting strategies) would provide short term advantages to firms or nations that pursued them. Both redistributed the economic pie. Only a narrow segment of economic elites benefitted from increased profitability as firms became more efficient at the expense of labor or did not provide a platform for sustained growth. Only new business creation strategies could provide a basis for sustained growth.
3. Acemoglu and Johnson, discussed below, introduce the concept of "so-so innovation" and the "innovation bandwagon." So-so innovations are broadly similar, but not identical, to Hirschman's "import substitution" and Christensen's process efficiency and product improvement. They redistribute the economic pie by shifting rents from labor to capital both by substituting capital for labor, and by increasing the bargaining power of capital. Bandwagon innovations enhance and create additional forms of human endeavor rather than substitute for it.

None of the three typologies explicitly address environmental sustainability, but they provide a framework for doing so. The challenge facing firms and societies will be to develop Hirschman's innovation capacity, Christensen's new businesses, and Acemoglu and Johnson's bandwagon innovations, that at once contribute to economic well-being and reduce stresses on increasingly scarce environmental resources.

The Supply Side—Inadequate Supply of Entrepreneurs and Innovators

Innovation in Mexico is anemic because there has been insufficient demand for it. Dominant firms have had an ample comfort zone, as governments and financial institutions have disincentivized innovation-based competition. But the educational system has also contributed to weak innovation performance. It has not supplied innovators, failing to recruit and train individuals with creative, entrepreneurial mindsets and a vocation for business. As we noted in [Mexico Facing the Future](#), public education, particularly in underserved, rural areas, has been characterized by a focus on rote learning and memorization. At the primary, secondary, and preparatory levels, progress has been stymied by distrust between educational unions and administrators. At research universities, academics have been distrustful of “commercial interests.” As a result, entrepreneurial students have frequently decided, instead, to attend universities in the United States and Europe. We will note below that there are signs of change in this panorama.

Toward a Better Future—The Role of Pro-Human Innovation

In [Power and Progress: Our 1000-year struggle over technology and progress](#) Acemoglu and Johnson review 1000 years (and more) of the history of technology. They suggest that technology is not destiny. Rather, it is formed by, and can be governed by, human endeavor, human decisions, and institutions. Throughout history, whether technology has been beneficial to society or solely to narrow elites has depended on two factors: the type of innovation and the distribution of the profits that technology generates.

As noted above, Acemoglu and Johnson differentiate “so-so innovation” and “bandwagon innovation.” So-so innovations increase the *average* productivity of labor by reducing the number of workers required to perform a given task (the denominator of the revenues per

worker ratio). On average, wages per workhour increase, but labor's share of revenue declines as fewer workers are employed. By contrast, "bandwagon innovations" are "pro-human." They increase the *marginal* productivity of labor. Each additional employee is more productive than the one before, incentivizing additional hiring with better wages, increasing labor's bargaining power in the distribution of rents, enhancing labor's capabilities, and empowering human endeavor. At their best, bandwagon innovations are "foundational innovations"—steam power, electricity, and the internet—that enable other new businesses. In a virtuous circle, bandwagon innovation empowers humans to do more and opens the way for additional innovations that further empower rather than disempower humans. Crucially, future bandwagon innovations will require building adaptability and resilience into business strategies and addressing existential societal and environmental challenges.

In Latin America, an "innovation bandwagon" model will benefit all of society by fostering businesses that empower rather than limit human endeavor. It will expand human skills and possibilities. Rather than replacing the enormous creativity and diversity of the Mexican people with automation, it will aim to leverage that creativity to build human-centric businesses of the future. While Northern and Central Mexico should not be ignored, conditions in the south, where labor informality persists and inequality is entrenched, should be addressed explicitly. Critically, the serious environmental challenges facing Mexico and the world—climate change mitigation and adaptation, preservation of biodiversity, and provision of basic environmental health and safety amenities—must be prioritized.

Innovation and Sustainability

In today's world, the UN Sustainable Development Goals provide a roadmap of future "jobs to be done." Universal access to basic capabilities and amenities—clean water and energy, health, education, decent jobs and housing in sustainable communities, reduced inequality,

climate change mitigation and adaptation, and biodiversity—encompassed by the UN Sustainable Development Goals (SDGs) represent critical unmet needs for Latin American (and global) society. The market is doing a demonstrably poor job of addressing these needs, but it is under increasing pressure to address them. With its enormous ethnic, biological, and cultural diversity, as well as its artistic heritage, Mexico is strongly positioned to serve as a laboratory where businesses of the future that meet needs defined by the UN SDGs can be visualized, tested, and deployed.

[The Sustainable Development Goals](#)



The 2015 Sustainable Development Goals set 17 goals to be achieved by 2030 (Agenda 2030). They cover environmental and social topics that together would provide the conditions to “meet the needs of the present without compromising the ability of future generations to meet their needs,” as stated in the 1987 UN report, *Our Common Future*. Some are highly specific while others describe capabilities to meet those goals. They will require concerted action by government, business, multinational organizations, and society, and at the local, regional, and global levels. The UN has published yearly reports on meeting the goals. Each has been more pessimistic than the one before. The 2023 Report stated, “But halfway to 2030, that promise is in peril. The Sustainable Development Goals are disappearing in the rear-view mirror, as is the hope and rights of current and future generations. A fundamental shift is needed—in commitment, solidarity, financing, and action—to put the world on a better path. And it is needed now.” The UN Secretary General summarized the [2023 report](#) as follows:

“Unless we act now, the 2030 Agenda will become an epitaph for a world that might have been.”

II. Addressing Mexico's Innovation Challenge

*When you **really** do not know what's coming next, there's no logical calculus you can bring to bear, so the rational decision-making process gets ruled out. That means that the whole rational decision-making doctrine you're taught in business school no longer applies. What's needed in this situation is not rational calculation but resilience. I define resilience as the capacity to respond, the ability to react appropriately, to deal with things . . . In a world where we don't trust the ground we stand on, what really counts is adaptation or resilience.*

W. Brian Arthur [McKinsey Quarterly, interview](#), "Crossing the River by Feeling the Stones"

"One of the benefits of working closely with a large number of people who are curious is that you learn as a community. There's this incredible power when you discover and learn together . . . I look at two things: I look at what we made, but far more important, I look at what we learned."

Jony Ive (former Apple Chief Innovation Officer) interviewed in [McKinsey Quarterly](#).

