COVID-19 Policy Environment and the Importance of Health Economy in Latin America

Report for FIFARMA

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Executive Summary

Latin America was among the regions hit hardest by the COVID-19 pandemic in terms of health and the economy. As every disruption has potential for societal progress, this report provides insights into the status of the Health Economies and on health sector reforms in selected Latin American (LatAm) countries. These exemplary cases can serve as an evidence base to support and guide policy work on further enhancing resilience in the transition to the post-COVID era. The report strengthens the view of health as an investment rather than a cost for society, which pays off in the future and offers a considerable return on investment for society as a whole.

The outset situation in the LatAm region before the pandemic was marked by inefficiencies in health systems and low public health expenditures. Public health expenditures in LatAm lagged behind the 6 %-target set by the PAHO, and were lower than expenditures by European countries and the OECD. Latin American health systems were differently equipped for the pandemic in terms of doctors, nurses, hospitals, and ICU beds in relation to inhabitants. Also, the pharmaceutical industry in LatAm was underdeveloped. It accounted for less than 5 % of the global market, and value added was about 5 %. Furthermore, only 1 % of R&D firms in the pharma sector were located in the LatAm region.

The economic impact of the pandemic underlines the heterogeneity in how countries were affected. GPD changes in 2020 range from -4.1 % in Brazil to -11.0 % in Peru, and projections indicate different catch-up processes. Given that during the pandemic unemployment increased and informal work decreased throughout the region, it becomes apparent that LatAm requires policies to reduce the incidence of informality and to create job opportunities for the vulnerable in the longer run. The LatAm Health Economy struggled to cope with the pandemic crisis. The financial and the R&D situation did not enable the healthcare system to advance with vaccines and treatments for COVID-19 at a regional level without relying on external stakeholders. In comparison, a more cooperative and stronger healthcare system in the EU allowed member states and the European Commission to take regulatory actions directly intended to develop, authorize, and safely monitor treatments and vaccines to treat and prevent COVID-19.

This report highlights the need for self-sufficiency of healthcare systems to become more resilient in the future. Besides increased public spending on health, this will crucially depend on the competitive strengthening of research and the regionwide production capacities for vaccines and medicines. In the medium and long term, the region should focus on strengthening or generating technological production capacities by ensuring a large stable market, strengthening regional R&D, and facilitating local production and regional

chains. Best practices of other regions clearly indicate the advantages of efficient regional cooperation for future resilience of the LatAm countries.

While digital health technology is already successfully applied in parts of Latin America, the stark heterogeneity in terms of digital infrastructure prevents its widespread use. The digital divide between rural and urban areas in LatAm is still significant with 67 % of households in urban areas but only 23 % of households in rural areas having internet access. Therefore, the potential implementation of digital health technologies is limited by unequal access to respective devices and broadband networks, which are key for accessing the health systems of the future. Not only a broader use of digital devices is a future prerequisite, but also the availability of telecommunication networks for taking advantage of digital health solutions.

Throughout the region, the share of the Health Economy has increased between 2018 and 2020, and the indirect effects of the HE to other economic sectors are considerable for gross value added and for employment. In the countries analyzed, the HE secures 26 million jobs and creates spillover effects of USD 270 bn. The different situations LatAm countries faced throughout the pandemic are reflected by the statistics of the Health Economy Reporting (HER). Generally, health expenditures in the region vary strongly, and these differences translate into heterogeneous sizes of the national Health Economies in terms of gross value added as well as employment.

Abbreviations

ECLAC	Economic Commission for Latin America and the Caribbean
EMA	European Medicines Agency
GVA	Gross Value Added
HE	Health Economy
HER	Health Economy Reporting
ICT	Information Communication Technology
ICU	Intensive Care Unit
IISD	International Institute for Sustainable Development
LatAm	Latin America
NGO	Non-Governmental Organization
NRA	National Regulatory Agency
OECD	Organization for Economic Cooperation and Development
PAHO	Pan American Health Organization
SDG	Sustainable Development Goals
UN	United Nations
WHO	World Health Organization

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1 Background and objectives

Health care systems worldwide are heavily affected and strained by the outbreak and subsequent global spread of COVID-19. In March 2020 most countries in Latin America took measures to control the pandemic. Despite these measures, the WHO declared the region the new epicenter of the COVID-19 pandemic in May 2020 (OECD, 2020).

Due to its impact on a variety of issues, researchers see the COVID-19 pandemic leading to the "region's worst economic and social crisis in decades" (ECLAC, 2020a). Nevertheless, the crisis is also a momentum for reforms (European Commission, 2020), and governments in LatAm have allocated resources to equip the health system's budgets to meet the pandemic challenges (ECLAC, 2020b). Even before the pandemic, individual health systems faced challenges for example due to increasing migration from Venezuela (World Bank, 2019). These challenges have intensified during the COVID-19 pandemic. This situation has created an additional burden on the health care systems and impacted also regulatory and healthcare policies, especially in Colombia but also in Peru, Brazil, and Chile.

However, the COVID-19 response in the region differed, resulting in variation in the number of cases and deaths and effects on the economy of LatAm countries (Alejandro et al., 2021; Garcia et al., 2020).

This disparity is driven by differences in access to medical interventions, policy support effectiveness, and structural characteristics going into the pandemic (Atun et al., 2015; International Institute for Sustainable Development, 2021). Beyond these differing underlying conditions, a country's resilience may influence the response (WHO European Office for Investment for Health and Development, 2017).

"Resilience" is defined as "the ability of a system to absorb, adapt, and transform when challenged by external threats and stresses, while still retaining control over its remit and pursuit of its primary objectives and functions" (OECD, 2013).

The questions are, how countries have absorbed, more specifically used predetermined coping responses, how countries have adapted these responses, and lastly, how they may be applied to transform their health systems in the future.

These questions are essential in detecting effective measures and assessing what health systems might look like in a post-pandemic era. The design of such new systems is essential for various stakeholders, e.g., governments, health care providers, and citizens.

Therefore, this project aims to analyze the leading directions of health system sustainability and resilience of Argentina, Brazil, Colombia, Chile, Mexico, and Peru from a policy-based perspective. In this project, WifOR Institute will utilize the three-dimensions “absorb, adapt, and transform” as guidance for analyzing reactions to the COVID-19 pandemic and assess pointers for developing systems in the future. The report is divided into three thematic chapters. Chapter 2 discusses policy context and regulatory topics in the countries, while chapter 3 touches the different states and strategies of digital transformation. Chapter 4 presents the concept and results of Health Economy Reporting on the six countries. Chapter 5 concludes the findings of the report.

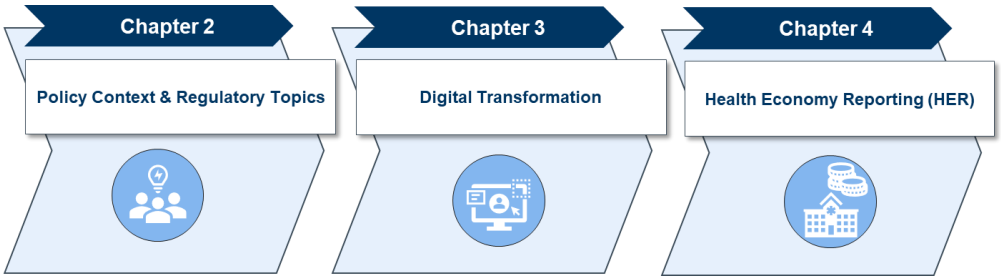

Figure 1: Agenda of this report.

WifOR Institute provides insights on the economic impact and health sector reforms in the Latin American region at the pandemic’s outset. Thereby, prime examples of health system responses to increase resilience during the pandemic as mentioned in the above three dimensions will be identified. These examples can serve as an evidence base to support and guide policy work on further enhancing resilience during the expected transition to the post-COVID era. The pandemic has highlighted the utmost life-saving importance of a scientific basis for advising and treating patients. Legal and regulatory frameworks that support the realization of clinical trials, registry-based studies, or other real-world studies to gather this scientific basis are therefore of great importance. Hence, if any ideal framework conditions in the prime examples are found that might favor collecting and analyzing such data, they will be highlighted. The analysis will furthermore identify themes that bear regional significance to improve FIFARMA’s strategy development. The project concludes with a roadmap outlining strategies for how health systems should respond to the post-COVID reality, which provides FIFARMA with strong scientific evidence and key messages to promote and support their strategies.

2 Policy context and regulatory topics

The COVID-19 pandemic had a distinctively heterogeneous impact on the countries of the LatAm region, and reactive policies, strategies and actions varied substantially. Figures on the impact of COVID-19 indicate case numbers ranging from less than 5,000 to more than 15,000 per 100,000 inhabitants, and deaths from 200 to about 600 (Table 1). These wide-ranging differences in exposure to the pandemic alone justify different political reactions.

Country	Cases per 100,000	Deaths per 100,000	Total doses per 100	People fully vaccinated per 100
Argentina	19,930	282	209	81
Brazil	13,933	309	180	74
Chile	17,749	232	258	90
Colombia	11,959	274	154	67
Mexico	4,369	249	143	61
Peru	10,738	642	195	76
France	36,005	211	228	78
Spain	23,925	214	210	86
UK	29,599	240	206	72

Table 1: Summary of COVID-19 cases (until March 21st, 2022). Source: WHO Coronavirus (COVID-19) Dashboard (2022).

This section aims to provide a comprehensive picture of the political reactions and situations in each country. Both health-related and economic impacts are presented. Focus is placed on how the COVID-19 pandemic has impacted plans for reforming health systems in LatAm. To answer this question, a country-specific overview of the respective national health systems is provided.

In addition, the analysis will also discuss regulatory topics. Within the scope of desk research, it is determined how regulatory agencies (NRAs) in the LatAm region have been managing the pandemic. It will be investigated how flexibilities that have been implemented during the pandemic support health systems and how they can be extended in the future.

2.1 The pre-pandemic period

Economic crises across the region during the last quarter of the 20th century resulted in a reduction of public spending in Latin America (Teixeira et al., 2000): Public health services tended to deteriorate; the technological gap between public and private hospital services widened; and the efficiency and effectiveness of publicly managed and provided health care declined. However, most countries of the region increased their total health expenditure as a proportion of GDP over the past 15 years before the pandemic (Kanavos et al., 2019). Although the increases in public spending aimed to strengthen the healthcare systems in the region, challenges and inefficiencies remained. According to Kanavos et al. (2019), one reason for the challenges and inefficiencies are the gaps between the public health expenditure as share of GDP and the target of 6 % set by the PAHO. Before the pandemic in 2015, these gaps ranged from 1.1 % in Chile to 2.9 % in Mexico. In comparison, European countries such as Spain (6.5 %), France (8.8 %) and the UK (8.0 %) exceeded the 6% benchmark even before the pandemic, and the OECD averaged a gap of only 0.2% (Table 2).

Country	Health expenditure (% GDP)	Public health expenditure (% health expenditure)	Non-public health expenditure* (% health expenditure)	Public health expenditure (% GDP)	Gap of public health expenditure (difference from benchmark of 6 %)
Argentina	6.8	71.4	28.6	4.9	-1.1
Brazil	8.9	42.8	57.2	3.8	-2.2
Chile	8.1	60.8	39.2	4.9	-1.1
Colombia	6.2	66.8	33.2	4.1	-1.9
Mexico	5.9	52.2	47.8	3.1	-2.9
Peru	5.3	61.7	38.3	3.3	-2.7
France	11.1	78.9	21.1	8.8	2.8
Spain	9.2	71.0	29.0	6.5	0.5
UK	9.9	80.4	19.6	8.0	2.0
OECD	8.1	71.6**	28.4**	5.8	-0.2

*Table 2: Health expenditure before the pandemic, year 2015. Source: Kanavos et al. (2019), OECD (2021). *Non-Public health expenditure corresponds to the sum of private, out-of-pocket, and external health expenditures. **For the OECD, public health expenditure correspond to government/compulsory expenditure, and non-public health expenditure to the sum of voluntary and out-of-pocket expenditures.*

When comparing the health expenditure as percentage of GDP in LatAm countries to that of selected European countries, even the LatAm country with the highest health expenditure (Brazil with 8.9 %) stood behind its European counterpart with the lowest health expenditure (Spain with 9.2 %). Furthermore, only Argentina and Colombia reported a share of public health expenditure over 65 % from the total health expenditure. Additionally, the healthcare systems in Brazil and Mexico were highly financed by non-public health expenditures (about 57 % and 48 % respectively). The high reliance on non-public sources of expenditure helps to explain the reduced health coverage for countries in which the access to health is harder for the most vulnerable people.

