Mission: Impossible - Learning to learn, innovating instead of copying and escaping the trap - A perspective from "the rest".

Ramirez Chaparro, Maria Nathalia and Chacón Mejía, Catalina

UNU MERIT-Maastricht, Universidad Santo Tomas

January 2024

Mission: Impossible - Learning to learn, innovating instead of copying and escaping the trap - A perspective from "the rest".

María Nathalia Ramírez-Ch
Catalina Chacón Mejía

Working paper 1.

Introduction

As a starting point, it is worth taking into account that today we could say that we live in a pro-innovation era, where there is a widespread interest in innovation and how it has shaped the forms of production, but at the same time how technological changes have also transformed the ways to innovate vs. what was studied decades ago. It is becoming increasingly complex to understand how and what to do to be a successful country in terms of industry and innovation. In particular, in this eagerness to innovate, to grow economically, and the desired economic development, especially for countries that have been left behind and seem to be trapped in a vicious circle of bad decisions. In the face of this, industrial policies emerge as critical determinants. For this reason, the essay will give them particular emphasis and will review the Latin American reality that shows how, despite the vast potential, the coordination deficits, the limited diversification, and the innumerable challenges in generating ways of absorbing technology make these regions continue in a growth and learning trap.

Likewise, industrial policies today are still back in the arena and it is important to explore the selectivity they may have, among the approaches and targeted favoring in their interventions, this from the lens of data and past experiences -continuing in the Latin American region-. To this end, particular productivity data was reviewed, which shows the imperative of effective industrial policies in the region. Turning to a macroeconomic perspective, the essay takes a historical look at the industrial policies of four Latin American countries. The diversity of approaches and interventions underscores the complexity of state involvement. While none can be declared completely successful, the participation of key economic agents in policy design emerges as a critical factor for success.

On the other hand, it transitions to the exploration of capabilities. It is clear that industrial policies are important axes, but they are of no use if they are not connected with innovation policies that seek to promote capabilities to respond to the challenges imposed by the global world. Thus, it is worth considering and re-considering the concept of unsatisfactory innovation and the importance of indigenous capabilities.

The role of universities in the particular context of the global south and how, from a more inclusive innovation, these processes can be articulated to the needs of the most marginalized. Among the exploration, alternative and uncommon solutions appear, such as looking at informality, which for many is a clinging enemy in the labor market, however, it could prove to be an innovative alternative, given its nature that intrinsically makes those who live from it, more creative and think of taking insights into grassroots-level problem-solving.

Industrial policies, a special look from Latin America

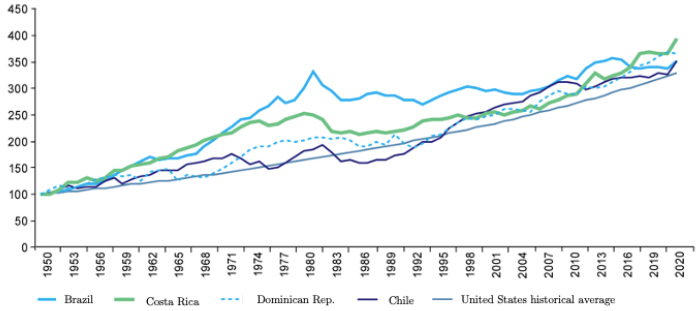
As mentioned in the introduction, a transformation at scale must have industrial policy as its main axis, so much so that it is necessary to rethink them and reflect on how they could be more successful than they have been in the past. In particular, I will emphasize on Latin America and how these policies are so lacking in the region, which has not achieved real progress in productivity and technological capabilities that would allow it to overcome the trap of low growth and low learning. It is well known that the region lacks coordination, diversification, and technology absorption. It is not possible that, in the face of another boom in natural resource prices, the strategic visions that would have catapulted the region in science, innovation, and technology will be overlooked (ECLAC, 2007). The past has already shown that in the face of lost opportunities, the region continues to lag behind the rest of the world in research and development advances.

As well as at the global level, in Latin America there has been a return of industrial policies, emphasizing their interventions in the functioning of the productive structure, overcoming a little the concept of sectoral policy that was previously held. Among the reasons for the return of these policies, ECLAC gives reason to the weakening of state institutions as a result of the adoption of theoretical models which, by intervening in productive policies, ended up destroying productive and technological capabilities. A controversial point of industrial policies is their selectivity or openness. From my point of view, I considered that in practice it was better to adopt selective policies, favoring particular sectors and production chains, according to the signals given by the market to modify the pattern of specialization (Pérez and Primi, 2009). However, looking at past experiences, particularly in the 1990s (Rovira and Stumpo, 2013; Rovira, Santoleri and Stumpo, 2013), when productive development policies boomed, and whose emphasis was on SMEs (small and medium-sized enterprises), policies ended up being limited to horizontal initiatives, which sought to provide public goods for all sectors and firms. However, all this was done under the assumption that firms and sectors all had the same capabilities and access to information (Rivas and Stumpo, 2011), an assumption that

is not true, and that is why horizontal policies ended up benefiting large firms, giving rise to adverse selections.