Mexico cannot forgo the opportunities that nearshoring presents. With it, Mexico can attract much needed investment and, to a limited extent, improve its anemic rate of growth. Nevertheless, nearshoring cannot distract from the real, fundamental economic and sustainability challenges facing Mexico. A new model is needed, one that is agile and resilient to unexpected change, one that enables Mexico to "cross the river by feeling the stones," as W. Brian Arthur put it, and "learn as a community," as Jony Ive put it. A new model should utilize the capabilities of "the other Mexico" for the benefit of its people and put all of Mexico, not just some privileged regions, on a path to "the innovation bandwagon."

The following sections describe a path forward for individual companies, for regional associations and/or sectoral clusters of companies working with universities, civil society, and local governments, and for national government, business organizations, and educational institutions. We see sustainability as a "Gordian knot" that cannot be undone by pulling at its individual strands. Rather, the role of each strand must be addressed holistically in relationship

to the others.¹⁵ The fundamental building block must be individual firms that are motivated and empowered to find new ways to meet human needs with more innovative, more inclusive, and more sustainable business practices. It is difficult, however, for individual companies to venture on a new path alone. This process can be strengthened by working in teams of firms or regional or sectoral clusters that provide both moral and psychological support and complementary skills, products, and services. Firm and cluster-level actions will be insufficient, however, unless they are backed by enabling national level policies to promote what we call, “the three I’s”—institutions, infrastructure and, innovation.

At The Firm Level: The Roles of Owners, Directors, Investors, Shareholders, and Stakeholders

Firms, even small firms, are complex organisms. Traditional thinking about the firm assumes that thousands of individual owner-operated small firms produce the products that they excel at producing and compete freely with each other. As Adam Smith put it in 1776 in [*The Wealth of Nations*](#), an “invisible hand” guides the sum of the actions of independent, individually-owned and operated firms competing in their own self-interest toward the common good.¹⁶

The real world today is far more complicated than the world Adam Smith described. As firms grow, the original owners hire managers to run the company, but managers who know more about the firm’s day-to-day operations might run the firm for their own benefit rather than the owners’ benefit. So, owners put in place monitoring systems and incentives that reward managers for acting in their (the owners’) interests. As the firm grows, the form of ownership changes. Additional investors provide financing, and in return they get a share of the profits

¹⁵ In the actual Gordian Knot fable, Alexander the Great cut through the Gordian Knot with his sword rather than attempting to unravel each individual strand, but we do not have a magic sword. We have only human will and endeavor.

¹⁶ In fact, there are few references to the “invisible hand” in *The Wealth of Nations*, and Smith did not oppose a constructive government role in the economy. He did oppose government-sponsored monopolies such as the East India Company.

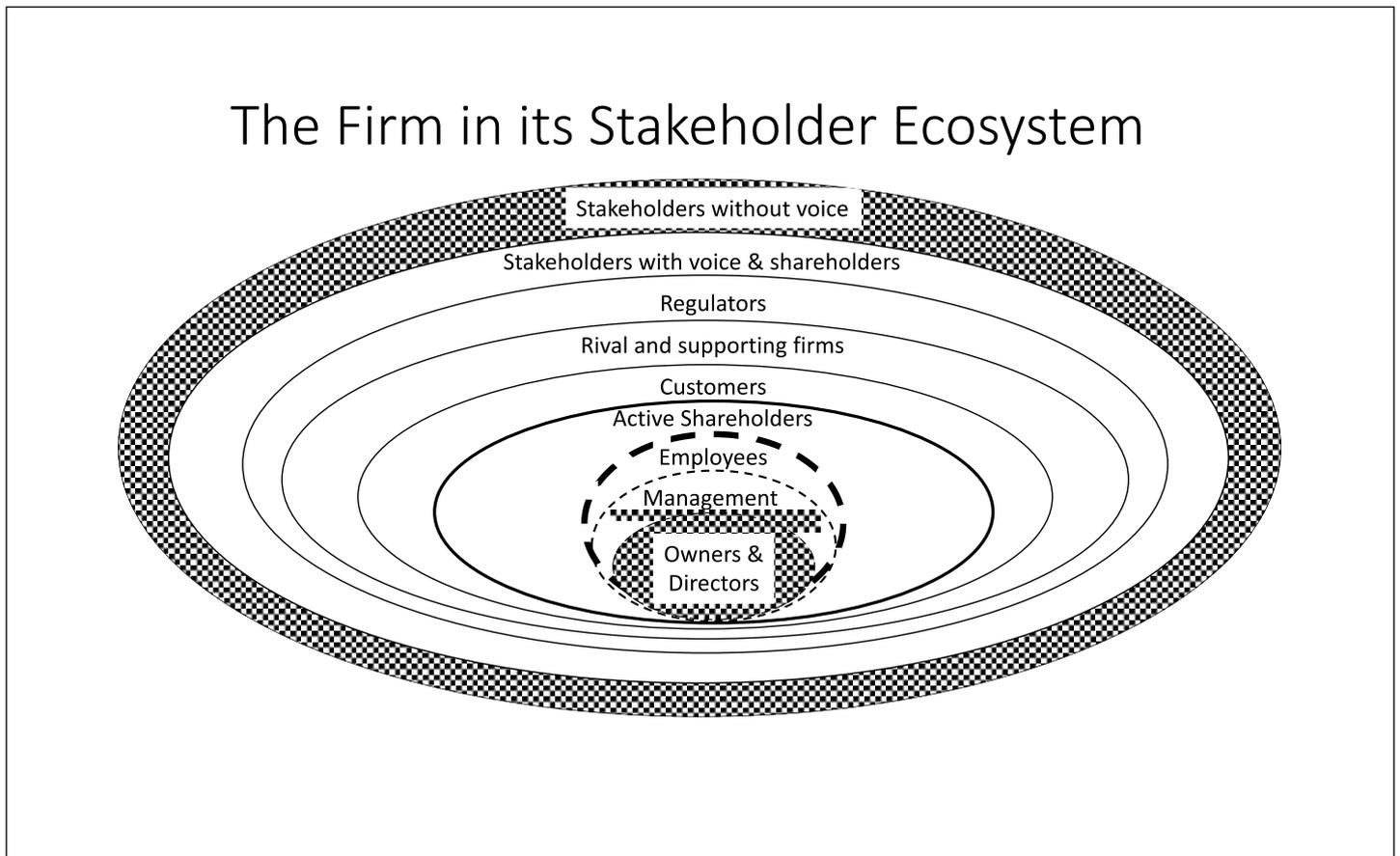
as well as the right to participate in decisions about the management and future direction of the firm. Owners establish boards of directors to ensure that all their interests are represented in firm decisions. As firms continue to grow, many go public, and thousands of shareholders become part-owners. Many of these shareholders are passive and own shares through pension funds and mutual funds. Often, they do not know in what firms they own shares.