Latin American health systems were differently prepared for a pandemic. Most LatAm countries showed a small ratio between inhabitants and doctors, nurses, hospitals, and beds in ICU. Although there are large differences and there are more doctors than nurses, the overall LatAm average is at the most part below the average for OECD countries. In the case of Argentina and Brazil, they seemed well-prepared in terms of the number of ICU beds (Table 3).

Country	Doctors per 1,000	Nurses per 1,000	Hospital beds per 1,000	ICU per 100,000
Argentina	4.0	2.6	5.0	18.7
Brazil	1.8	1.5	2.3	20.6
Chile	2.5	2.7	2.1	7.3
Colombia	2.2	1.3	1.7	10.5
Mexico	2.4	2.9	1.4	3.3
Peru	1.3	2.4	1.6	2.9
LatAm	2.0	2.8	2.1	9.1
France	3.3	11.5	5.9	19.4
Spain	3.9	5.7	3.0	9.9
UK	2.8	8.2	2.5	5.9
OECD	3.5	8.8	4.7	12.0

Table 3: Hospital figures before the pandemic. Latest year available for each the indexes varies between 2016 and 2018. Source: OECD & The World Bank (2020).

Triggered by these inefficiencies, different countries started to reevaluate their health spending in 2018 and 2019 with the objective to reduce inefficient and wasteful spending and create more sustainable healthcare systems. According to the OECD, even in high-income countries, inefficient and wasteful spending is prevalent. Although there have been efforts to reduce

wasteful spending in LatAm, it still presents a significant problem in the region (OECD, 2020). Therefore, one step towards a modern health system is to increase health expenditure while at the same time using existing resources more efficiently.

Another topic that complicated fighting the pandemic for LatAm governments was the underdevelopment of the pharmaceutical industry (ECLAC, 2021). While the share in revenues of the global pharmaceutical market was over 45 % and over 20 % for North America and Europe respectively, LatAm accounted for less than 5 % of that share. Additionally, the value added generated in the pharma industry from LatAm was about 5 %, while the USA generated about 21 % and the EU about 36 %. Furthermore, R&D firms in the pharma sector are mostly located in the USA and the EU (about 70 % of the global share), while only 1 % are located in LatAm. This situation could have caused difficulties in terms of access to medicines and treatments that are highly demanded worldwide. Furthermore, higher presence of a pharma innovative environment would also contribute to GDP growth and employment in the countries.

Additionally, the adoption of e-health/digital technologies in the region before COVID-19 also intended to reduce inefficiencies (see Chapter 3).

2.2 The situation during COVID-19

While analyzing how the governments responded to the pandemic in LatAm, one can recognize a heterogeneity of strategies to reduce the virus spread, which can be summarized by the following measures (Gonzalez et al., 2021). Governments in LatAm adopted: multiple-stage vaccination plans, processes of economic reactivation following strict health guidelines, border restrictions and PCR test samples for travelers as well as in person school suspensions. Furthermore, LatAm governments implemented policies to address the economic slowdown, such as cash transfers for informal workers and families in need, credit and financial reliefs for small- and middle-sized companies, and public budget reassignment (Alvarez-Risco et al., 2021).

Having in mind previous epidemies as the H1N1, is important to mention that there was a less abrupt increase in demand for healthcare services during that period (Litewka & Heitman, 2020). However, the transmissibility, morbidity and mortality rates were lower than those of COVID-19, and government trust helped with the acceptance of temporary mobility measures. Additionally, just before the pandemic started LatAm countries were suffering from the seasonal spike in vector-borne diseases (dengue, chikungunya, and yellow fever), challenges with tuberculosis and non-communicable diseases:

diabetes, hypertension, chronic obstructive pulmonary disease, and cancer. This situation already put pressure on healthcare systems which then increased even further with the onset of the pandemic.

Given the situation described in the last paragraph, LatAm governments took different actions to boost the capacity of their healthcare systems to address the crisis and facilitate the access to health for all citizens (OECD, 2020). Some of the measures to achieve this goal were:

- Constructing emergency hospitals in record time (Argentina).
- Making additional intensive care unit (ICU) beds available (Colombia and Peru).
- Training health professionals to serve ICUs (Brazil and Chile).
- Developing own testing kits (Argentina) or expanding the importation of those from countries such as China (Brazil and Mexico).
- Telemedicine to face the health needs arising from the COVID-19 pandemic (Peru).
- Online trials to ensure continued justice service provision (Argentina, Mexico, Chile, and Peru).
- Telematics means that enabled family conciliation and arbitration centers to stay open (Colombia).

To summarize, the regulatory agencies in the region have managed the pandemic employing different strategies. Argentina set up measures to boost the capacity of healthcare systems, including the construction of emergency hospitals in record time. On the other hand, Colombia and Peru increased the number of ICU beds to strengthen the hospital care, while Mexico also focused some efforts on ICU beds. In the case of Brazil and Chile, these countries promoted the training of health professionals to serve ICUs.

Apart from these measures that had a positive impact on Latin American societies, misconceptions and conspiracy theories made by the heads of state of countries such as Mexico and Brazil might have had a negative effect (Litewka & Heitman, 2020). Additionally, decisions taken by state governments rather than the central government in those same countries, especially in Brazil, might have resulted in the implementation of considerably later mitigation measures (OECD, 2020) thereby significantly weakening its effect.

The various measures taken, such as the ones already referred to, demonstrated the needs for a more equitable access to health services and a better quality of health systems, capable of reacting to future sanitary crises, as well as the need to guarantee universal social protection and healthcare coverage for all (OECD, 2020). In this way, the countries of the region could consider having higher health expenditure and using it in a more efficient way and try to reduce harmful and inefficient private spending. Furthermore,

regional, and international collaboration will be essential to develop public goods such as R&D on vaccines, diagnostics and treatments, and health statistics and information.

In comparison, a more cooperative and stronger healthcare system in the EU allowed member states and the European Commission to take regulatory actions directly intended to develop, authorize, and safely monitor treatments and vaccines to treat and prevent COVID-19 (EMA, 2020). In this sense, through R&D and health investments, the EMA created a Task Force to address different activities such as: reviewing available scientific data on potential COVID-19 medicines and identifying promising candidates; requesting data from developers and engaging with them in preliminary discussions; offering scientific support to facilitate clinical trials for the most promising COVID-19 medicines, and ensuring close cooperation with stakeholders and relevant European and international organizations. In this case, one can demonstrate big differences in comparison to LatAm, since the financial and the R&D situation allowed the EU to take the lead in advancing with the vaccines and treatments for COVID-19 at a regional level without relying on external stakeholders. In contrast, these activities were not feasible in the LatAm region.

Apart from the regulatory measures taken during the pandemic, the effects of COVID-19 on the economic activity also demonstrated that LatAm requires policies to reduce the incidence of informality and to create job opportunities for the vulnerable. The unemployment rate from Q1-Q3 2020 (10.6 %) in Latin America increased by 1.9 percentage points compared to the same period in 2019 (8.7 %) (González et al., 2021). Furthermore, 23 million people stopped trying to gain employment in Q1-Q3 2020, while the labor force amounted to 57.2 % of the region's working-age population (reduction of 5.4 percentage points). In this sense, restrictions to mobility due to quarantine led to a reduction of informal workers, with the highest drops being recorded in Argentina (10.7 %) and Peru (8.1 %).

The economic impact of the pandemic also underlines the heterogeneity in how countries were affected, with GPD changes ranging from -4.1 % in Brazil to -11.0 % in Peru in 2020, with a regional average of -6.9 % (Table 4). Projections indicate still varying catch-up processes, but there is scope for a more equally distributed growth path in the post-COVID-19 period.

Country	GDP growth 2020 as % change	GDP growth 2021 as % change (estimates)	GDP growth 2022 as % change (projections)
Argentina	-9.9	7.5	2.5
Brazil	-4.1	5.2	1.5
Chile	-5.8	11.0	2.5
Colombia	-6.8	7.6	3.8
Mexico	-8.3	6.2	4.0
Peru	-11.0	10.0	4.5
LatAm	-6.9	6.8	2.4
France	-8.0	6.7	3.5
Spain	-10.8	4.9	5.8
UK	-9.4	7.2	4.7
Europe	-5.9	5.2	4.0

Table 4: Economic impact of COVID-19. Source: IMF (2022).

In comparison to other regions such as Europe (average GDP growth of -5.9 %), the economic downturn in most LatAm economies was greater (EUROSTAT, 2021a). Although some European countries experienced a significant reduction in GDP like Spain with a decline in 2020 of -10.8 % in GDP, other countries like Finland and Norway experienced smaller reductions in GDP with growth rates of -2.3 % and -0.7 % respectively. Interestingly, Ireland managed to achieve an economic growth of 5.9 %.

In spite of the fact that the economic activity in Europe decreased due to the restrictions implemented to slow down the spread of COVID-19, the Recovery plan for Europe, as the largest stimulus package ever financed in the region, has helped to mitigate the negative economic effects of the pandemic (European Commission, 2021; European Council, 2021). In general, the measures taken as part of this plan focused on the temporary support for workers, amendments to the EU budget to address urgent issues, re-direction of EU funds to help member states most in need, and support to most affected sectors. Furthermore, the majority of the € 2 trillion are being used for R&D, digital transformations, and preparedness, recovery, and resilience.

Even though a great proportion of the budget of the Recovery plan was planned for 2021 to 2027, the EU put forward three immediate safety nets in Q2 2020, worth € 540 billion, to support jobs and workers, businesses and member states (European Council, 2021). This support could explain why, while the GDP quarterly growth rates during Q1 and Q2 2020 were negative in the EU (-3.1 % and -11.2 % respectively), it experienced a rebound in Q3 (11.8 %) (EUROSTAT, 2021b). This quick recovery demonstrates that timely

measures have been essential to address the pandemic as it will be discussed in Section 2.3. Another aspect that helped Europe address the pandemic in a better way was the smaller share of labor informality compared to LatAm. While less than 20 % of the EU employment corresponds to the informal employment, the level of labor informality in LatAm comes close to 60 % (ILO, 2021; OECD, 2020).

In this sense, as the EU employment rate only slightly decreased from 73.1 % in 2019 to 72.4 % in 2020 (EUROSTAT, 2021c), the labor force in LatAm declined by 5.4 percentage points, highly affecting informal workers, as discussed before. Informal workers were greatly restricted by mobility measures to mitigate the pandemic spread and, at the same time, had less access to digital work and social assistance, which are more easily accessible for formal workers. Hence, it could be concluded that the higher the informal sector in a region, the less effective the employment measures are.

Based on the information mentioned, and the decisions taken in Europe, LatAm governments should focus their efforts on improving quality of education and formal employment through the improvement of digital skills and R&D. Likewise, the region should promote competition and reduce regulatory burdens to boost productivity and sustainable growth through private initiatives. Finally, the use of digital technologies will also be vital for increasing regional integration through enhancing infrastructure and connectivity coverage (OECD, 2020). At a local level, the use of digital technologies by governments will be beneficial to transform public institutions and enhance public transparency, accountability, and connection with citizens, by simplifying bureaucracy and widening the participation of citizens in the decision-making processes. Additionally, the process of digitalization will benefit the development of industries, such as health, through R&D, and will improve the quality of education, generating a positive effect on skilled and, therefore, formal employment.