To explore the ideas further, it is crucial to examine the most recent data for the region. Although steady growth was observed in the 2010s, this did not translate into significant improvements in productivity, which is essential for closing the technological gap, and an important point to develop in this essay. The Latin American experience consistently indicates that, despite economic growth, the region is still far from reaching the technological frontier. Even during the periods 2003-2008 and 2009-2013, when relative productivity improvements were recorded compared to the United States (mainly due to underperformance in the mining sector), it is evident that there is still much to be done to capitalize on future opportunities, or even to actively pursue them.

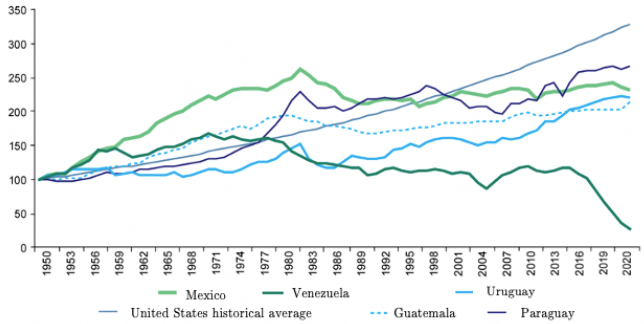
Figure 1. Labor productivity growth greater than the U.S. average productivity (1.7%).



Source: Economic Commission for Latin America and the Caribbean ECLAC and International Labour Organisation (ILO), based on official figures (2022)

Summarizing the evolution (Figure 1.) In most of the region's economies, labor productivity has experienced growth of less than 1.7%, resulting in a widening of the gap that already existed in 1950. Moreover, since the 1990s, a slowdown in labor productivity growth has been observed.

Figure 2. Average growth below the U.S. average productivity (1.7%) and with increasing divergence in the growth rate.



Source: Economic Commission for Latin America and the Caribbean ECLAC and International Labour Organisation (ILO), based on official figures (2022).

This makes it important to consider the process of structural change, which has received great attention in productivity studies (Cimoli and Porcile, 2015), whose main emphasis has been on the patterns of structural change in jobs with respect to the reallocation of labor and capital from the production of primary goods to manufacturing and then to services (Vázquez, 2018). From the literature review, and with data from the region, the approach of changes in sectoral participation appears as a way to increase productivity and reallocate resources from low productivity and quality sectors to medium and high productivity sectors, thus increasing aggregate productivity (Cimoli et al.,2017). Putting as a scenario the closure of low productive companies, to give way to new companies with higher productivity and intra-sectoral changes.

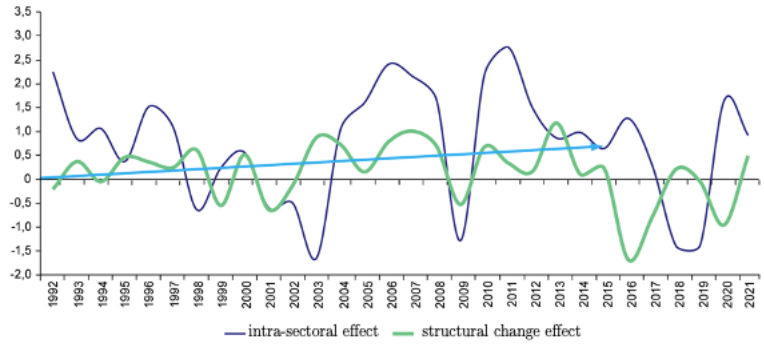
Table 1. Latin America (18 countries): labor productivity decomposition 1991-2021

	Latinamerica	*South America*	*Mexico and Central America*
Intrasectorial effect	0,83	0,52	1,21
Structura change effect	0,05	0,06	0,04
Total Effect	0,88	0,59	1,25

Source: Economic Commission for Latin America and the Caribbean (ECLAC) and International Labor Organization (ILO), based on official figures.
Note: simple average*

Back to the Latin American reality, when looking at the breakdown of labor productivity, countries show no contribution through structural change, i.e., productivity growth is only driven by intra-sectoral changes.

Figure 3. Latin America (18 countries): labor productivity decomposition 1992-2021 (percentage points)



Source: ECLAC and ILO based on official figures.
Note: ***Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela.

Although according to the ILO and ECLAC, they suggest that it is probable that the higher level reached was due to the drag of a specific sector, and not to better conditions that allowed the displacement of workers from less productive sectors to others of higher productivity. This makes sense if we look at the evolution of the structure of the employed by sector of economic activity, since the trend is constant in all periods. And the share of employed fell both in a high productivity sector such as manufacturing and in a low productivity sector such as agriculture, in contrast to the increase in the commerce and services sectors.