Today, in the developed economies passive investors may own over 95% of the shares of publicly traded firms. Their existence dilutes the influence of major owners and boards of directors. With widely dispersed passive ownership, firms also become vulnerable to capture by activist investors who can gain control of a company with only a very small share of ownership of the firm. Activist investors, for example, engineered the \$130 billion merger of Dow and Dupont, refocusing both companies on short-term financial performance over long term research and development.

Additionally, as they grow in today's world, firms operate in a complex ecosystem in which management must account for the diverse, and often contradictory, interests of other actors or stakeholders. As shown in Figure 2 these actors range from "stakeholders who have no voice" to stakeholders who exert a strong influence on firm actions. The latter may be stakeholders who can take their business elsewhere or shareholders or who may invest in funds that concentrate on specific types of investments using innovation or environmental, social, governance (ESG) criteria. Numerous other internal and external stakeholders—communities, regulators, rival and supporting firms, passive shareholders, managers, and employees—seek a "voice" (influence) in firm decision. Stakeholder theory, described most prominently by [Edward Freeman](#), focuses on stakeholders who have a stake in a firm's decisions—customers, suppliers, investors, communities, employees, *and who can have an impact on a firm's fortunes.*

In the figure below we highlight two sets of actors whose role we interpret differently from conventional stakeholder theory: stakeholders without voice and owners and directors.

Figure 2



Stakeholders Without Voice

In a short but profound book, [Exit, Voice and Loyalty](#), A.O. Hirschman, whom we quoted at the beginning of this article, noted that when firms and governments underperform, their customers, investors or stakeholders have three options:

- Exit—to shift purchases or investments to another entity. This is typically, but not always, the choice that concerns firms (and economists). Customers and investors express their dissatisfaction by “exiting” to another firm, product, service, or

investment. As the firm witnesses this exit it adjusts its behavior to recover or stop losing them.

- Voice—to exert a “voice” to promote change from within or outside the organization. This is typically, but not always, the choice that concerns civil and social polities (and social scientists). When they are dissatisfied with its performance members of a polity seek to change its behavior from the inside (employees or dissident managers) or outside (community or environmental organizations) through political or social action.
- Loyalty—for a variety of reasons (fear, belief that the organization will “come around,” inertia) the cost of leaving the organization outweighs the benefits of exit or voice, so individuals remain loyal to the organization even when they are dissatisfied with it. While loyalty can be positive, giving organizations time to adapt or “slack” without alienating its stakeholders, it also explains the absence of resistance to repressive regimes and firms.

Change will come through exit *and* voice (and be threatened by loyalty to old ways). Firms today are subject to the “voice” of internal and external stakeholders (customers, investors, employees, neighbors, society, the natural environment) that drive changes in policies and governance as well as the “exit” of disillusioned customers and investors.

An important category of stakeholders is ignored in the calculus of firms addressing the voice of stakeholders. What we term “stakeholders without voice,” are future generations, indigenous, marginalized, and other communities who do not participate fully in a market economy as well as the natural world and non-human species. They are vulnerable to the consequences of market failures, environmental degradation and social inequality resulting from firm actions, but they have no direct voice in firm decisions.¹⁷ Firm executives can, and

¹⁷ Of course, some non-profit organizations have the mission to represent the interests of stakeholders without voice, but this influence is only indirect and filtered by through the interests of the non-profit organization.

often do, ignore the interests of “stakeholders without voice” with impunity because they cannot directly affect the firm’s fortunes. To account for their interests, firm executives need explicit authorization from owners or boards. In this sense, Milton Friedman was right in “[The Social Responsibility of Business Is to Increase Its Profits.](#)” Only firm owners or their representatives on boards can make the decision to sacrifice profit for social responsibility. Without such authorization, managers exceed their authority if they put the interests of stakeholders without voice ahead of profits.

Most businesspeople would say, correctly, that it is the role of governments, charitable organizations, and non-governmental organizations to advocate for the interests of these “stakeholders without voice.” Nonetheless, young people, marginalized communities, and the Global South are growing more assertive about inequality and climate change, binding together, and finding their voices. Many of these groups have concluded that a capitalist system does not serve their interests, thus giving rise to anti-capitalist movements. A recent Harvard Business School publication, [Capitalism at Risk](#), argues that unless capitalism addresses their and other stakeholders’ needs, capitalism itself as a system to incentivize and reward human effort will be imperiled. Though it is profitable in the short term for individual firms to ignore “stakeholders without voice,” in the longer term, it will be catastrophic for the legitimacy of capitalism on which all firms depend.

The Roles of Owners and Directors

Most works on innovation and sustainability see them as management issues. We disagree. Innovation and sustainability are governance issues that have to do with the purpose of a corporation, determined by the firm’s owners or the board acting on behalf of the owners. Jordi Canals argues in [Boards of Directors in Disruptive Times](#), that boards define the firm’s purpose, largely by selecting a senior management team that is aligned with that purpose. Management’s role is to execute the mandates of the owners and directors as their agents,

not as principals. In 2019 the CEO's of over 150 major US corporations signed the US Business Roundtable's ["Statement on the Purpose of the Corporation."](#) The statement expressed a "fundamental commitment to all our stakeholders," mentioning specifically customers, employees, suppliers, communities, and to "generating long-term value for shareholders, who provide the capital that allows companies to invest, grow and innovate."

It would have been more effective, and more credible, had it been signed by the board chairs of the corporations with a commitment to hold management accountable to meet the goals set out in the statement.

The role of owners and boards is frequently more important in Mexico and Latin America because families are key shareholders in many Latin American companies. The dominance of families in corporate governance and management has been seen as a disadvantage because it has led to weak boards and management insularity, particularly among small and mid-sized firms. But the role of family ownership is also an important opportunity. As Canals points out, family shareholders tend to take a more active role in the governance of the firms they own and to have a longer-term time horizon. In our experience, an intangible factor, the association of the family's brand with the firm's brand is a strong motivating factor for family owners.