2.3 The post COVID-19 period

To understand the effectiveness of policy measures during the pandemic, it is important to compare how the LatAm countries reacted and how these different initiatives had distinct outcomes. Argentina, Peru, and Colombia started implementing policy measures earlier (middle March 2020) than Chile, Mexico and Brazil did. From these six countries, Chile was the one that had a higher level of economic policy response since the beginning of the pandemic until August 2020. On the other hand, Mexico had not adopted any economic response during the same period, while Brazil had a lower economic policy

response level than Colombia, Peru, and Argentina (Martinez-Valle, 2021). After implementing the policies, Chile and Argentina presented the highest and most steady mobility reductions until September 2020 (averages of 70 % and 80 %, respectively), while Mexico and Brazil showed the lowest average mobility reductions. Furthermore, Peru had the highest weekly mortality rates between March and September 2020, followed by Brazil and Mexico, while Argentina and Colombia presented the lowest rates until July when the rates started to grow again.

Based on the outcomes that different policy implementations resulted in, Martínez-Valle (2021) draws several conclusions. First, timely implementation of more strict mitigation and control policy measures was effective to address the pandemic. Second, digital technologies are essential to achieve goals, such as the right information divulgation of mitigation measures by the governments to the citizen; and the use of reliable and complete information for the right policy, which enhances government trust. Third, income support to reduce mobility needs and strong social protection systems increase the compliance of people with closure and social distance policies. Fourth, high levels of policy stringency, income support, and effective surveillance through testing policy and contact tracing contribute significantly to mitigating the pandemic.

Policy recommendations from International Organizations

At the beginning of the pandemic, the United Nations (2020) suggested that the policy response to COVID-19 should focus on the following points for a sustainable development: equality and universal social protection; creation of decent jobs based on local technological capacities; protection of the nature; and democracy, conflict preservation, transparency, participation, and access by civil society. Thus, to address the consequences of COVID-19, the United Nations gave various recommendations that seem to be aligned with the policies taken by the LatAm countries. In the short term, it is essential to provide basic emergency incomes for people living in poverty and full access to economic and humanitarian assistance for all in need. Additionally, measures to preserve productive capabilities should be adopted, such as: financial support for businesses; policies for the equal access to digital technologies; investment in R&D, and green investment. Finally, international multilateral response across middle-income countries in LatAm is fundamental to address the rise of external public debt.

Apart from the short-term recommendations that have been addressed through different local and regional measures, the United Nations mentioned that the development of a comprehensive welfare system based on social protection and universal access to health care and education is key for a sustainable development. Furthermore, countries should think about the

promotion of sustainable industrial and technological policies (including building capabilities in health and in digital and green technologies and relocating informal workers) to fulfill the SDGs. Another aspect for sustainability is the stimulation of regional economic integration to support productive diversification, economic resilience, and regional cooperation to finance research, science, and technology. This last aspect would be achieved through a democratic governance that allows effective public policies, through accountability, transparency, and inclusivity (United Nations, 2020).

Having in mind the importance of regional cooperation to facilitate the economic recovery and to overcome the pandemic, WHO Director Cooke (2019) defines reliance as "the act whereby a regulatory authority in one jurisdiction may take into account/give significant weight to work performed by another regulator or other trusted institution in reaching its own decision." In this sense, reliance would be associated with cooperation across countries and the lessons adopted by states from other states' experiences.

Although, the current literature has not yet explicitly addressed how reliance measures have been implemented during COVID-19, various topics were outlined relating to regional experiences that are fundamental for the policy formulation and implementation in the health sector (ECLAC, 2021a). One of these aspects is the role of science and technology policies and boards to strengthen scientific research and innovations in the health sector, such as multilateral agreements signed in Mexico in 2021. A second topic is the need of competition policies that would be beneficial for consumers and the system by reducing the asymmetries of power among market agents, given the oligopolistic or monopolistic structure of the health markets, such as the CONPES Social 155 report of 2012 implemented in Colombia (Consejo Nacional de Política Económica y Social, 2012). Mexico's Health Sector Program 2020-2024, which sought to strengthen the national pharmaceutical industry and promote research, is a measure related to a third topic: the interdependence of pharmaceutical policies and health plans. One final topic is how countries plan their health policies according to time horizons and the prioritization of specific population groups (countries with comprehensive public health systems tend to have wide-raging national health plans, such as Brazil, Colombia, Chile, and Mexico).

According to ECLAC, the self-sufficiency of the healthcare systems in LatAm depends on the competitive strengthening of research and the regionwide production capacities for vaccines and medicines. These strategies should mainly focus on primary health systems for equitable and universal access to medicines and services targeting the speed up of vaccination processes in the short-term, by improving the access to vaccinations and facilitating the vaccination process, through a reginal vaccine procurement mechanism

based on a cooperative integration. In the medium and long term, the region should focus on strengthening or generating technological production capacities by ensuring a large stable market, strengthening regional R&D, and facilitating local production and regional chains. This goal would be achieved through the following means: public procurement mechanisms for regional market development; consortiums for the development and production of vaccines; a reginal clinical trials platform; regulatory flexibilities for access to intellectual property; and regulatory convergence across the region and recognition mechanisms.

International lessons learned from fighting the COVID-19 pandemic

At an international level, the COVID-19 pandemic gave different lessons. One of them is the need of an innovative ecosystem based on the technological progress associated with the spread of digital technologies within the health system (ECLAC, 2020a). In this way, changes in consumption and production of health services and products will generate subsystems of information and connectivity that would be detrimental for citizens who do not have enough access to information. Additionally, digital platforms would open opportunities for personalized medicine. A second lesson is that, if Latin American states want more self-sufficient healthcare systems, the balance of pharmaceutical trade should change based on more innovative pharmaceutical services and products. For 2020, the region registered a deficit in pharmaceutical trade of over 20 %, in which the imports in 2020 were six times bigger than the exports (ECLAC, 2020a). In this sense, demand for innovative drugs, including biopharmaceuticals, is satisfied mainly by the imports from companies outside the region, and imports of active ingredients for generic drugs produced in the region are increasing.

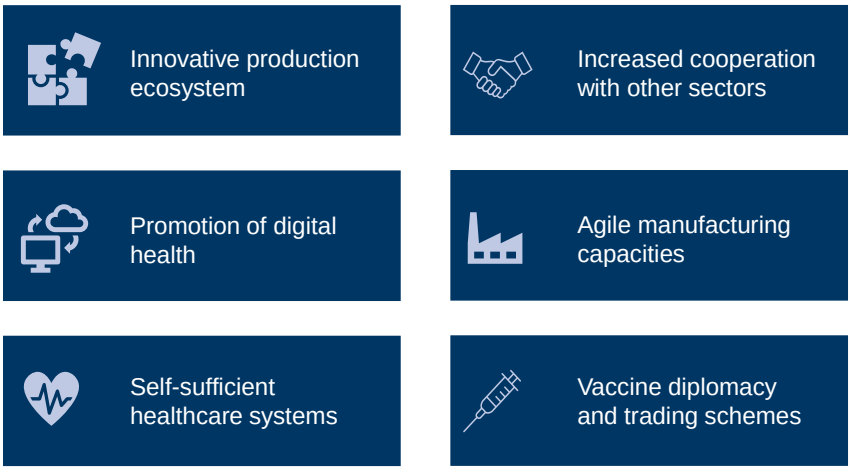

Figure 2: International lessons learned from fighting the COVID-19 pandemic. WifOR illustration based on ECLAC (2020a), Saulnier et al. (2021), Lal et al. (2021), Schmider et al. (2021).

For future adaptive challenges and resilience, governments should cooperate with NGOs, the biomedical industry, the supply chain and logistics, the tech

industry, regional markets, and other private sector actors, as they all are likely to help the health system's capacity to overcome those challenges (Saulnier et al., 2021). For this cooperation, the use of comparative data across countries is key to measure how healthcare systems have changed over time and to understand the dynamics that explain those changes. Furthermore, the literature shows that the countries' reaction to the pandemic has been related to how resilient their health systems are (Lal et al., 2021). Thus, an effective response would be required to mitigate the immediate and long-term health effects of the pandemic and the global cooperation for health and development agendas should focus on Universal Health Coverage and Global Health Security.

Following the international lessons that LatAm should consider, the Asian Pacific region has taken right actions to address challenges related to vaccination and drugs supply (Schmider et al., 2021). For example, the countries of this region have used flexible trading mechanisms and vaccine diplomacy to acquire vaccines from countries with excess supply. Additionally, they have ensured last-mile delivery of vaccines to address the weaknesses in public health infrastructure. Furthermore, Asia Pacific has developed agile manufacturing capacities to build long-term resilience for future health emergencies, and regional approaches to harmonize policy foundations for accelerating and standardizing new drug approval.

Schmider et al. (2021) also mention that the ultimate solution for preventing another pandemic lies in governments, businesses, academics, and civil society committing to building health systems that can adapt, evolve, and innovate quickly and coherently in the face of new challenges. Thus, the authors propose three foundations for resilience in the region. First, guaranteeing an equitable vaccine distribution as COVID-19 becomes endemic, while seeking for interregional and intraregional vaccine procurement and distribution. Second, looking for regional cooperation to improve vaccine rollouts, since lack of coordination generates continuing disadvantages for all stakeholders in the region, undermining resilience. Finally, policymaking and regulatory institutions should support manufacturing in the region for future resilience, since harmonized regulations within the region will be needed to enhance long-term resilience.

Not catching up to these political pathways would have long lasting implications for the future wealth in the LatAm region. To summarize the best international practices that might help address properly future health and economic crises, LatAm should consider the ones already mentioned and the procedures taken by Europe that were mentioned in section 2.1 and 2.2. First, governments should increase efforts to meet the minimum target for public health spending set by the PAHO to guarantee a proper coverage that also

benefits the most vulnerable. Second, investments should help strengthen the health industry though R&D and digitalization and promote the development of human capital for a more skilled and formal work force. Third, governments should support private enterprises and small businesses in periods of crisis to boost productivity and sustainable growth. Fourth, timely interventions and government trust play a key role for citizen cooperation. Fifth, regional cooperation would be key in achieving more resilient health and economic systems, in which appropriate initiatives to guarantee health access and economic welfare would be achieved.

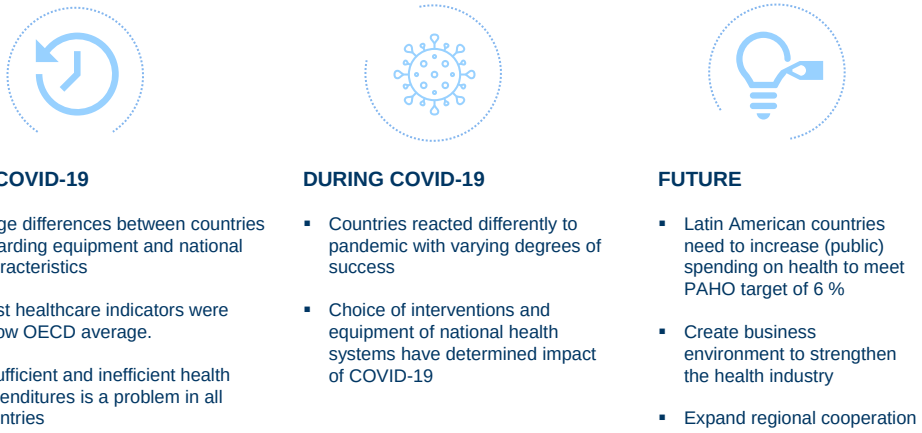

Figure 3: Policy context and regulatory topics in LatAM - Insights. WifOR illustration

3 Digital transformation

As in other regions, the COVID-19 pandemic accelerated digitalization efforts in LatAm. However, many Latin American countries continue to lag behind high-income countries in terms of access to digital services. At the same time, LatAm shows a substantial intraregional heterogeneity regarding the availability of digital infrastructure and the implementation of measures to close this digital divide. Still, how health systems manage to take advantage of digitalization in the future is even more decisive for LatAm than for other regions in the world. The reason is that technology is considered to be a main factor in overcoming already existing structural barriers in the LatAm healthcare system such as inequality in access to healthcare. Inequality in access to healthcare exists especially on a geographical level with distant regions being less well served by the healthcare system than urban centers.

The first section of this chapter summarizes how the LatAm countries were equipped in terms of digital infrastructure and access to digital technologies before the onset of the COVID-19 pandemic. Establishing the groundwork for further analysis allows a review in the second section on how the COVID-19 pandemic affected the digital transformation in the region with a focus on digital health.