Table 2. Latinamerica(18 countries): structure of employed persons by sector of economic activity, simple average, 2019-2021 (in percentages)

	1991-2003	2004-2013	2014-2021
Agriculture	24,7	21,1	18,7
Mining	0,48	0,61	0,60
manufacturing industry	14,7	12,6	11,5
electricity, gas, water	0,6	0,6	0,8
construction industry	5,8	6,6	7,2
Commerce, hotels and restaurants	22,6	24,4	24,7
transport, communications and storage	5,2	6,1	6,5
financial, real estate and business services	4,1	5,7	7
General, social and personal services	21,8	22,4	23

Source: adapted based on ECLAC and ILO, based on official figures.

This may explain, in some way, the reason for the negative effects of structural change in the region, because if we look in detail, while agricultural workers migrate to sectors of higher productivity in services, industrial workers do not go to more productive sectors within the same services (Cimoli and Porcile, 2015). All this to reaffirm, that in effect the gaps vis-à-vis developed economies are explained by the slight dynamics of labor productivity in the region, which is generalized in the economic sectors, and as seen above, the contributions through structural change are almost nonexistent (Cimoli et al.,2017). Being a region whose growth is explained more by intra-sectoral changes, reason to be considered in industrial policies. In addition, being positive, it could be an opportunity for improvement if it is considered that inefficiencies in the allocation of productive factors could become an engine of growth through structural change, if from the planning it were possible to shift labor and resources from not so productive activities to those of higher productivity.

Thus, the objective of looking at productivity data was to show that the context shows signs of a *lock-in* situation (Abeles, Cimoli and Lavarello, 2017), since structural changes in sectors such as manufacturing have not been favored, and there have been no incentives for agents to direct their investments towards new sectors. And returning to the main theme of this section, industrial policies have evidently been weak, and somewhat without reason, since governments have had enough resources on account of the increase in raw materials, fiscal policies and the growth of economic activities that they did not use for industrial improvements.

With this, what is left is almost that between opportunities for lack of good policies, Latin America has had options and they have simply passed by, and have been wasted. Much has been said about future industrial policies and the need for them to be based on the accumulation of competencies in the new technological paradigms, guided by innovation. In the Latin American context, I believe it is necessary to think of them not only from the economic, but also from the social and environmental sustainability. Particularly in times as changing as now, it is even more necessary to look for competitiveness in different branches that are now developed with new technologies. Evidence (Correa and Stumpo, 2017) shows that in effect the new technologies in a certain way condition the fulfillment of any growth trajectory (Abdon et al.,2010, Feijo, Punzo and Tostes, 2021). In that sense, the ECLAC agrees with the postulates of Mazzucato (2013) that it is up to the institutions to generate the necessary incentives to direct technical change, which implies understanding industrial policies beyond the distinction between vertical and horizontal, and really tend to create policies that efficiently choose technological trajectories and growth patterns that respond to energy changes, urban transportation systems,

environmental impacts in the product cycle, among other factors of today (ECLAC, 2017, p. 74)

Now, taking into account the macroeconomic context, I considered that it was also important to review historically the general evolution of some industrial policies in four Latin American countries, seeking to answer to what extent these policies were successful or not, particularly in redefining incentives to investment or in promoting transformations in the patterns of specialization. As has been explained above, these have been the two central axes or objectives of industrial policies. And at the same time, thinking that from the experience we can reflect more and better on the importance of structural change as a force for development.

Table 3. Industrial Policy Review Argentina, Brazil, Chile and Costa Rica

Aspect	**ARGENTINA**	**BRASIL**	**CHILE**	**COSTA RICA**
Diversification of production	Call for diversification into higher productivity sectors.	Emphasis on diversification and expansion of existing clusters.	Diversification towards higher productivity and sophistication.	Recommendation for explicit industrial policy formulation and comprehensive approach.
Natural Resource Development	Initial boost from natural resources.	Exploitation of natural resources for export.	Initial expansion based on natural resources.	Transition to technologically complex goods and services.
Policies over the last 25 years	Evolution of industrial and technological policies since 1990.	Emphasis on innovation, modernisation and exports in the 1990s.	Expansion in areas and selection of selective initiatives.	Success concentrated in the external sector, lack of policies for internal development.
Emphasis on Innovation and Modernisation	Yes (in the 1990s).	Yes (in the 1990s).	Yes (in the 1990s).	Yes (with significant challenges in some sectors).
Current Challenges	Exhaustion of growth based on natural resources.	Need for diversification in the face of production limits.	Decline in growth due to depletion of resource-based sectors.	Lack of linkages and duality between export and domestic sectors.
Focus on Specific Sectors	Global service clusters.	Smart specialisation programmes, such as mining cluster development.	Smart specialisation programmes, with emphasis on global service clusters.	Success in sectors linked to FDI and exports, with challenges in other sectors.
REFERENCES	Angelelli (2011), Lavarello and Sarabia (2015), Lavarello and Goldstein (2011)	ABDI (2015), Buainain, Corder and Pachecho (2014)	Magendzo and Villena (2012), Zahler et al. (2014)	Arbache et al. (2015), Escolán and Schatan (2016)