Firms in Mexico and Latin America can bypass the short-term value maximization model prevalent in the Anglo-Saxon countries. Canal's book is based on clinical case studies of eleven companies with effective, forward-looking boards. Eight of these companies have strong family and/or foundation ownership. Similarly, three of the five top "global sustainability leaders" in [Globescan's 2023 survey](#) of "sustainability experts" are privately held or closely controlled companies. This ownership structure provides a stronger long-term

vision and less vulnerability to (and concern about) takeovers by short-term focused activist investors.¹⁸

In making decisions concerning the purpose of firms, owners and boards will need to balance three competing objectives as shown in Figure 3. Whether to focus on:

1. The short term or the long term? Whether to concentrate on short-term returns or to make investments in R&D that will enable the firm to compete for future opportunities.
2. The interests of shareholders or those of a broader set of societal stakeholders? Whether to address social issues such as climate change, deforestation, and inequality as opportunities or to focus solely on market issues that concern existing customers.
3. Long-term investment in future market or socially-beneficial opportunities? Whether to find new ways to anticipate and address society's future social and environmental needs or to focus on existing market needs.

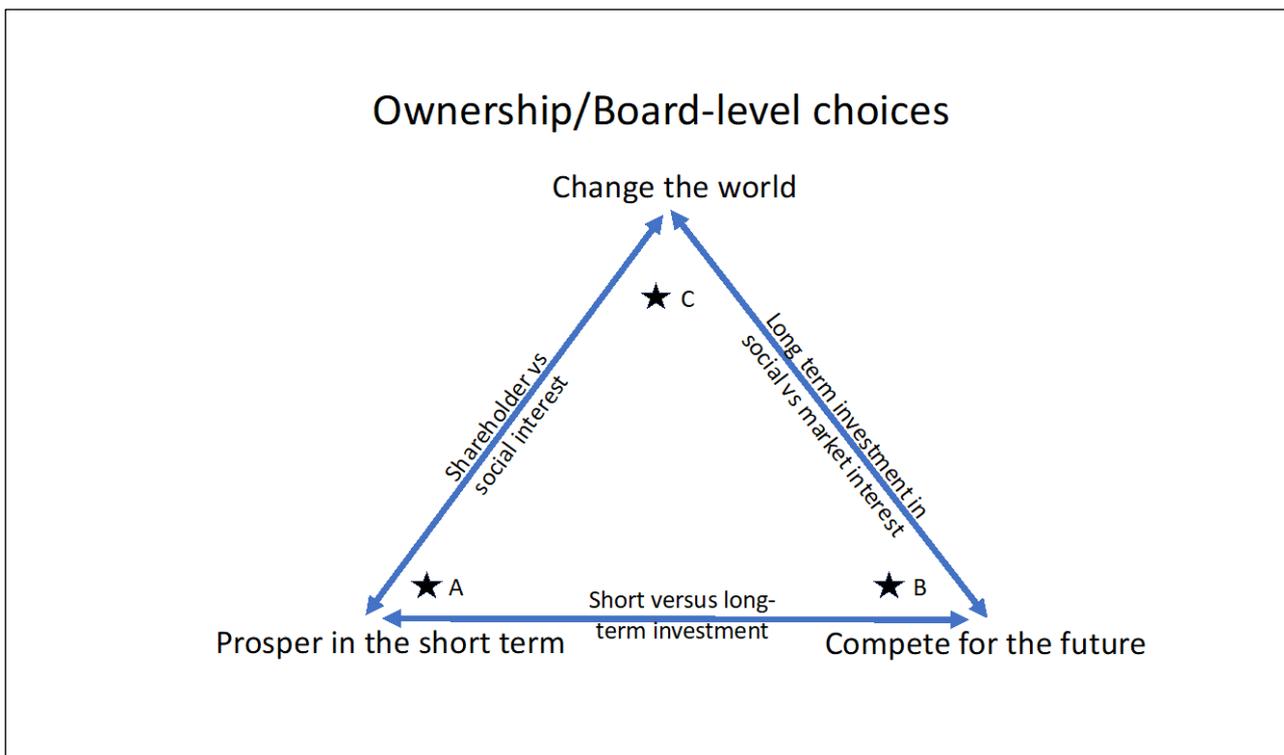
Some boards may focus on the short term with little regard for sustainability (point A); others may focus on long-term growth without regard to sustainability (point B); others may see sustainability as a route to future growth (point C).

Proponents of sustainability suggest that it is possible to find “win-win” solutions if we look hard enough and apply the right tools. In this view, finding solutions is a technical, management problem. Sometimes this is true, but often it is not. These are not easy choices, which is why they must be made by owners and/or boards. These choices involve

¹⁸ Proponents of a more aggressive form of capitalism would argue that in insulating firms from the “discipline of the market,” family- and foundation-owned firms tend to be less efficient and often protect projects, including, in our experience, innovation projects, that should be abandoned. The challenge for Mexican companies will be to maintain the discipline of the market while maintaining a long-term orientation.

the fundamental purpose of the corporation, why it exists. Once they have made their choices, owners and boards must hire management committed to the defined purpose; they must ensure its implementation and protect management from activist investors seeking to change the purpose of the corporation.

Figure 3



Characteristics of Successful Firms

In the past two decades we have worked with hundreds of small and mid-sized firms and entrepreneurial businesses in Mexico and Latin America on projects with the Inter-American Development Bank, the World Bank, USAID as well as with business associations in Mexico, Central America, and Peru. We have also worked with numerous large, publicly- and family-owned businesses in the United States, Mexico, and Peru. Our work has been a learning process. Our initial, narrow focus on measurement, pollution prevention, and circularity, has evolved to encompass management systems, collaboration among businesses, the use of

scenarios to foster creative thinking, and leadership training. We have failed frequently, and cannot claim to have all the answers, but we have learned and improved.

Below, we distill the characteristics of successful, innovative, sustainability-driven firms; the absence of these characteristics has often been a predictor of failure.