The third section focuses on the lessons that can be learned from both within the region as well as from countries outside the region for the future development of healthcare systems. Emphasis is placed on the use of digital tools which improve the access to health systems. Using the example of the EU, it also highlights the case for cooperation between countries, especially for projects profiting from scaling opportunities.

3.1 The digital situation in Latin America before the COVID-19 pandemic

Although digital health technology was already successfully used in Latin America before the pandemic, the region itself is still characterized by a stark heterogeneity in terms of digital infrastructure. In particular the digital divide between rural and urban areas is significant.

On the one hand, the presence of digital health technologies in Latin America was a thriving healthcare measure even before the pandemic. It is applied much better than in many OECD countries. In Colombia, the government introduced an efficient system to improve the patients-doctors connection. It is mainly used to improve the medical diagnosis of patients. In the case of Chile, the Public Health Sector includes The National Telehealth Program in the portfolio of services. The National Telehealth Program includes teleophthalmology, teledermatology, telecardiology, etc. to address all communities regardless of distance. In Brazil, hospitals use digital health tools to give more attention to patients. It is also aimed to support clinical decisions. In the case of Argentina, the use of telemedicine in the public sector was already routine, mainly to enable appointments with specialists, who are located at distant provinces. Also, it is common for virtual appointments to be used to get second opinions from a health professional. In addition, the country has a National Telehealth Plan and a Telehealth Advisory Council, which aims to promote programs that facilitate the use of this technology and create all-around good practices.

On the other hand, the potential use of digital health technologies is limited by access to respective devices and broadband networks. Therefore, not only

the individual use of computers, tablets, and mobile phones is a key prerequisite, but also the availability of telecommunication networks is of vital importance for taking advantage of digital health solutions.

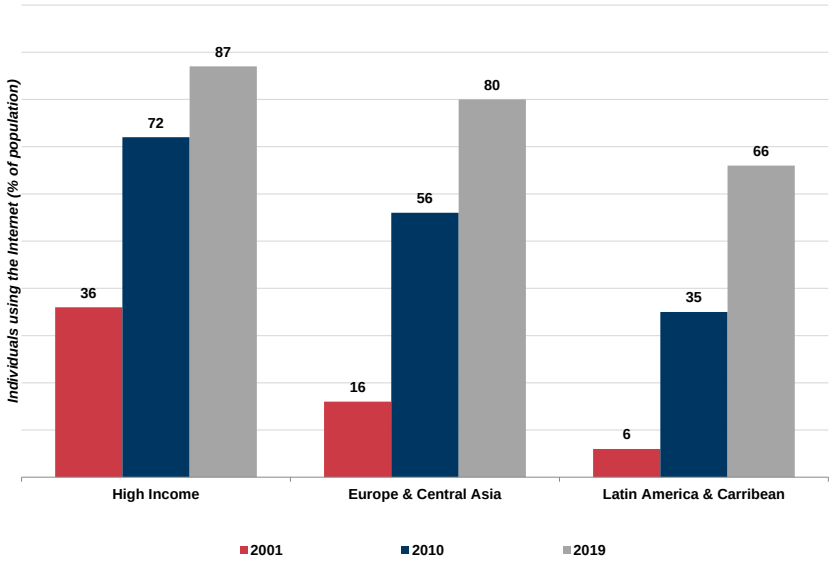

Figure 4: Individuals using the Internet (% of population). WifOR illustration based on Celis and Pereira (2021).

In LatAm, digital exclusion which prevents the uptake of digital solutions such as digital health technologies represents a widespread problem. According to most recent data, countries in Latin America and the Caribbean are still lagging significantly behind in terms of access to the internet. As it can be seen in Figure 4, the share of the population using the internet in 2019 was still 20 percentage points lower in Latin American and the Caribbean than in high-income countries. One reason for this stark difference is the high relative cost of connectivity. Both in terms of mobile data as well as in terms of broadband access, countries in the Americas region rank among the most expensive countries in the world. In relative terms, consumers in the Americas pay 1.5 times the world median for fixed-broadband access and 1.4 times the world median for mobile data (ITU, 2021b). It means that LatAm greatly exceeds the affordability targets set by the independent Broadband Commission for Sustainable Development. This shows again the high relative prices for internet access in the region which hampers the uptake of innovative digital solutions.

Even in regions and countries with advanced broadband networks, regional or national averages mask a significant heterogeneity, also called the digital divide. This becomes visible through several factors. First, the cost of mobile internet access is for example in Chile (USD 0.71 for 1GB) significantly cheaper than in Panama (USD 6.66 for 1 GB). In the case of broadband access, the situation is similar. Second, the number of subscribers in LatAm

varies substantially between the countries with Chile and Uruguay having more than 90 % of the population subscribed to the internet, while most LatAm countries show numbers between 50 % to 77 % (ITU, 2021a). Third, the digital divide is most pronounced between rural and urban areas within countries in LatAm. While in urban areas 67 % of households are connected to the internet, in rural areas only 23 % of households have access to the internet. Fourth, the gap between internet users at the top and the bottom quintile of earners is on average 40 % (Wilson Center, 2021). Concretely, this means that in the top quintile 40 percentage points more households are connected to the internet than in the bottom quintile showing the social dimension of the digital divide.

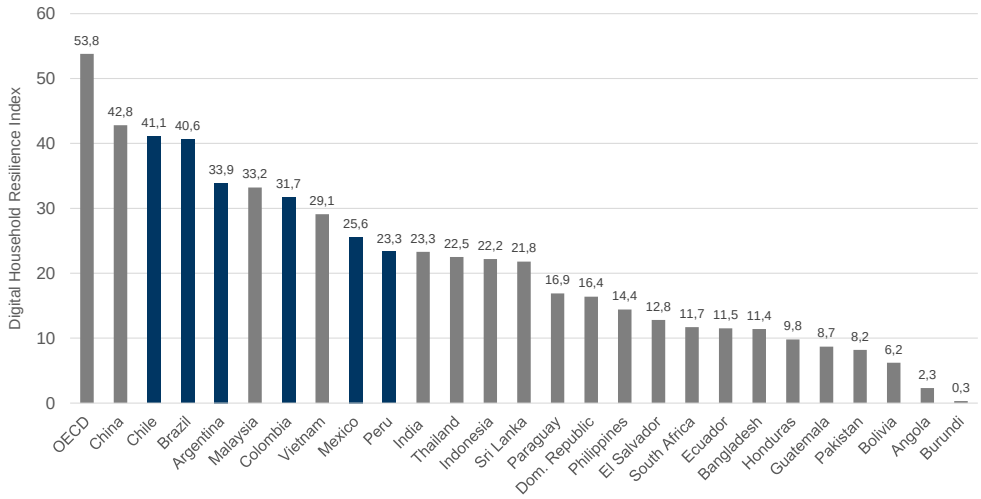

Figure 5: Developing Countries Digital Household Resilience Index (2019). WifOR illustration based on Katz et al. (2020).

The fact that countries in Latin America also lag behind high-income countries in terms of digital preparedness was shown in Katz et al. (2020). Both in the Development Index of Digital Ecosystems and the Digital Household Resilience Index, which measure the current state of digitalization in a country, LatAm countries fall short of the OECD average. The results once again highlight the structural weaknesses of the region in this area as well as the regional heterogeneity with Chile being relatively close to the OECD average while other countries such as Peru lag significantly behind.

Despite affordability being one of the central barriers to connectivity and consequently the uptake of digital solutions in LatAm, other factors also limit the expansion of internet access within and across countries such as poor infrastructure, policies, taxes and operational barriers (West, 2015). Especially for rural areas which frequently are not adequately connected to the internet, overcoming these barriers is important. Rural areas would gain most from being connected to the internet and being able to access the healthcare system through online services.

3.2 The effect of the COVID-19 pandemic on digitalization in Latin America

During the COVID-19 pandemic, the new reality of remote working and virtual connectivity has accelerated digitalization efforts across the globe. Still, the extent to which measures have been implemented and how they affected the digital landscape in individual countries varied widely between LatAm countries as well as internationally.

Confronted with their populations confined to their homes, many LatAm countries tried to scale up their efforts to expand access to healthcare systems through digital health. Digital health in this context encompasses a wide range of electronic services and digital processes related to health. Since using digital health tools such as telemedicine often effectively requires the availability of fast and stable internet access (Pierce et al., 2021), the digital divide made it difficult to abruptly expand access to digital health tools in the pandemic. Furthermore, the policy environment in Latin American countries has historically lagged behind the current technological state of digital health.

Measures taken in LatAm to promote digital health during the pandemic

Consequently, governments used the window of opportunity in the beginning of the pandemic and adopted measures promoting the use of digital health tools. By doing this, governments tried to reduce existing barriers to the use of telemedicine. In Brazil, telemedicine was temporarily allowed through Ordinance No. 467 adopted in March 2020. This ordinance allowed for the use of telemedicine both in the private as well as in the public health system. Appointments were made using a certain electronic system, while e-prescriptions were also temporarily permitted under this program (Pierce et al., 2021). Similarly in Colombia, the Congress created through the enaction of Law 2015 in the beginning of 2020 an “interoperable electronic medical records system that grants medical professionals online access to relevant data” (Pierce et al., 2021), which aims to centralize medical data and documents on an interoperable platform.

In Peru, case studies were conducted that detailed under which conditions digital health and especially telemedicine has been proven successful for the treatment of cancer patients during the COVID-19 pandemic (Montenegro et al., 2021). The overall positive results clearly indicate the potential for telemedicine in the LatAm region, but at the same time researchers acknowledged that the character of a case study does not reflect the reality of the health system in Peru with a high variety in healthcare quality as well as internet access.

The potential of telemedicine was also recognized by the private sector and actors such as the Colombian telehealth companies 1Doc3 or the Peruvian Start-Up Smart Doctor which was also cooperating with the Peruvian Ministry of Health in the provision of health services (Pierce et al., 2021). These examples demonstrate the potential the private sector sees in digital health and its applications as well as the progress which has been made in the course of the pandemic. However, digital health touches on various interconnected domains which is why a silver bullet solution to promote the adoption of digital health does not exist.

Assessment of the digital health framework existing in LatAm

Consequently, it makes sense to identify the different factors required for a widespread adoption of digital health and analyze how far they were affected by the COVID-19 pandemic in Latin America. According to various studies (LeRouge et al., 2019; Zanaboni & Wootton, 2012), the regulatory and legal framework, the financial sustainability, the technological and organizational basis as well as staff prerequisites need to be aligned to provide a productive environment in which digital health applications can be widely used. An illustration of the factors which shape such an environment is depicted in Figure 6.

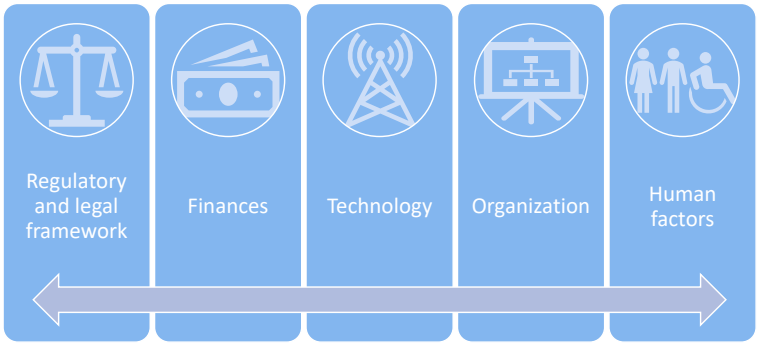

Figure 6: Framework for the promotion of digital health. WifOR illustration based on LeRouge et al. (2019) and Zanaboni & Wootton (2012).

Despite recent changes in the legislative and regulatory environment, the launch of telemedicine services in Latin America continues to be often restricted by irregular policies and legal frameworks. One example being the definition and reimbursement of telemedicine services itself which in Argentina and Mexico in 2019 were not even defined (LeRouge et al., 2019). The lack of clarity and commitment makes it difficult for providers and the private sector to engage in offering structural solutions for the long-term although the technology already exist. Therefore, the financial sustainability of investments in digital health gets questioned due to the missing regulatory framework which underlines the interconnectedness of the factors necessary for the adoption of digital health mentioned above.