Source: authors elaboration

As is evident, the approaches in the specific sectors have been very different and so have the interventions, however, according to the literature consulted in general terms what should matter, beyond the taxonomies of the policies (Cimoli et al., 2017), is to see the differences between countries according to the intensity and type of State intervention, understanding how and with what capacities the institutions formulate

the industrial policies, in order to make them different from other countries. At the moment none of them can be said to be completely successful, but it is recognized from experience that the more important economic agents participate in the design of initiatives to support industrial growth, the greater the chances of success.

This continues to show that there is indeed much to do and improve, because while the region's industry was - and still is - dealing with structural problems, internationally production models are changing, and the digitization of production processes is no longer a futuristic question, but a reality (Cimoli et al., 2009). The "fourth industrial revolution" is already coined in global discourses, and developed countries are already considering it in the design of their industrial policies (ECLAC, 2015; Cortés, 2017). Contrary to the region, where many sector processes have not even reached the third industrial revolution, global value chains continue to change and transform economic coordination models. Leaving once again the Latin American industry behind, which without adequate policies will remain stagnant. And whose consequences, as mentioned above, are not only economic, but are reflected in the social and environmental fields (ECLAC, 2014), even more with the eminent automation, which continues to leave the issue of equality as a utopia in the most unequal region of the world.

Innovation capabilities, alternatives from the global south

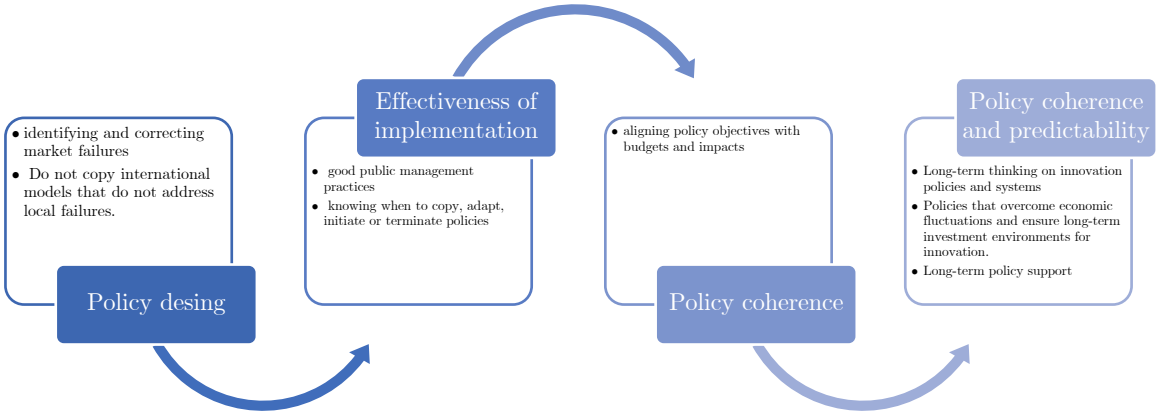
What has been said above, with particular emphasis on Latin America, is consistent with what is known as the innovation paradox (Maloney and Cusolito, 2021), Since, as we have observed, it appears that governments and companies are squandering opportunities and funds by not enhancing competitiveness, even when the potential returns from innovation are assumed to be reasonable. So much so that the usual recommendations to move towards production baskets that are more favorable for growth ignore in great detail that countries that cannot innovate in their current industries are less likely to innovate in new ones. So, as in industrial policies, the nature of innovation is not as easy to implement, copy and transform as it rhetorically sounds. And it is precisely in the Latin American context Cirera and Maloney (2021), analyzed business data to comprehend the nature of investments in innovation, reveals that, overall, companies report innovation across all sectors. However, upon closer examination, these innovations often amount to marginal improvements in processes or products; that is, they are not significant improvements, nor imitations, therefore such "innovations" do not really involve "frontier research". In doing so, the authors show that in effect the low investment in innovation in poor countries vs. the (high) returns they create under technology adoption and Schumpeterian

convergence, being far from the frontier, translate into the aforementioned innovation paradox.