1. *Purpose-driven leadership.* There has been a clear and pervasive sense of corporate “purpose” or its equivalent (the use of the term “purpose” is relatively recent). In the best cases the firm’s purpose stemmed from the commitment of the firm’s owners or board. It has gone beyond a pro-forma environmental policy or statement to become a constant and abiding presence across all the firm’s activities. This finding is consistent with what Canals argues. Where firms were successful, the most senior level of the organization, preferably the board, imbued a sense of purpose and a message that went beyond their direct reports, and diffused through the whole organization. This has applied both at the plant level and at the corporate level.

This sense of purpose-driven leadership has been much rarer among publicly listed companies. Among publicly listed companies, leadership has come from a highly committed owners and boards (for example at Natura, Danone, or Interface) or CEO (classically, Paul Polman when he was CEO of Unilever) or from a charismatic Chief Sustainability Officer (Paul Tebo at Dupont) or in its heyday, from several Environmental Vice Presidents at Xerox. This leadership is more fragile and transient when it is not consistently backed by the owners or board.

2. *“Bottom up” teamwork that values the opinion of all levels of the staff.* When we conducted multi-firm projects, we could predict which companies would be successful from the attitude of senior managers. Firms whose senior managers told us in the initial briefing, “do not bother working with line staff; they are uneducated and don’t understand the business,” were likely to fail. Those whose senior managers actively

encouraged us to work with line staff because, “they know a lot” and “their opinions matter,” were likely to succeed. In the best cases, teams developed creative solutions to complex problems that senior management respected and implemented. The teams took pride in their work and were committed to the process. Teams often cut across organizational boundaries and were linked by a sense of common purpose.¹⁹

3. *Experimentation and willingness to learn from failure.* There has been a willingness to experiment and try different things. The focus has *not* been on continuous improvement, but rather on *discontinuous* improvement. New ideas have been valued; innovation has been seen as hypotheses to be tested; innovative projects have been systematically reviewed, changed drastically, adjusted, and scaled only after they have been tested; failure has been valued as an opportunity to learn, not a fault to penalize.
4. *A systematic and frequent process to review performance, to test new approaches, and adapt to new developments and to new learnings.* Measuring sustainability performance is one of the most difficult challenges we have encountered. At the project level, we developed a process we called, “root cause analysis in reverse.”²⁰ As an innovative project was in development, teams conducted a “root cause analysis” to anticipate what might “go wrong” and conducted a “root cause analysis” to determine what needed to “go right” for the project to succeed. They then tested their approach by focusing the factors identified in the “root cause analysis in reverse.” Management accountability has been complex to establish because sustainability performance is inherently more difficult to measure than financial performance. Too often, easy-to-measure financial performance indicators (or easy-to-

¹⁹ Gary Hamel makes a very similar point in his recent (excellent) book, [Humanocracy](#).

²⁰ Normally, a root cause analysis is conducted *after* a failure; we conducted it before a failure to anticipate what might go wrong.

measure aspects of sustainability performance) outweigh difficult-to-measure aspects of sustainability performance. In the early stages of the computer era the sociologist, William Bruce Cameron, argued against a tendency to excessive quantification: “not everything that counts can be counted and not everything that can be counted counts.” This statement applies to sustainability as well, and it applies all the more so in the era of artificial intelligence.²¹

5. *In the best cases there has been a regional or business group that has supported like-minded companies. We discuss this topic below.*

Clusters, Business Associations, Regional Partnerships, Collective Action

Adam Smith’s benign view of an “invisible hand” that guides the sum of individual actions to the common good does not always apply. Scholars and game theoreticians have demonstrated that society is not necessarily better off when firms or individuals compete on their short-term interests.²² Firm rivalry and competition are necessary for healthy regional business ecosystems, but so are collaboration and trust that rivals are playing by the rules. These relationships can be fostered in subnational units—communities, cities, states, and regions solving local issues.

Two very different books, published in 1991 and 1990, Michael Porter’s [*The Competitive Advantage of Nations*](#) and Elinor Ostrom’s [*Governing the Commons*](#), provide the conceptual underpinnings for looking at innovation, regional development, and sustainability at the subnational level. Mexico can draw on its own important experience with regional clusters as well as international experience to develop a new generation of clusters that foster regional

²¹ The quote is often attributed to Einstein, but [actually comes](#) from a 1963 article by William Bruce Cameron.

²² See for example Elinor Ostrom’s *Governing the Commons* cited below.

diversity of opportunity, business competitiveness, and social and environmental sustainability.

Regional Business Clusters

In [*The Competitive Advantage of Nations*](#) Michael Porter argued that national and regional competitive advantage stems from regional “clusters” of business activities. Porter suggested that regional clusters are based on geographically concentrated “determinants of competitiveness”—“factor conditions” (talent and specialized resources); “demand conditions” (market demand for the products and/or services the cluster produces, well-developed local markets that provide a testing ground for new product and service concepts); “related and supporting industries” (complementary businesses that create demand for and supply of specialized talent and resources, investors and consultants with specialized skills); and “firm structure and rivalry” (competitive conditions that foster efficiency, innovation and new business creation).²³

These determinants interact to create conditions for new and existing businesses to develop. Significantly, “rivalry” is an important component of Porter’s framework. Firms improve and innovate by competing as well as by collaborating. Arrangements that reduce rivalry and make doing business “easier” are not necessarily helpful. They weaken the entrepreneurial drive that is necessary for firms to innovate. Since Porter wrote, the importance of his conceptual framework has become evident as clusters have become focal points for growth worldwide. Frequently, clusters have grown around academic institutions, which play a key role in

²³ Since Porter wrote, virtual connectivity and remote work have transformed the nature of “clusters.” “Virtual” rather than geographic clusters have become more prevalent, but they have not supplanted geographic clusters.

innovation, developing and attracting talents. The presence of venture capitalists and banks has also been critical to the development of clusters.

Clusters provide additional benefits beyond those that Porter identified. Experience has shown that entrepreneurs benefit from associations with their peers. They develop networks with other entrepreneurs, receive peer support and advice as they face new issues and challenges, and are introduced to sources of financing. Additionally, there exists what might be called the “Silicon Valley café effect”—two entrepreneurs meet at their daughters’ soccer match. They agree to meet for a coffee. As they meet, they identify a new business opportunity combining their talents, and form a third business to pursue their shared opportunity. We have witnessed this phenomenon in classes in Mexican business schools, as well as at entrepreneurship workshops for low-income entrepreneurs in which entrepreneurs have worked together to identify business opportunities and discover mutual interests in developing a new business. Regional clusters can also facilitate bottom-up regional governance that accounts for local needs and capabilities.