The financial sustainability of investments in telemedicine applications itself is another factor which is hampering the adoption of digital health tools in LatAm. Although there has been progress regarding the compensation in the course of the COVID-19 pandemic through temporary waivers for example, a long-term commitment is necessary given the high upfront investment costs often associated with telemedicine for practitioners and institutions.

One of the greatest barriers in LatAm for the adoption of telemedicine is the digital divide meaning the lack of technological and organizational infrastructure for parts of the population. Although the COVID-19 pandemic has illustrated the need for digital infrastructure quite drastically, the region continues to face supply-side constraints in this regard. In the context of digital health and its provision this is even more critical since the parts of the population that would profit most from being connected to healthcare are often those who do not have sufficient network access. Unfortunately, the COVID-19 pandemic has not yet led to a boost in terms of public and private spending that can be considered sufficient.

Furthermore, it is questionable whether the personnel conditions exist in LatAm which would allow for the widespread adoption of digital health tools. The personnel conditions in this case refer to an open-minded and adequately trained workforce which needs to be skilled and experienced in the area of digital health to be able to deliver the services needed. While these skills can be acquired, receiving adequate training and instructions is paramount. Supporting this assessment, studies in Colombia have shown (Gallegos Mejía, 2013) that a higher turnover in physicians and personnel was one barrier for the implementation of digital health tools. Similarly, in the Mexican region of Nuevo Leon, a change in the leadership that brought administrative reforms significantly pushed the use of digital health (López, 2017) again underlining the crucial importance of the human factor for the adoption of new methods.

International comparisons of frameworks for digital health promotion

While structural issues hampering the widespread adoption of digital health in LatAm become apparent, EU countries such as Italy face similar difficulties. In Italy the “heterogeneity of available solutions” (Omboni, 2020) and the consequential lack of interconnectedness makes using digital health tools in most cases inefficient and expensive. Furthermore, the exchange of information between different institutions in the health system such as between primary care clinics and secondary or tertiary facilities is often non-existing thereby preventing an effective and patient-centered approach of using digital health. Finally, many of telemedicine services for example are not included in the public health system, so the reliance on out-of-pocket expenditure further limits the adoption by doctors and patients.

Many of the issues mentioned in Italy also exist in Latin American countries, which is why in particular outstanding systems in LatAm such as in Chile are often considered exemplary even for high-income countries given that by 2019, 65 % of Chilean hospitals were already using telemedicine as one form of digital health (LeRouge et al., 2019) and digital health in general is embedded in a national strategy and recognized and accepted as a tool by the actors in the health sector.

Summing up, although there has been significant progress in the area of digitalization during the pandemic, structural barriers to a widespread adoption of digital health tools persist. Differences also remained stark between LatAm countries. In the literature, Chile has often been cited a role model with a National Telehealth Plan and a Telehealth Advisory Council. At the same time, only 53 % of the countries in the region reported having a Health Information System (Núñez et al., 2020) . Also, because of the digital divide in LatAm the technological and organizational basis do not exist in a sufficient manner to allow telemedicine and digital health application to be used uniformly, not even within the same country. Working on the overall provision of adequate ICT infrastructure can therefore be considered one of the keys to tap into the potential of digitalization for LatAm.

3.3 Closing the digital divide in Latin America

Adopting telemedicine services widely requires addressing several areas such as the regulatory and legal framework, the financial sustainability, the technological and organizational dimension as well as the human factor. The following chapter will discuss in detail which measures were adopted by countries in LatAm and globally to address these areas. Furthermore, it will be discussed in how far these measures should be replicated in LatAm so issues existing in the areas listed above can be resolved.

The regulatory and legal framework is one of the cornerstones for using telemedicine. In the US, the foundation for using telemedicine as a recognized tool in patient care and in treating new patients was created through a waiver of restrictions on telemedicine on a federal level. The overwhelmingly positive feedback even led to further extensions. This highlights the need for cutting red tape and actively creating a forward-looking legal framework for digital health applications in contrast to adopting a wait-and-see approach.

Financial sustainability is key to guarantee the long-term involvement of actors in this area. In case the reimbursement of services is not guaranteed,

providers will be very unlikely to offer their services. Estonia created a reimbursement fund, that unbureaucratically reimbursed expenses that were caused by the provision of telemedicine consultations. It thereby directly addressed the otherwise open question of financial sustainability, which needs to be solved for telemedicine services to work efficiently. Subsequently, of all doctor visits in Estonia during the first stage of the pandemic, 40 % were carried out online (Balla et al., 2020) which even for a country with an excellent network and vast experience in e-services, is remarkable. The Estonian experience highlights the importance of financial sustainability and in the face of a crisis also the importance of fast and unbureaucratic decisions. For medical service providers, reimbursement is essential to be able to deliver their services which is why facilitating this process is necessary. In case the reimbursement process does not work as envisaged, it can cause long-lasting damage to the trust of the medical personnel in telemedicine.

Especially for Latin America, the technological and organizational dimension of telemedicine is paramount given the digital divide existing between and within LatAm countries. Since most telecommunication providers face incentives to serve fast-growing large markets first, the structural disadvantage of smaller countries and rural areas becomes clear. Thus, the potential for cooperation to allow multi-country investments in infrastructure remains high. Additionally, setting up development funds which focus on the installation of network capacity in historically underserved areas such as in the Amazonian or in the Andes region could work as a tool to compensate private investors for the lower financial profitability of those investments. Strengthening connectivity in these regions would also be important from a developmental perspective, given the frequently existing lack of access to medical services.

One example of a developed country that was able to rely on an existing ICT infrastructure to fight the pandemic was Estonia. The digital infrastructure built across government agencies facilitated the utilization of health data and allowed for easily implementable modifications so that the system was able to cater the demands created by the pandemic. Estonian citizens were therefore able to directly access their COVID-19 test results online as well as detailed information about the current state of the pandemic such as the number of people recovered or deceased. It was also possible to directly ask for sick leave on the corresponding national portal which alleviated pressure on the healthcare system (Balla et al., 2020).

Using the example of Estonia, the advantages of an excellent ICT infrastructure become clear. Not only is it possible to use services such as telemedicine better or offer companies a more attractive business environment, reacting to short-term changes or external shocks with digital means is becoming considerably easier. Also, official communication is

facilitated which, as explained in Chapter 2, has been a concern in several LatAm countries during the pandemic. The reason is that data can be made available in a transparent way and thereby increase trust in official communication.

Another example of sensible use of infrastructure is South Korea where an extensive use of the existing ICT infrastructure was key in its containment strategy during the first stage of the pandemic. Taking advantage of information collected by mobile phones and accessing other information related to location and potential exposure to infected persons, let South Korea contain outbreaks relatively quickly (Park et al., 2020). Additionally, immigration services also heavily relied on the use of apps that visitors to the country were required to download which facilitated the implementation of official guidelines regarding isolation after arrival. Obviously, is up to debate how to balance the trade-off between data privacy and effective response to a pandemic but the fact that the option of fighting the pandemic through digital means exists, can already be viewed as a success.

Organizational examples in individual countries include countries such as Germany or Estonia which used cooperation to bring actors from the private, public and third sectors together. In this context, solutions were created that could be used to fight the crisis. Exemplary results were among others the creation of a Dashboard, a contact tracing app, workforce sharing platforms and an application to estimate border crossing times (Balla et al., 2020). Due to the cooperation and often voluntary work that was contributed, the cost for the public was comparably low.

The European Union also serves as an example for organizational practices that can be adopted in Latin America. First, in terms of vaccine development EU countries decided to negotiate as a bloc instead of having 27 governments negotiating with the pharmaceutical companies individually. Cooperation thereby prevented pushing up prices and creating national resentments. Second, EU governments also decided jointly to set up vaccine production facilities in Europe to reduce dependencies and guaranteeing timely as well as affordable and equitable access to vaccines in the future (European Commission, 2022). Third, the development of contact-tracing apps guaranteeing interoperability between the different national applications was considered a milestone for technological cooperation in Europe. Especially for the population living in the border regions this was a significant facilitation in their day-to-day activities.

In Chile, the importance of reaching a critical number of health professionals who are also trained in digital health services was recognized even before the pandemic. Reaching this critical number would significantly facilitate the adoption of technologies in the health sector. Consequently, the National

Center for Health Information Systems as a cooperation between several universities and other actors in the health sector was created in 2017. The objective was to build up sufficient human capital in the field of digital health to be able to use advanced health information systems and technology in the future (CENS, 2022). This example from Chile demonstrates that measures to train health professionals in the adoption of digital health measures will be an important aspect for the adoption of digital health tools in the LatAm health sector.

In conclusion, many working practices have already been developed and tested in other countries in and outside of LatAm. Replicating these practices after adjusting them to match the national characteristics would mean to create the prerequisites that will be decisive for the wider adoption of digital health. Due to the importance of digital technologies for LatAm, starting as soon as possible with a structured approach addressing the areas discussed above is paramount for the long-term development of the healthcare systems and the region.

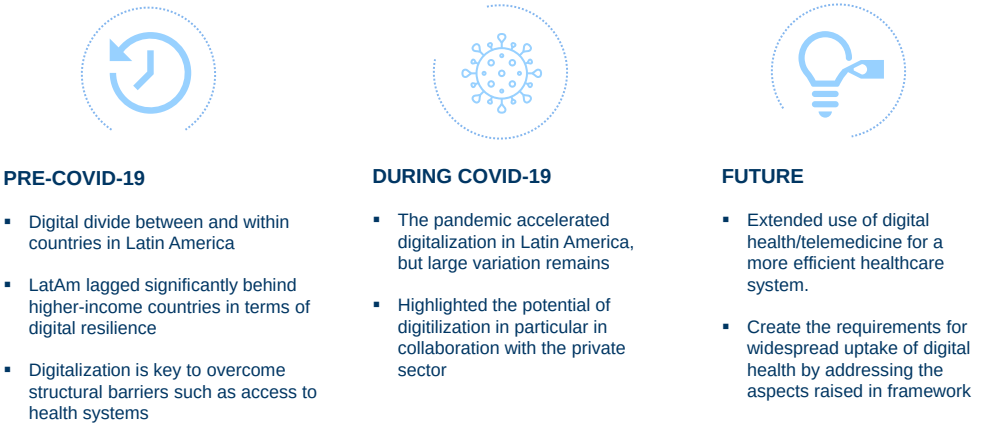

Figure 7: Digital Transformation in LatAM - Insights. WifOR illustration.

4 Health Economy Reporting (HER)

To obtain more detailed insights into Health Economy (HE) spending and the economic effects of the HE, a Health Economy Reporting (HER) is conducted. WifOR Institute's HER concept provides a structured approach to better understand the size, impact, and importance of the HE, a distinct economic

sector that consists of all economic activities that contribute to healthcare. (A detailed description of the HER methodology can be found in the Annex.) In this way, healthcare can be understood as a driver and enabler of economic growth, wealth, and employment rather than a cost.

The key focus here is – for every selected country – the quantification of the HE with its sub-sectors together with national spillover effects within the respective overall economy. Creating a common metric to assess the HE and measure its impact on the wider society is considered essential to strengthen economic growth prospects while alleviating societal burden related to health factors such as illnesses (Ostwald et al., 2021). Results present the Gross Value Added (GVA) of activity, as a proportion of GDP and the relevant employment effects.

Health expenditures alone are not sufficient to quantify the actual size of a country's HE. In case a country imports all its health products, health expenditure would be comparably high but without being backed by an equivalent domestic health sector. Therefore, it is essential to analyze the GVA of the respective economic activities. In simplified terms, GVA is measuring the additional value that is added to the product by a unit. If a business buys its inputs at a high price and only sells them at a slightly higher price to your customers, its value added would be small given that it is the difference between the final price and the price of the inputs used. In the case of the country mentioned above, the situation is similar. The GVA of the health sector would be small given that the health products were only sold in the country but without any additional modifications meaning there was no additional value added.

Conversely, if a country exports many products of the HE, the share of the sector can be higher than the share of health expenditures. This would mean that the health expenditures of other countries were at least partly responsible for a strong HE in the exporting country.