Having said this, we are facing a scenario in which Schumpeter's convergence is far from being fulfilled, because although the returns to innovation are almost always positive, below certain levels of development they diminish - accompanied by the distance to the frontier - becoming negative. Hence, the importance that I consider unites public policies as an important axis in the essay, is the need to generate complementarities between them; in this case, human and physical capital are essential to reduce the distance to the frontier and achieve structural changes. Experience has shown that there is no point in investing in innovation without skilled workers, the possibility of importing the necessary machinery, or the capacity to generate new organizational forms. Without this, neither high returns on investment nor any kind of capital accumulation can be achieved. In view of this, again the dilemma and the question of what to do remains, which following the research, I believe can be improved by betting on the role of governments (State) and how and what capabilities they decide to promote and develop that contribute to innovation processes (Bleda and Del Rio, 2013; Andrews, Pritchett and Woolcock, 2015).

So, under the argumentative thread that has been followed, in order to generate capacities for innovation, it is necessary to overcome *the dilemma of innovation policies* (Cirera and Maloney,2017), since in the case of backward countries (called underdeveloped in the developmental context), the complexity in the generation of innovation policies lies in what has been seen in the essay: countries with a greater number of market failures to solve, little complementarity in and between institutions, and state weaknesses that impede efficiency in policy coordination. This last one, being a topic that is little addressed in academic debates, because in addition to generating technological capabilities, I believe that attention should be paid to governmental capabilities as a central axis of effective guarantee of innovation policies, starting from the servers and ministries (Loray, 2017). In the long run, they will end up being key to the innovation paradox, thus, following Cirera and Maloney (2021), governments need to expand their capabilities on 4 fronts (Figure 4).

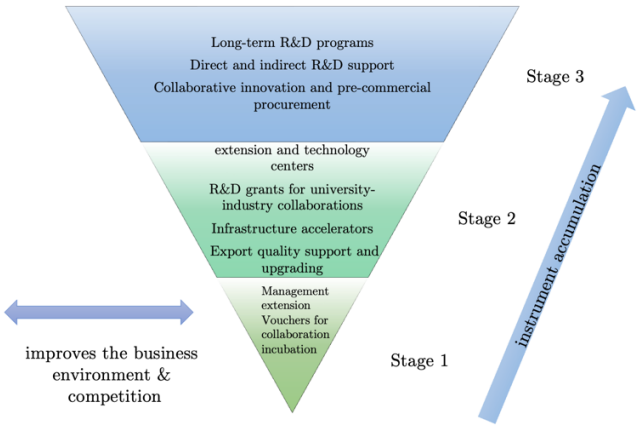
Figure 4. Areas where governments need to expand their capacities



Source: author's elaboration, based on Cirera and Maloney (2017).

Although Maloney himself recognizes that these are difficult capabilities to generate and maintain. He also shows in his book *The Innovation Paradox* (Cirera and Maloney, 2021) that countries at similar stages of development share challenges in terms of innovation and policy implementation capacity. Thus they follow three stages, even if the instruments they use are different, the path is similar, being 1, *production and management capabilities*, 2, *technological capabilities,* and 3, *invention and technology generation capabilities* (p. 180). But also, innovation activities in these countries are usually dispersed, and in small increments. For, as mentioned above, complementarities are needed and the demand for innovative local products is often very low.

Figure 5. The capability ladder: the set of policies evolves from less to more sophisticated.



Source: authors elaboration and adopted based on Maloney (2021)

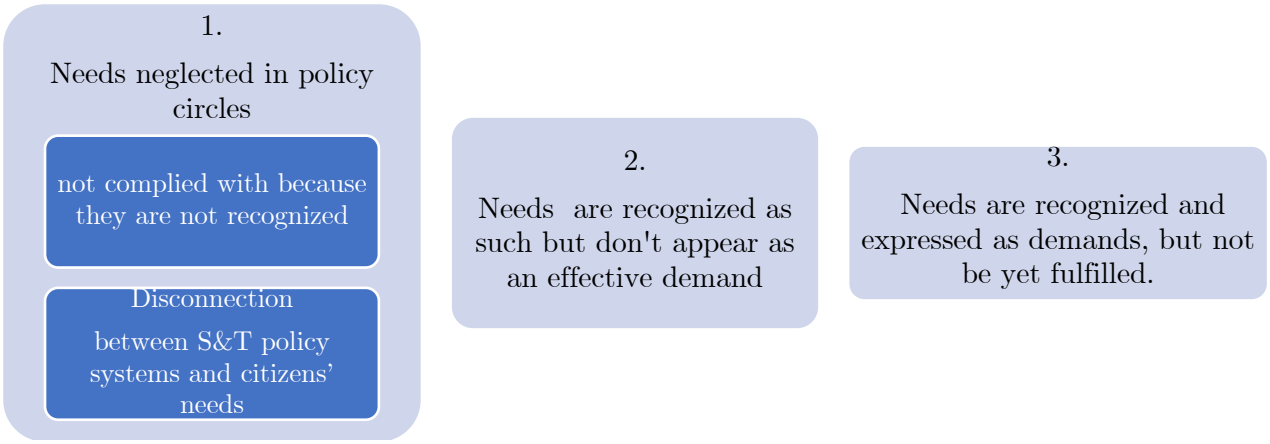
Therefore, the policies generated must guarantee easy access to technologies, or other forms that help strengthen the capacity of companies or citizens to absorb technologies from developed countries. Thus, as shown in Figure 5., the stages and