Clusters for Regional Collaboration

Elinor Ostrom won the 2009 Nobel prize in economics for her work on “polycentric governance” to protect what she called “common pool resources” (resources such as environmental amenities that are available to all but can be diminished by overuse or misuse). In her 1990 book [*Governing the Commons: The Evolution of Institutions of Collective Action*](#), she and her colleagues studied cases in which communities of users of “common pool resources” have evolved mechanisms to protect these resources through trust building

measures, collaborative action, and effective mutually-agreed monitoring of performance.²⁴ Specifically, she addressed cases where voluntary associations of resource users prevented a “tragedy of the commons.”²⁵

Recent [advances in ecological thinking](#) parallel Ostrom’s findings. Far from existing in “survival of the fittest” competition, members of different species in ecosystems actively, and reciprocally communicate and collaborate to ensure their mutual survival. Today the tragedy of the commons applies to key topics in sustainability present in local and global “commons” related to the UN Sustainable Development Goals—climate change, biodiversity loss, the loss of social cohesion and inequality, as well as societal trust in business are all “common pool resources.” Ostrom’s and her colleagues’ work provides insights into how regional clusters can build trust through collective action while they address local and global sustainability issues. She distills her findings into eight principles that have characterized instances of effective collaboration. For simplicity we classify these principles in five categories:

- I. Clearly defined boundaries and topics covered by the agreement, which is adapted to local needs and conditions,
- II. Collective “bottom-up” decision making in which all parties have a say. (This is consistent with our findings from working with and across companies where we have found that giving “voice” to those affected by decisions provided important insights and increased the likelihood that they would abide by group decisions).

²⁴ Common pool resources” in economist terms are resources like aquifers, forests, public lands, the earth’s atmosphere, or environmental quality that can be diminished by use (or overuse) but to which it is difficult to restrict access.

²⁵ The “tragedy of the commons” was classically described by Garrett Hardin in a 1968 article in Science magazine in which individual herdsmen motivated by their private interest destroy a common pasture on which they all depend. It is closely related to the concept of a “Nash equilibrium.” Hardin saw it as an argument of private ownership of the pasture, which would give the herders a stake in preserving the pasture. Ostrom, instead, drew lessons from instances of successful voluntary, collaborative management of the commons by its users. Both were skeptical of top-down central government action.

- III. Agreed upon performance measures and independent monitoring to build trust among participants that all parties live up to their commitments.
- IV. Inexpensive and accessible conflict resolution mechanisms as well as graduated sanctions for partners who repeatedly do not comply with their commitments,
- V. Recognition by higher level units (state or national) of the legitimacy of the agreements and commitments entered to by the participants.

Firms in a Porter cluster are supplemented by supporting entities—academic institutions, local governments, business organizations—as well as external supporters that often take a role—multilateral financing and development institutions, local governments, and community organizations. The innermost oval represents five individual firms operating in a cluster that benefits from the specialized factor conditions illustrated in Figure 3. The cluster also includes related and supporting firms (in this case, financial institutions including venture capital and specialized consultants). The next three ovals represent the stakeholders discussed in the previous section. Lastly, the outermost oval represents Elinor Ostrom’s collective action institutions that set and, when necessary, enforce the rules of the game necessary for all participants to benefit.

The Central Role of Clusters

If Mexico is to attain sustainable long-term growth, it will be important to create regional clusters that leverage local factor conditions and capabilities following the Monterrey, Guadalajara, and Bajío models in the poorer regions of Mexico. But it will also be important to build collective action mechanisms like those described by Ostrom to establish trust and collaboration. Specific efforts will be required to extend the benefits of business clusters to regions that have been excluded. Regional business associations, universities, and state governments can take a lead role in creating regionally focused clusters that leverage region-specific factors and demand conditions, as well create new businesses that will compete with

and support each other. Regional sustainable development clusters can draw on lessons learned by sustainable cities initiatives worldwide as promoted by the [UN Environmental Program's \(UNEP's\) Sustainable Cities](#). These clusters will be “nested,” to use Ostrom’s term, within national and global institutions that recognize their legitimacy and provide the conditions for them to grow and prosper. We now turn to national and international institutions.

At The National and International Level: The Role of Governance Institutions²⁶

In *The Competitive Advantage of Nations* Porter writes that “government help that removes pressure on firms to improve and upgrade is counterproductive.” His reference was to government actions to undervalue national currencies to promote exports, but his comment has broader implications—national government action should focus on creating the framework conditions that build a competitive, inclusive, sustainable, and innovative economy rather than on making it “easier” for firms to succeed. Nearshoring presents an opportunity for “easy” business success.

“Three I’s”—Institutions, Infrastructure, and Innovation

We argued at the beginning of this paper that innovation is not an end in itself; it is a necessary means to create prosperous, just, and sustainable national and global economies. The high-value sustainable businesses of the future cannot rely on existing business models, products, and services. Government’s role is not to make innovation “easy;” it is to make innovation

²⁶ For simplicity, in this section we refer to “national governments,” but it is important to recognize that both within nations (for example, private accreditation and standards setting organizations) and internationally (for example, multilateral financing institutions, regional free trade area, and United Nations commissions) take on national and global governance roles.

possible and to set guardrails within which firms compete fairly. The role of government is to ensure that institutions and infrastructure that foster innovation are in place.

In the 2000's and 2010's we worked with Mexico's Ministry of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales or SEMARNAT) on two projects that examined Mexico's preparedness for the environmental challenges of the coming decades.²⁷ In both cases the "Three I's"—institutions, infrastructure, and innovation—rose to the top as the key challenges. Since then, these challenges have only become more urgent and the nation's capacity to address them has decreased.

Institutions and the Rule of Law

All businesses require a stable, predictable legal environment in which everyone's rights are respected equally, contracts are enforced, and corruption is not present. Security is important as well. The very successful owner and CEO of a highly innovative Mexican company recently commented to us, "all good innovators draw attention to themselves. That is the way we grow our businesses and prosper. We cannot hide our achievements and be successful, but without security, drawing attention to ourselves is risky."