Contribution of the Health Economy to GVA and Employment

Using the HER approach allows for a quantification of the impact the COVID-19 pandemic had on the HE of LatAm countries. Thereby making it possible to compare the difference in shocks across countries, identify the factors responsible for this difference and draw preliminary conclusions what might be necessary to build resilience for the post COVID-19 period.

Figure 8: Key indicators on selected LatAm Health Economies. WifOR calculation; based on World-Input-Output Database (WIOD) and Eora Global Supply Chain Database (Eora). 1 Initial WifOR estimation, 2 Methodological deviations due to more detailed data, 3 indicates the most recent year available.

The fundamental insight that HER generates is the size of the HE in a given country. Figure 8 depicts those key indicators on selected LatAm health economies in terms of the share of health expenditures in relation to 2020 GDP, the share of the HE relative to 2020 GDP, and the share of the labor force employed in the HE in 2020. The share of health expenditures ranges from 5.2 % in Peru to 9.6 % in Brazil, while the share of the HE ranges from 5.3 % in Mexico to 9.7 % in Brazil. The observed differences across countries show again the heterogeneity of the HE. However, this heterogeneity makes it difficult to explain the differences by referring to one single factor given that the HE is composed of different parts of the economy and therefore per definition subject to a variety of factors.

Typically, shares of health expenditures and the size of the HE, are of similar magnitude, but in Chile there is a distinct gap. As expenditures are higher than the size of the HE, one possible explanation could be that Chile relies more on imports than the other countries to serve the market. In terms of labor, the LatAm HEs employs differentiated, though large shares of the national labor force, ranging from 5.5 % in Mexico to 9.5 % in Colombia.

Developments in the HE are influenced by multiple different factors, which makes it difficult to determine a single reason for cross-country differences. The key indicator of the share of the HE is a combination of several underlying factors such as the public investments in the health system as well as the national characteristics of individual sectors.

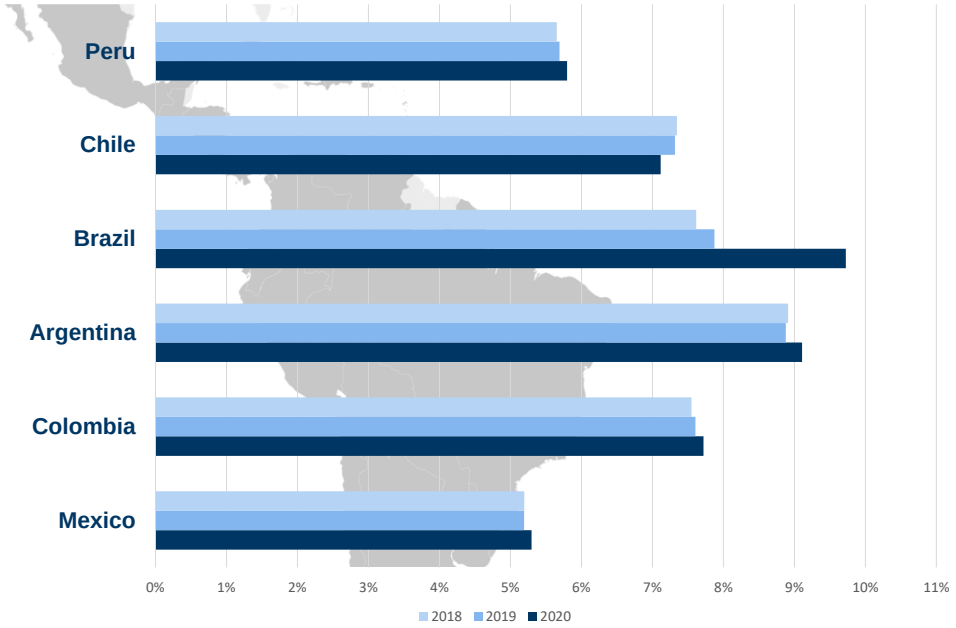

Figure 9: Share of the Health Economy in GDP 2018-2020. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), OECD.Stat and UNdata).

Over time, an increase in the share of the HE on GDP in almost all countries between 2018 and 2020 (Figure 9) can be observed. This region-wide development suggests a strong trend across the LatAm countries; however, the stark contrast between countries is likely caused by inherently different fiscal and economic national environments. As it can be seen in Figure 9, the stability of the health sector in the face of a crisis like the COVID-19 pandemic stands out. Similar to the situation during the global financial crisis of 2008/09, the health sector can again be regarded as a stability factor and backbone of the overall economy, although it was directly affected by the crisis itself.

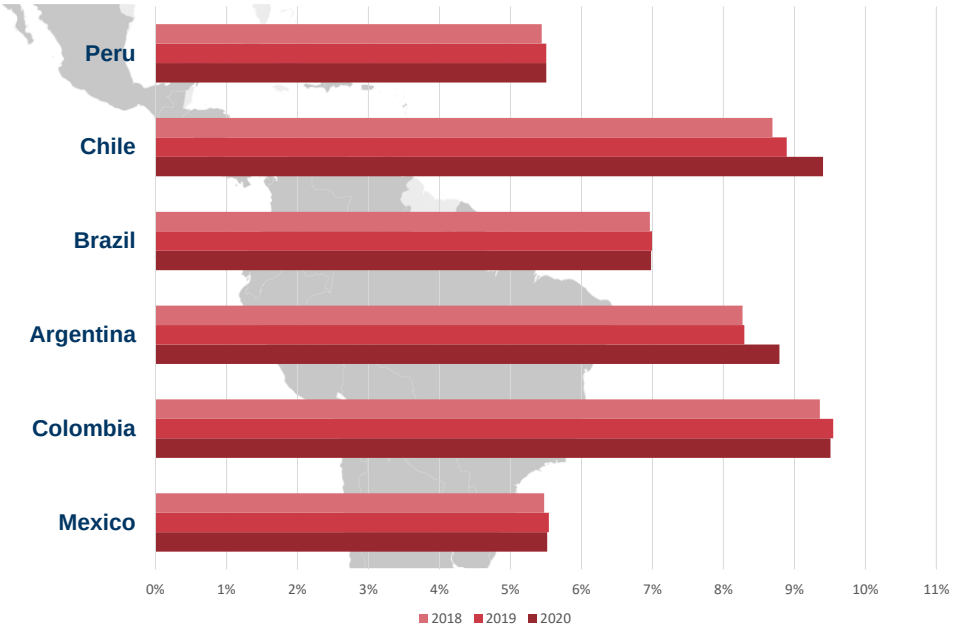

Figure 10: Share of the Health Economy in total labor force 2018-2020. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), ILOSTAT, OECD.Stat and UNdata.

The general observations for the GDP share are also true for the share of the HE in the labor force (Figure 10). In several countries like Chile and Argentina, the labor force in the HE was expanding in the crisis year 2020, while it was mostly stable throughout the other countries in the region.

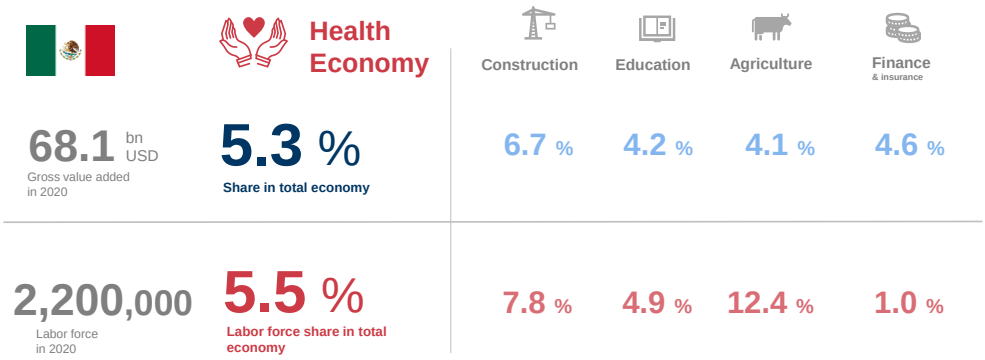

Figure 11: Comparison of the different sectors in the Mexican Economy in 2020. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), ILOSTAT, OECD.Stat and UNdata.

Comparing the HE to other sectors in the wider economy offers the opportunity to obtain a tangible impression of the relative size of this sector. When conducting this analysis for Mexico (Figure 11) and Chile (Figure 12), the contribution of the HE in relation to other sectors can be quantified. It shows that in terms of GDP, the HE is larger than the Mexican education, agriculture and finance sector, thereby underlining the relative importance of the HE for the Mexican economy.

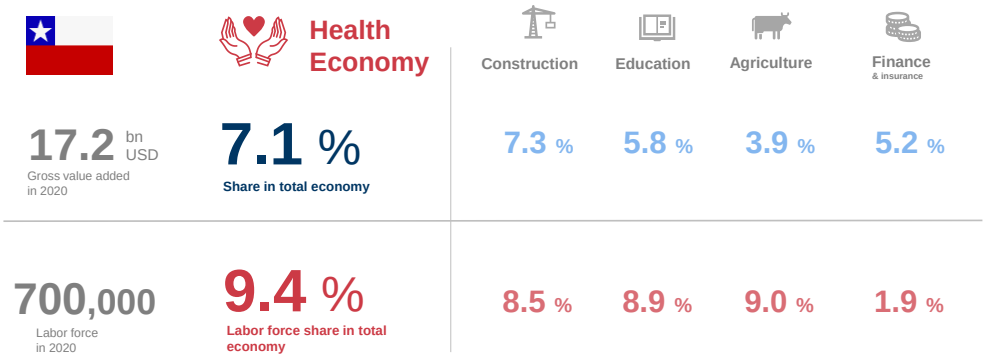

Figure 12: Comparison of the different sectors in the Chilean Economy in 2020. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), ILOSTAT, OECD.Stat and UNdata.

A similar picture emerges regarding Chile. Analyzing the size of the respective sectors, it becomes clear that the share of the HE in the Chilean economy is at 7.1 % almost identical to the share of the construction sector and significantly larger than the contribution of the education, agriculture and finance sector to GDP. Furthermore, the labor share of the HE in Chile is among the highest in the LatAm countries. Also, a higher share of the labor force on the national level is working in the HE than in the agriculture sector. This not only shows the importance of the HE as an integral part of the Chilean GDP, but also as one of the most important sectors providing employment. Country sheets for Argentina, Brazil, Colombia and Peru can be found in the Annex.

Economic Footprint of the HE – direct, indirect and induced effects

A question that arises and is related to the size of the HE is how other sectors are affected besides the immediate, direct effects generated in the HE. These spillover effects of the HE can be expressed by indirect effects (arising in the supply chain triggered by procurement) and induced effects (caused by expenditure of directly and indirectly generated incomes) (Figure 13).

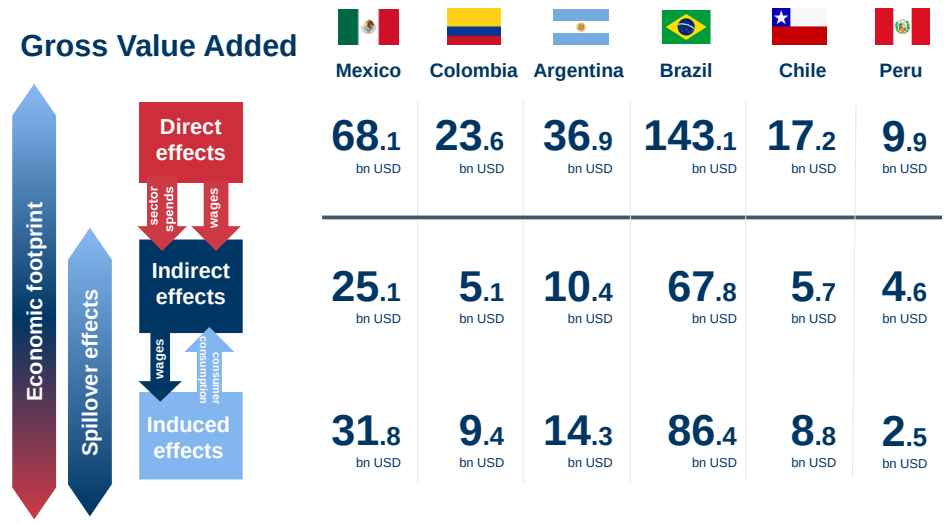

Figure 13: The economic footprint of the HE in the wider economy in terms of GVA. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), OECD.Stat and UNdata.