implications for policies can be seen, implying that policies as a whole are cumulative and evolve from less to more sophisticated, following the ladder of capabilities. This is precisely because innovation in developing countries faces greater challenges, and thus fostering innovation in effect implies rethinking innovation policies.

Now, trying to see from another axis how to generate capacities for innovation, education emerges as another fundamental axis to take into account, which despite being generic in some studies, I consider that it can be analyzed from the global south in a more critical way and beyond education as human capital, to emphasize the importance that universities can have towards socially marginalized people. Although, in addition to the right to education, the argument that has been used to give importance to universities has been the potential that can come out of them to generate innovative knowledge in pursuit of productivity. In this case, I want to focus on the importance they can have in contributing to innovations that transcend market structures and are conceived as assets in society, that is, I believe that universities can support innovative processes with social sense, especially in the context of "the rest" where the import of solutions has prevailed, and local capacities have been limited. To mention an example, during the covid-19 crisis, it was shown that in the universities there were advances, solutions and, faced with the limitation of not being able to bring from outside (from the global north), eyes were turned to our own, importance was given and trust was placed in what was being innovated; the technological imaginary *began to be transformed*, which shows us that it is possible to overcome the myth that "lo nuestro " is useless.

In the literature from the global south, theoretical approaches have sought to understand innovation and how it responds to market-driven demand, and not necessarily to the needs of individuals. Precisely because market demands are discriminating by income group, and given the high levels of economic inequality in the region, many suggest that the analysis is biased (Srinivas, 2014). This is explained by Arocena, Göransson and Sutz (2018) who explain that in the global south the market plays a less important role as a central ruler to induce and diffuse innovation, as social groups without purchasing power also represent an important weight in demand. Thus, as Srinivas (2014) argues, there are different ways in which needs can be expressed outside of market structures as seen in Figure 6.

Figure 6. Social demand for innovation



Source: author's elaboration based on the postulates of Arocena, Göransson, and Sutz (2018) who coined the term 'social demand for innovation'

This leads to consider another concept which is that of 'unsatisfactory innovation' proposed by Lundvall (2016), who focused his research also in the global south, and explained that since the demands in the global south vary according to the context, the application and adaptation of knowledge acquired in the north must consider the particular socioeconomic contexts where it is to be implemented. This is where *indigenous* capabilities resonate, being understood as those developed by national actors to generate R&D activities, but with a particular emphasis, and that is that they allow the production of knowledge that addresses local problems, often from interaction with external sources (Bell, 1979). However, the problem when talking about external sources in the context of the global south is that there has not been an adequate approach to imports and integration of foreign knowledge in the development of innovative products or processes that satisfy needs through the market structure. This is precisely why Lundvall considers it *unsatisfactory innovation*. As Freeman (1992) puts it in his essay *The economics of hope: essays on technical change, economic growth and the environment*, the less industrialized countries really need efforts to build indigenous capabilities, otherwise a *voluntary underdevelopment* awaits them, led by the importation of technology and prefabricated solutions - a consequence that is not far from reality.

Given this, following in the context of the global south, universities (especially public ones) come to play a very important role, in articulating the needs and demands of social groups that do not have purchasing power (Halme, Lindeman and Linna, 2012). Hence, concepts such as socially responsible universities and engaged research have become more common lately (Arocena, Göransson and Sutz, 2018), positioning the university as a way to satisfy social demands that are outside of market structures (Arocena, Göransson and Sutz, 2018).

In particular, Grobbelaar, Schiller and De Wet (2016) studied in South Africa 15 technological innovations (e.g. in human settlements, developed fast and inexpensive fire detection systems with automatic alarms) developed from universities, which demonstrated that it is possible to create opportunities that improve the social and economic welfare of the most vulnerable people. Likewise, successful cases of high renown have been the transformations in universities in Peru and Pakistan, which have demonstrated the convergence of social demands with innovation from the university classrooms. As a noteworthy fact, the experiences reviewed have in common the production of indigenous knowledge, and at the same time also the use of knowledge from the global north adapted to local demands from a university-community connection. Thus, they propose an idea of co-creation of knowledge, and from this point of view they are avoiding falling into voluntary underdevelopment, and on the contrary, solving problems that have been neglected for decades. Hence, in addition to closing these gaps, they also highlight points that are in line with what has been said, and serve as a wake-up call to be applied in other countries.