The rule of law includes well-designed, stringent social and environmental standards that establish a level playing field for all firms. The traditional view is that regulations limit firm choices and, therefore, impose a cost on rational, profit maximizing firms is obsolete. In a 1991 Scientific American [article](#) Michael Porter posited an alternative, "Porter Hypothesis,"

²⁷ The first was conducted in 2009. In it, we examined Mexico's institutional readiness to face future environmental challenges by comparing Mexico to other nations in terms of their institutional readiness, based largely on secondary sources such as the [World Competitiveness Index](#) and the global [Environmental Performance Index](#). In the second project, conducted in 2014, we exposed SEMARNAT staff to four plausible scenarios of Mexico's future based on trends in markets, the environment, technology, and society. The scenarios were designed to describe not "the future we want" but the "future we may face." In structured settings SEMARNAT staff were randomly assigned to one of three worlds and asked to describe actions Mexico should take to address the challenges that world posed. Subsequently the groups were combined to define what steps Mexico should take independently of what future emerged.

that well designed, stringent environmental regulation can have economic benefits for the firm, fostering innovation or improving business performance. A 2011 Resources for the Future study, [*The Porter Hypothesis at 20*](#), reviews the literature and concludes that regulations can spur innovation. It found that regulations that target performance (rather than the use of specific technologies to attain that performance), and information disclosure drive innovation.²⁸ This finding is consistent with our own experience working the U.S. Toxics Release Inventory (the predecessor to Mexico's Registro de Emisiones y Transferencias de Contaminantes (RETC)). A more important (and less studied) point is that consistent, evenly enforced regulations establish a level playing field that prevents a "race to the bottom." The absence of evenly enforced regulations places responsible firms at a competitive disadvantage as their rivals can find ways to benefit economically by skirting environmental actions.

Levy and López-Calva focus on the fundamental challenges of well-meaning ideas and perverse incentives that have resulted in slow and inequitable growth in Mexico. They suggest that instead of the "creative destruction" that would eliminate less productive or obsolete businesses and promote more dynamic, productive, new businesses, Mexico has in place a process of "creative construction." We quibble with the term "creative construction" and would call it, instead, "routine stagnation," but we agree with the analysis. Levy and López-Calva present a compelling analysis of the 20-year history of the census of firms in Mexico. They conclude that the desirable business "churn," in which less productive firms are eliminated and replaced by more productive firms, is very weak or non-existent in Mexico. Even in competitive markets subject to international competition, the very strong advantages of incumbency outweigh the advantages of innovation and productivity.

²⁸ Regulations that specify the application of so-called "best available control technology" limit the incentive for firms to develop new, more effective environmental technologies.

Two factors contribute to the advantages of incumbency. 1) It is difficult to establish firms, and more importantly, to exit firms. The absence of adequate bankruptcy protections places firm founders at personal risk if the firm fails and discourages the closure of non-productive firms. 2) Access to finance is based more on “whom do you know?” than on “what is your business idea?” Anecdotally, when we worked with a group of rural, darker skinned entrepreneurs in Puebla, we recognized that they would have more difficulty obtaining financing for an agricultural startup that would recycle food waste than would the scion of a wealthy family looking for investment in a fintech.

Infrastructure

The UN Sustainable Development Goals couple infrastructure with inclusive, sustainable industrialization and innovation in Goal 9, “Industry, Innovation, and Infrastructure.” The great economist Amartya Sen, argued in his book, [*Development as Freedom*](#), that ultimately development is about freedom, the freedom of each individual to have the capability and opportunity to choose their own life plan. The absence of a strong, sustainable, built infrastructure (telecommunications, internet connectivity, buildings, transportation, water and energy supply, adequate housing in proximity to markets, employment, education, and public safety) inhibits this freedom.

Climate change adds to the challenges of resiliency and adaptation as well as to the needs for a modern built infrastructure. Renewable energy infrastructure represents a key opportunity for Mexico. It is well-endowed with renewable energy resources (solar, hydro, wind, and geothermal), and renewable energy will enable Mexico to attract environmentally aware firms to underserved regions of the country. Transportation infrastructure will need to account for alternative fuel vehicles; buildings will need to be redesigned and upgraded; water supply in the north and center of the country will become a critical issue as scarce groundwater resources are exhausted (and frequently contaminated by naturally occurring

and anthropogenic pollutants). Surface water supplies will become increasingly volatile, varying between droughts and floods in all regions. Congestion and urban pollution in Mexico's major cities are critical. Violence and the absence of economic opportunity have contributed to urban migration. Lacking adequate housing, squatters will continue to invade aquifer recharge zones in major cities. One of the solutions must be to revive sustainable rural communities through local agriculture.

In the past Mexico has been a leader, introducing innovative infrastructure solutions. In 2013 Mexico City's Metrobus and pedestrian and bicycle infrastructure won the Sustainable Transport Award.²⁹ The Metrobus also won the 2009 Harvard Kennedy School's [Environmental Award](#) as, "an outstanding public-private partnership project that enhances environmental quality through the use of novel and creative approaches." Transitioning towards more sustainable community water, building, and transportation infrastructure, however, will pose numerous challenges that will require innovative thinking and demand major investments. There is no reason why, as before, Mexico cannot be a global leader in the development and adaptation of innovative solutions to the needs of sustainable communities and infrastructure. In a project for Mexico City's Attorney General for the Environment and Land Use Planning (Procuraduría Ambiental y de Ordenamiento Territorial, PAOT) we interviewed brilliant city planners, architects, and policy thinkers in academia, non-governmental organizations, municipal organizations, and private companies. The ideas are there; what are missing are the resources and will to implement them.

Equally important is the "soft" human infrastructure based on education and relationships. The image of a "lone genius" innovator is attractive, but often innovation is a social process

²⁹ The [Sustainable Transport Award](#) is awarded annually by the Institute for Transportation Development and Policy to ". . . a city that has implemented innovative sustainable transportation projects in the preceding year. These strategies improve mobility for all residents, reduce transportation greenhouse gas emissions and air pollution, and improve safety and access for cyclists and pedestrians . . ."

that involves interactions in an ecosystem or clusters of innovation. Ideally, innovation clusters provide access to state-of-the-art research and financing, as well as to a supportive network of fellow innovators. As noted above, these clusters are emerging in some parts of Mexico, but are developing much more slowly in others.