Differing magnitudes of these spillover effects over countries primarily stem from different sizes of the respective LatAm economies. Still, some trends are still worth pointing out. As an example, for most countries induced effects are larger than indirect effects: This finding emphasizes the importance of increased personal income and therefore of working opportunities in the Health Economy.

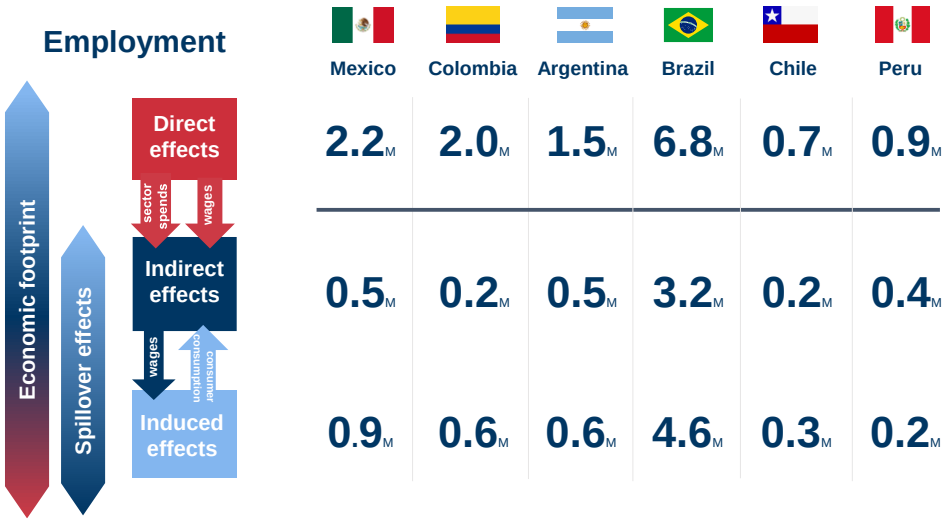

Figure 14: The economic footprint of the HE in the wider economy in terms of employment. WifOR calculation; based on World-Input-Output Database (WIOD), EORA Global Supply Chain Database (Eora), ILOSTAT, OECD.Stat and UNdata.

The measurement of indirect and induced effects for the labor force again emphasizes the relevance of the HE for the labor market: The HE is a job creator for the overall economy (Figure 14). This is a further argument that health is not solely a cost factor but an investment in the economy and society, as the return in terms of employment created by indirect and induced effects

is substantial. In the case of Mexico, 2.2 million people are employed directly in the HE, but via indirect and induced effects of the HE, additional 0.5 and 0.9 million employed persons are involved.

Moreover, employment related to the HE, particularly in the Pharma industry, exhibits particularly high productivity. Generally, there is a clear correlation between the size of the HE and the employment it provides to the wider economy.

GVA and Job-Multiplier of the HE

The relation of direct and spillover effects can be expressed by the GVA-multiplier, which indicates how much spillover is generated by each US-Dollar invested in the HE (Figure 15).

Figure 15: The Impact of Health-related activity (activity related to the HE) on GDP. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), OECD.Stat and UNdata.

It becomes clear that the HE needs to be discussed in the context of the wider economy. There is enormous potential since investments not only affect the HE directly but create GVA in the wider economy, too. To give an example, one direct USD invested in the Mexican HE generates an additional USD 0.8 within the overall Mexican economy. This is the strongest evidence for the assertion that health as an investment pays off.

Still, regional differences regarding the size of the HEs are prevalent which are likely caused by multiple factors such as the composition of the HE and its integration in the wider economy, the overall economic structure, country specific differences like demographic and geographic factors. As an example, the HE of a country which is more reliant on the manufacturing of medical products would have been significantly more affected by the disruption of value chains than the HE of a country which primarily offers health care services.

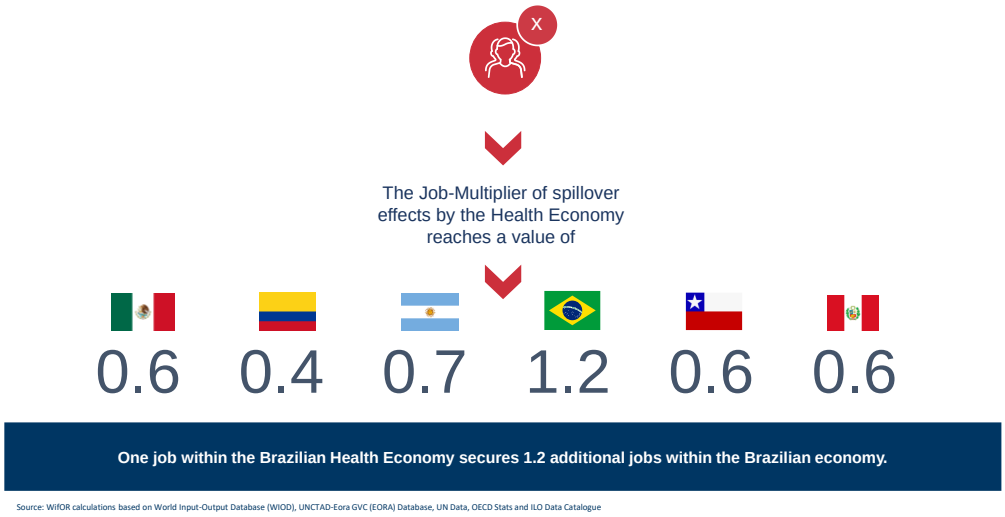

Figure 16: The Impact of Health-related activity (activity related to the HE) on employment. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), ILOSTAT, OECD.Stat and UNdata.

The multiplier can also be calculated for employment effects (Figure 16). Going on with the Mexican example, each job created in the HE generates an additional 0.6 jobs via indirect and induced effects in the wider economy. Both multipliers are largest for the Brazilian HE, while the other countries lie in the same range.

The HE in Latin America in international comparison

Generally, comparing the HE in LatAm countries with the HE in high-income countries presents a challenge. Not only because of data availability, but also because of differently structured economies. However, when analyzing the composition and size of the HE in high-income countries such as Germany and Estonia and comparing it to LatAm, the following aspects inter alia stand out.

Firstly, as discussed above, there is a clear correlation between the healthcare expenditures per capita and the size of the HE. The marked difference between Germany and Estonia in terms of health expenditures (12.5 % vs 6.7 % of GDP) is also reflected in the size of the respective HE. While the HE in Germany accounts for 12.1 % of GDP, the Estonian HE is responsible for 6.6 % of GDP. Given the similar pattern in the LatAm countries analyzed in this report, one can assume that this link holds irrespective of the developmental stage of a country. Consequently, one way to strengthen the HE in LatAm would be to increase health expenditures.

	Argentina	Bolivia	Brazil	Chile	Colombia	Estonia	Germany	Mexico	Peru
Share of out-of-pocket expenditure	27.7	23.9	24.9	32.8	14.9	24.4	12.8	42.1	28.1

Table 5: The share of out-of-pocket expenditure on current health expenditure in 2019 (in %). WifOR illustration based on World Health Organization Global Health Expenditure database.

Secondly, many LatAm countries but also Estonia face high levels of out-of-pocket health expenditure. Out-of-pocket health expenditure are "borne directly by a patient where insurance does not cover the full cost of the health good or service" (OECD, 2009). In Germany, as shown in Table 5, the share of out-of-pocket expenditure as a fraction of health expenditure has been 12.8 % in 2019. In contrast, in the other countries analyzed in this report, the most recent shares range from 14.9 % in Colombia to 42.1 % in Mexico with the majority being located in between these two extremes. Since an excessive share of out-of-pocket expenditure potentially limits the access and coverage of healthcare systems, reducing the share would mean to expand access to the health system. Expanding access can be viewed as beneficial since a low-threshold access is a key characteristic of a high-quality healthcare system and at the same time supports the HE.

Thirdly, average health spending per capita in LatAm represents only one fourth of health spending in OECD countries if adjusted for purchasing power. Although significant variation exists between countries and health spending outgrew economic growth over the last years, it still is only a fraction of the OECD average. Furthermore, health expenditure in LatAm is also more dependent on private spending than in OECD countries. According to OECD data, governments and compulsory health insurances in LatAm account for only 54,3 % of health expenditure in 2017 while the OECD average was at 73,6 %. These two aspects clearly indicate the need for more public spending to create high-quality healthcare systems and to minimize wasteful spending on health.

As the comparison of high-income countries with LatAm shows, there is no unique pathway towards a high-quality healthcare system. Still, there are several characteristics such as a low share of out-of-pocket health expenditure and higher governmental health expenditure which characterize more resilient health systems and stronger health economies. Consequently, replicating measures taken in these countries that have been reviewed favorably in terms of their outcome presents a viable pathway towards creating a similarly advanced healthcare system in LatAm. Examples of such

measures are the establishment of compulsory prepaid funds to cover parts of the health costs in the future as well as the implementation of institutional reforms to enable change. Notwithstanding, the concrete application in each country depends on national characteristics.

5 Conclusion

The report analyzes the important role of the Health Economy in the LatAm region and points out how the health sector contributes to a better health of the population as well as to overall societal wealth. It shows that the Health Economy already represents an essential part of the wider economy through the contribution of a significant part of the GVA. It also emphasizes its role for the labor market through quantifying the share of jobs that it provides, thereby making clear that it is one of the most important employers in many LatAm economies. By doing this, the report strengthens the view of health as an investment rather than a cost for society, which pays off in the future and offers a considerable return on investment for society as a whole.

Considering the societal impact of investments in health, the report also indicates the need to recognize the importance of their contribution to achieving the SDGs. Health investments especially contribute to SDG 3, namely the provision of good health and well-being. Understanding the relation between SDGs and health is key to fully comprehend the framework, which should be used to discuss investments in health. Therefore, health investments can be considered to have a developmental impact next to its economic impact and play a decisive role in achieving the SDGs.

Before the COVID-19 pandemic, differences between LatAm countries regarding the health indicators were significant, as was the distance to European countries and the OECD. The gap in public health expenditures is most striking when reviewing the public health expenditure in LatAm: All analyzed countries fail to meet the 6 % target set by the PAHO. Consequently, the impact of COVID-19 was intense and varying over LatAm countries, and projections indicate different catch-up processes.

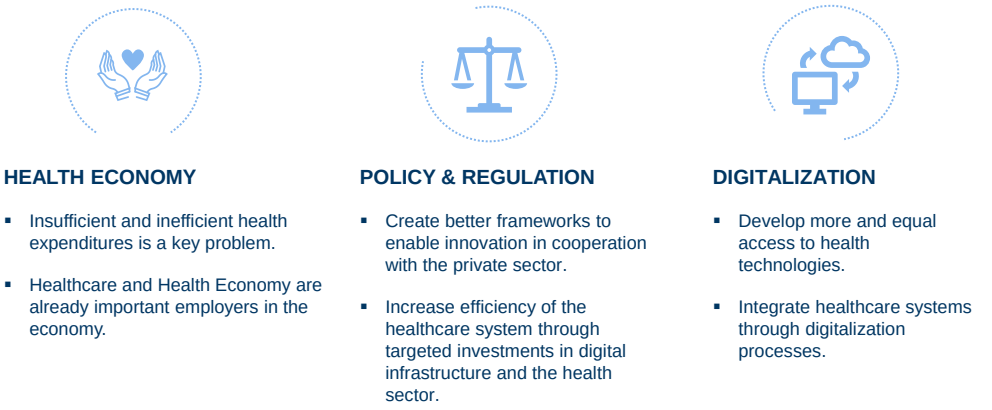

Figure 17: The COVID-19 Policy Environment and the role of the Health Economy – Main Insights. WifOR illustration.