Although education models have been changing, there is still a need for greater democratization of knowledge, more science with open access, greater international mobility, and as has been repeated in the essay, more and better science, technology and innovation policies that allow the development of +knowledge (particularly autochthonous[1]). And without leaving behind, in addition to the much that needs to be done at the individual level, it is also worth thinking about integrative processes between regions of the global south, to be able to co-create/share autochthonous knowledge that overcomes geographic and linguistic barriers. However, Galdos and Haneef (2021) expose in their research, that many times these co-creations remain only in prototypes and are not commercialized, then they still do not meet in reality the social demands of the most marginalized, among the reasons that the authors mention, is precisely the typical structural limitations of the countries of the South, which have failed to adapt university systems to the rules of the market. So much so that Ferlie, Musselin and Andresani (2008) blame that this is due to the fact that universities seek interests towards flexible accumulation that only benefits groups with influential power and not the marginalized, thus, the role of the institutions in social inclusion has been forgotten and they only focus on offering access to education.

As we have seen, capabilities can be managed from government and in particular there are also new ways of looking at it from education. But, one option that is usually misunderstood, criticized and tried to eliminate is informality, a sector that

[1] Examples such as the Global Network on Learning Economy, Knowledge and Skill-Building Systems and its regional chapters in Africa, India, China, Latin America, that are currently working on capacity building for research in the global south.

abounds among those in the global south and that, from the literature review, appears as another alternative (outside the innovative heterodoxy) to learn from the creativity of the infomals and limit it to the local contexts. In particular, UNDP has implemented UNDP Accelerator Labs, which have used different quantitative and qualitative methodologies (ethnographies to RCTS), to understand the different manifestations of informality, results that have surprised researchers by the different and new findings from different sectors of informality. In what they have learned from informality, they highlight that it is innovative because it addresses the day-to-day problems of citizens, problems that derive from the lack of access or unequal access to public services/goods.

Therefore, people and communities marginalized by the state end up creating their own solutions, solutions that are generally seen as negative because they are outside the "formal" but that in this odyssey of innovation would allow them to learn from them. From UNDP, in particular, they highlight the way in which the dynamics of informality is very changing and on a small scale, from the entrepreneurs, who in their own way also create autochthonous knowledge to solve the problems resulting from being left behind by governments. In many cases, informal solutions range from enabling waste management, cooperatives to ensure community-level social protection or initiatives to overcome digital gaps, among others.

Thus, the global South, particularly Latin America, is at a turning point in its history, and its people are calling for bold changes in response to both persistent problems and new opportunities. Strategic industrial strategies combined with creative capabilities and an open approach to diversity can lead the region towards a future of higher economic growth, advanced technology and greater social welfare. In conclusion, the paper argues that the pursuit of innovation and development in Latin America requires a complementary approach. Government capabilities, educational reforms and the recognition of unconventional sources of innovation, including informality, are integral components of a novel strategy. The search for indigenous capabilities, social demand-driven innovations and redefining the role of universities in addressing societal challenges are proposed as key elements to overcome the innovation paradox and foster sustainable development in the region.

References

Abdon, A., M. Bacate, J. Felipe and U. Kumar (2010). Product complexity and economic

Abeles, M., Cimoli, M., & Lavarello, P. (2017). Manufactura y cambio estructural. *Santiago de Chile: cepal*.

Agencia Brasileira de desenvolvimento industrial - ABDI (2015). Plano Brasil Maior: innovar para competir. Competir para crescer. Balanço executivo 2011-2014. Available at http://www.brasilmaior.mdic.gov.br/

Andrews, M., Pritchett, L., & Woolcock, M. (2015). The challenge of building (real) state capability.

Angelelli P. (2011) "Características y evolución de la Agencia Nacional de Promoción Científica y Tecnológica" en Porta F. y G. Lugones (Directores) Investigación científica e innovación tecnológica en la Argentina: impacto de los fondos de la Agencia Nacional de Promoción Científica y Tecnológica en Argentina, Universidad Nacional de Quilmes.

Arocena, R., B. Göransson, and J. Sutz. 2015. "Knowledge Policies and Universities in Developing Countries: Inclusive Development and the 'Developmental University'." Technology in Society41: 10–20. doi:10.1016/j.techsoc.2014.10.004.

Bleda, M., & Del Rio, P. (2013). The market failure and the systemic failure rationales in technological innovation systems. *Research policy*, *42*(5), 1039-1052.

Buainain, A. M.; S. Corder y C.A. Pacheco (2014). Brasil: experiencias de transformación

Cimoli, M., & Porcile, G. (2015). Productividad y cambio estructural: el estructuralismo y su diálogo con otras corrientes heterodoxas. *Neoestructuralismo y corrientes heterodoxas en América Latina y el Caribe a inicios del siglo XXI. Santiago: CEPAL, 2015. LC/G. 2633-P/Rev. 1. p. 225-242*.