Innovation

Specific national government actions to promote innovation are complicated and need to be designed carefully. “Picking winners” is a dangerous undertaking because the most important innovations often come from unexpected places, “winners” may turn out to be losers. The focus of national programs should instead be on creating conditions that foster sustainable innovation rather than investing in individual innovative projects.

Critically, government purchases should also be focused on creating the basis for a modern, sustainable economy. The state and federal governments are enormous purchasers of goods and services—food and agricultural products, paper products, energy, transportation, buildings, electronic components and services, design services among others—that are ripe for innovation to make them better and more sustainable. Municipal, state, and national governments purchases can promote innovative, sustainable products and services as well as provide or facilitate hubs for circular economic initiatives by incorporating the products they buy in local, regional, and national circular economies.

At a minimum, arcane contracting procedures that favor incumbents and large, well-connected companies, which are not usually innovative, can be simplified and innovative opportunities can be established for smaller, entrepreneurial companies. Government contracting procedures are, even in the best cases, complex but not unchangeable. We are not experts in contracting procedures, but we do understand them sufficiently to recognize that they can be improved to make them more innovation friendly. Governments could establish objective expert commissions to review contracting procedures to determine how

they can be adapted to promote small business innovation and participation in the government purchasing process.

Large, direct government loans or grants to innovative, sustainable business initiatives are fraught with problems and can become political targets as the Obama administration found with its \$535 million loan to Solyndra, an innovative renewable energy company that subsequently went bankrupt. Innovative companies face high risks of failure. In the case of Solyndra, dramatic declines in the cost of competing solar panel components rendered its technology economically unviable. A better model might be the staged financing process of the US National Science Foundation's Small Business Innovation Research grants. These provide modest, initial grants where conventional funding may not be available for small, innovative companies. Additional funding opportunities are available to participants who successfully complete the initial phases.

Lastly, and critically, the role of education must be rethought. In the mid 2010's we conducted a future scenarios project for Mexico's Ministry of Education in which we exposed Ministry staff to scenarios of plausible futures for Mexico and asked them to visualize the education the Ministry should provide future generations. Not surprisingly, almost all participants felt that there should be a shift to less rote learning and more individualized and group and team learning that would foster creativity and imagination, but nothing has changed. José Vasconcelos, Mexico's first minister of education characterized Mexico's education system as "arthritic dinosaur." Unfortunately, that characterization remains true today.

An educational system that is highly segregated between public and private educational institutions inhibits the close relationships among ethnicities and socio-economic levels that characterize effective educational systems.³⁰ We found a strong commitment for change

³⁰ It is relevant to note that elite universities in the United States are being challenged on the same grounds.

among Ministry staff, but also a very high level of mutual distrust between the Ministry and the teachers' unions. Working from the bottom up as well as top down will be indispensable. Like line workers, teachers understand operational problems better than their supervisors. They can contribute to developing better solutions and will take ownership of solutions they design.³¹

Strong educational institutions are at the core of innovation ecosystems worldwide. We found over thirty years ago in a project for the US National Science Foundation, that US universities (notably MIT) closely tied to business needs were most likely to foster an ecosystem of local startups. In Mexico, private and a few public universities, such as the National University (UNAM), are taking initial steps to enhance university-private sector collaboration. This model is being advanced in multiple faculties, with the chemistry faculty being the most successful. More such collaborations based on models developed in Mexico and other countries will be important.

Nevertheless, both pure and applied research are important. Universities are not and should not be considered appendages of private companies. Their most important mission is to advance human knowledge and create informed citizens of the future who are critical and committed to building a better world. There is an important role for pure, objective, research that is not driven by economic needs. This role will become more important as academics take a key role in addressing the ethical and social implications of technology. But this role must be complemented with appropriate component applied research.

³¹ When I mentioned this project in a class at the EGADE Business School, one of my students, the son of schoolteachers in Oaxaca, commented that we should not have limited the exercise to Ministry staff. He felt teachers, like his parents were strongly committed to their students, and have had a great deal to contribute. They recognized many of the inadequacies of Mexico's educational system, but the voice of teachers who had the most direct contact with the students was not heard. He was, of course, correct. Change must come from the ground up.

Promoting University-Business Collaboration

Over thirty years ago, we conducted a study for the US National Science Foundation asking why some universities in the United States were more successful in promoting startup business ecosystems than others. During an interview the then-provost of MIT said, “it is simple, we know that our entrepreneurial professors will remember us in their wills.” MIT and other universities have created university-centered business ecosystems that actively encourage their faculties to engage with industry and convert their research into businesses. Faculty are allowed time to work on their businesses and provisions are made to transfer university-funded research into business intellectual property. The assumption is that ultimately successful academic entrepreneurs will endow their universities. In Mexican universities, an attitude that “pure research” is superior to applied research is more prevalent.

III. Conclusion

In [their article](#) cited at the beginning of this paper, Santiago Levy and Luis-Felipe López Calvo divide Mexico’s economic strategies into three periods: 1) pre-1990, 2) 1990-2018, 3) 2018 to the present. This year, Mexico will enter a fourth period for a post-2024 economic strategy. It will need to create the basis for an economy that is agile and resilient in a rapidly changing global geopolitical and technological context, productive for the benefit of all Mexicans as well as just, and socially and environmentally sustainable. One thing is certain—business as usual will not suffice. Mexico did some things well in its 1990-2018 economic strategies (notably maintaining macroeconomic stability), but it got innovation wrong, and it failed to address inequality, regional disparities, and environmental degradation. In the post-2018 period it sought to redress some of the manifest inequities of the earlier periods, but it has, at times, looked backward to a history that is less relevant to today’s world (and perhaps never existed). Going forward it will need to couple the goals of a just

and sustainable society with an ability to compete and prosper in a rapidly changing global economy.

A national conversation that includes the voice of marginalized peoples and regions as well as of those who have the resources and capabilities to drive change must be at the core of Mexico's post-2023 economic strategy. This conversation must address the fundamental challenges of inequality and environmental degradation embodied in the Sustainable Development Goals. It must recognize the importance of confronting an unfamiliar situation in which no single idea or set of ideas will be demonstrably correct. Creative ideas must be put forward and tested empirically. There is no magic bullet. Some ideas will work; others will not. Failure must be seen as a learning opportunity, not penalized. Innovations in technology, business models and public policy must benefit all; not just one or another party, region, or sector. No single group has the skills, knowledge, and resources to address this challenge. But collaboration between groups can create a resilient future for all.



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