Cimoli, M., Castillo, M., Porcile, G., & Stumpo, G. (2017). Políticas industriales y tecnológicas en América Latina.

Cimoli, M., Correa, N., Porcile, G., Primi, A., Stumpo, G., Rovira, S., Vergara, S. (2009). "Crisis económica, tecnología y producción. ¿Otra odisea para América Latina?", La especialización exportadora y sus efectos sobre la generación de empleos. Evidencia para Argentina y Brasil, documentos de proyectos, N° 264 (LC/W.264),Santiago de Chile, Comisión Económica para América Latina y el Caribe (CEPAL).

Cirera, X., & Maloney, W. F. (2017). Supporting Innovation: Agencies and Government Capability.

Cirera, X., & Maloney, W. F. (2017). The nature of innovation in developing countries.

Cirera, X., & Maloney, W. F. (2021). *La paradoja de la innovación* (No. 018919). Universidad de los Andes â€"Facultad de Economía â€"CEDE.

Correa, F., & Stumpo, G. (2017). II. Brechas de productividad y cambio estructural. *Políticas industriales*, 35.

Cortés, C. B. Y., Landeta, J. M. I., Chacón, J. G. B., Pereyra, F. A., & Osorio, M. L. (2017). El entorno de la industria 4.0: implicaciones y perspectivas futuras. *Conciencia tecnológica*, (54). *de Chile: Division of Porductivity and Management, ECLAC, October.* de la institucionalidad publica de apoyo a la innovación y el desarrollo tecnológico,en RIVAS, Gonzalo y S. Rovira (eds.), Nuevas institución para la innovación: prácticas y experiencias en América Latina, Documento de Proyecto CEPAL, Naciones Unidas, Santiago de Chile, LC/W.601. development, Working Paper No. 616. Levy Economics Institute of Bard College.

ECLAC (2007) *"Progreso Técnico y Cambio Estructural en América Latina", Santiago*

ECLAC (2014). Pactos para la Igualdad. Hacia un futuro sostenible. Trigésimo quinto período de

ECLAC,. (2022). Coyuntura Laboral en América Latina y el Caribe: Dinámica de la productividad laboral en América Latina.

ECLAC(2015). Panorama de la Inserción Internacional de América Latina y el Caribe, Comisión Económica para América Latina y el Caribe.

Feijo, C., Punzo, L. F., & Tostes, M. (2021). Las trayectorias de crecimiento de la Argentina, el Brasil, Chile y México: una visión comparativa a través de la lente del espacio marco (framework space). *Revista CEPAL*.

Freeman, C. (1992). The economics of hope: essays on technical change, economic growth, and the environment.

Lavarello P, Sarabia, M. (2015)"La política industrial en Argentina durante los 2000" Documento de Proyecto, CEPAL, Buenos Aires. En prensa.

Lavarello, P. J , E. Goldstein (2011), "Dinámicas heterogéneas en la industria de maquinaria agrícola argentina", Problemas del desarrollo, 42(166), 85-109.

Loray, R. (2017). Políticas públicas en ciencia, tecnología e innovación. Tendencias regionales y espacios de convergencia. *Revista de Estudios Sociales*, (62), 68-80.

Maloney, W. F., & Cusolito, A. P. (2021). *Productividad revisada: Cambio de paradigmas de análisis y políticas públicas*. Universidad de los Andes.

Mazzucato, M. (2013) The Entrepreneurial State: Debunking Public Vs Private Sector Myths. London: Anthem.

Peres, W. y Primi, A. (2009), "Theory and practice of Industrial Policy. Evidence from

Rivas, D., & Stumpo, G. (2011). Las TIC en el tejido productivo de América Latina. *En: El desafío de las TIC en Argentina: crear capacidades para la generación de empleo. Santiago: CEPAL, 2011. p. 43-77.. LC/R. 2178*.

Rovira, S., Santoleri, P., & Stumpo, G. (2013). Incorporación de TIC en el sector productivo: uso y desuso de las políticas públicas para favorecer su difusión. *Entre mitos y realidades. TIC, políticas públicas y desarrollo productivo en América Latina. Santiago: CEPAL, 2013. LC/L. 3600 p. 17-54*.

Rovira, S.,& Stumpo, G. (2013). Entre mitos y realidades. TIC, políticas públicas y desarrollo productivo en América Latina. sesiones de la CEPAL. Comisión Económica para América Latina y el Caribe.

the Latin American Experience", ECLAC, Santiago Chile, LC/L.3013-P.

Vázquez, R. (2018). Cambio estructural y productividad laboral en la industria. Un análisis global. *El trimestre económico*, *85*(338), 277-310.