The literature review makes it abundantly clear that across LatAm countries insufficient and inefficient health expenditures remain a problem that needs to be solved. Key recommendations derived from the literature and from the data are summarized in Figure 17. The underlying problem is inefficiency and underfinancing, which results in comparably small sizes of the HE in the observed countries. The HE is a major employer, but more jobs can potentially be created with better investment strategies, competitive strengthening of research, and generating technological production capacities by ensuring a large stable market. Moreover, efficient regional cooperation would be highly beneficial for future resilience of the LatAm countries. A task for political regulation to improve healthcare efficiency is to create better frameworks for innovation and investment in digital infrastructure. Future digitalization should aim to generate equal access to health technologies, so that fully integrated healthcare systems can be achieved.

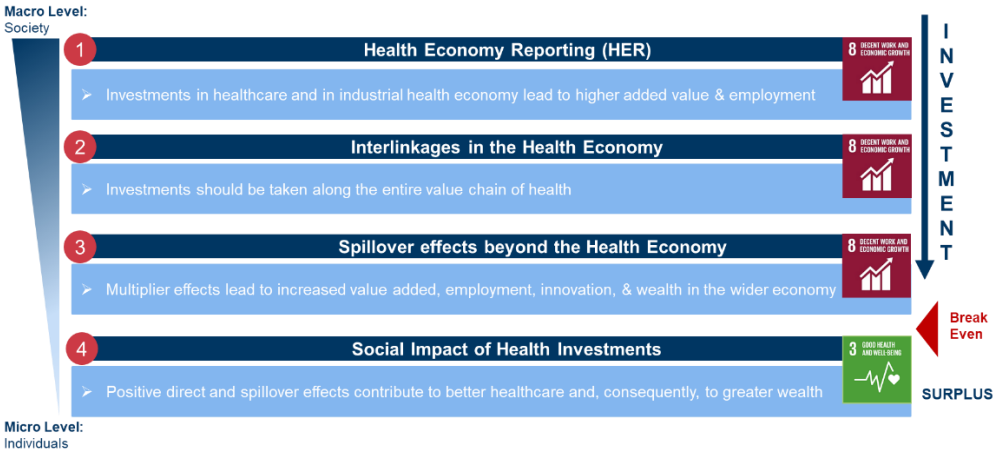

Figure 18: WifOR's 4-step value framework to address rising global disease burden and ROI of sustainable investment for healthy societies and economies. WifOR illustration.

To put this report into perspective, the results of the Health Economy Reporting underline the important contribution of health investment to the overall economy (Figure 18). However, the effects of health investment are even more manifold: Beyond direct effects, interlinkages, and spillover effects in the wider economy, investments in health and in the HE have an impact on society. This Social Impact is a unique characteristic of the HE and distinguishes this sector from other sectors. A potential analysis for the future could be to investigate differences in the Social Impact of health investments across LatAm countries.

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7 Annex

7.1 Health Economy Reporting Methodology

Measuring the Impact of Health Expenditures on GDP at the National Level

We view the ecosystem of the extended health sector, in other words the HE, as a distinct sector that has a significant contribution to GDP and employment. This allows governments and policy makers to view healthcare as a driver and enabler of economic growth, wealth, and employment rather than a cost.

As an example, since 2009, the German Federal Ministry of Economic Affairs has been developing metrics, focusing on the HE Gross Value Added (GVA). The HE GVA is based on annually updated data from the official national and international statistical services, the Organization for Economic Cooperation and Development (OECD) and the World Health Organization (WHO). In 2020 the German Government commissioned such an analysis for the entire European Union, demonstrating the importance it places on these metrics and on the significance of being able to methodologically project effects of health expenditures on National Accounting Systems (NAS).

The political implications of aligning health expenditure data to National Accounts are critical for planning and assessing the role of health for sustainable and inclusive economic growth. The HER approach also allows for an evidence-supported impression on the overall “ROI of health” - e.g., to the extent to which health expenditure stimulates National GDP.

Interlinkages in the Health Economy - Analyzing and Assessing links between the Subsectors of the Heterogenous Health Economy

The HER applies an economic policy perspective to health and compromises of the three sub-sectors: the Healthcare Economy, the Industrial Health Economy (IHE), Services and Support (Figure 19).

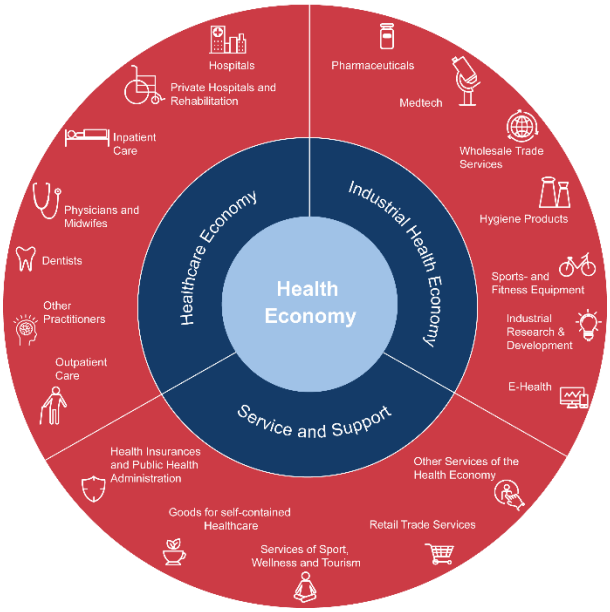

Figure 19: The subsectors of the Health Economy. WifOR illustration.

A value chain is defined as the end-to-end production chain from the input of raw materials to the output of final products and/or services. According to this rational, each link, or third party in the value chain, should add value to the original inputs and the outputs.[1] The challenge that we still face is that health continues to be viewed in silos and not as a backbone for economic stability and growth through its effects on supply chains. This is where the health dividend for a society is measured and its contribution in the context of the National Accounting Systems is captured (by calculating the GVA connected to health investments).

To prevent these silos, we suggest a Value Added (VA) approach that is in line with Porter's concept. We can distinguish contributions and different added values of various companies and organizations along the value chain of health and show interlinkages of interactions amongst various stakeholders including from the field of R&D, Biotech, MedTech, Pharma, Hospitals, Care Services. This allows us to identify and assess where the actual value is generated and what is gained at the patient level and what is the added GDP to the economy.

Our analysis identifies that 20-50%[2] of the value added in the HE is related to the Industrial Health Economy (IHE)[3]. Sectors like R&D, Pharma, MedTech, Biotech, that are critical parts of the IHE, are important components of the

[1] Michael E. Porter (1985) Competitive Advantage: Creating and Sustaining Superior Performance. New York: Free Press.

2 Ireland and Switzerland have up to 50%

3 The IHE is the industrially orientated part of the health economy and includes manufacturing of goods and the provision of services associated to health care. Consequently, the IHE related to the manufacturing of pharmaceuticals, medical devices and large medical equipment, as well as wholesale trade of those goods. In addition, the IHE includes all biotechnology products and processes, as well as digital applications and R&D activities in health care.

value chain and hence have a strong footprint on the wellbeing of the society as generators of knowledge and as drivers of technological progress.

As to the implications on policy, it is key that the HE must be understood as an integrated and functional sector that provides health. And this means that only by strategically optimising the allocation of resources within the HE, the supply chain of healthcare can improve its efficiency throughout the overall value chain. In other words, by identifying and analysing opportunities along the supply chain, we could reduce the policy limitations of "silo" approaches, resulting in a comprehensive policy associated with smaller, though smarter, investments that are more efficient, better support a healthy population, and overall promote societal wealth, economic growth, and better jobs.

Using such an approach will help meet the urgent need to formulate comprehensive health policies that can consolidate distinct policy targets and improve the performance of the value chain of health. This is becoming more important than ever. Especially in the period following the pandemic, where governments will have to redirect resources in ways that can both provide a shield against health threats to economies and societies, while driving enhanced growth, so that economies can catch up with their development efforts, following the pandemic economic downturns.

Spillover-Effects of the Health Economy - Health Investments and their Impacts Beyond the Health Economy

Health investments have multiplier effects on the economy that appear along the supply chain. These are spill over effects that arise outside of the HE and are either directly created or are indirect - from suppliers' activity - or are induced economic effects. Here, induced economic effects describe direct and indirect activity is connected to income that also gives rise to additional economic activity due to the spending of that direct and indirect stakeholders in the economy.

The methodology follows the Input-Output (IO) analysis developed by Leontief.[4] The IO analysis we follow is based on the National Accounting Systems (NAS), and is implemented for the HE, so that we can have comparability with other sectors in the economy. Establishing the HE as a distinct macroeconomic sector, provides metrics with which we can make comparisons and draw conclusions on the contributions of various industries

4 We calculate the estimated value-chain effects in the economy that are expected to arise due to increased economic activity of a healthier patient population. The indirect and induced effects for paid and unpaid work are calculate using input-output tables from the national accounts of a specific country applying Leontief multipliers.

Reference to Leontief multipliers: W. Leontief, (1937) "Interrelation of Prices, Output, Savings and Investment. A Study in Empirical Application of the Economic Theory of General Interdependence," The Review of Economics and Statistics, Vol. 19, no. 3, pp. 109–132, and W. W. Leontief, (1936) "Quantitative Input and Output Relations in the Economic Systems of the United States," The Review of Economics and Statistics, vol. 18, no. 3, p. 105.

to the national economy by using similar methodological approaches, such as the manufacturing sector, the energy sector, among others. Indicative results for spill over effects are metrics such as one dollar investment in health, creates additionally XX cents in the overall economy and every employee supports more than YY additional employees.

Figure 20: Examples of indicative results for spillover-effects of the HE from the German Economy

Based on the spill over effects there is an urgent need to adopt a new understanding of health, and the activity around it. As a distinct macroeconomic sector, which requires supplier for goods and services, as well as support jobs to operate, all creating additional activity, and therefore additional wealth, over and beyond health.

7.2 Country sheets with sector comparison

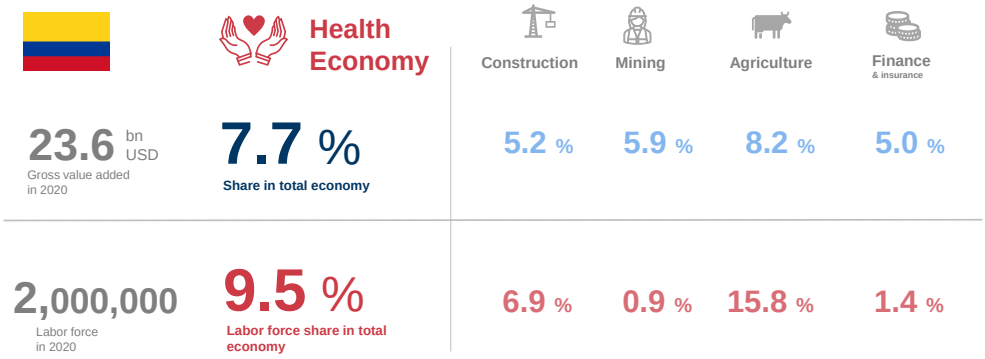

Figure 21: Comparison of the different sectors in the Colombian Economy in 2020. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), Banco de la República, ILOSTAT.

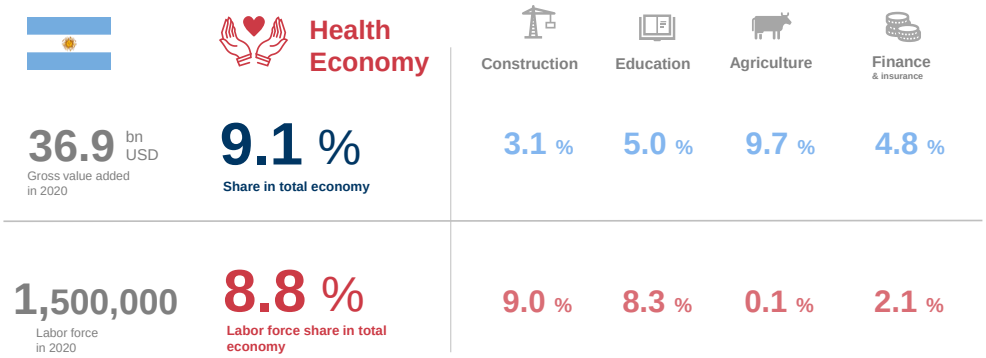

Figure 22: Comparison of the different sectors in the Argentinian Economy in 2020. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), INDEC, ILOSTAT.

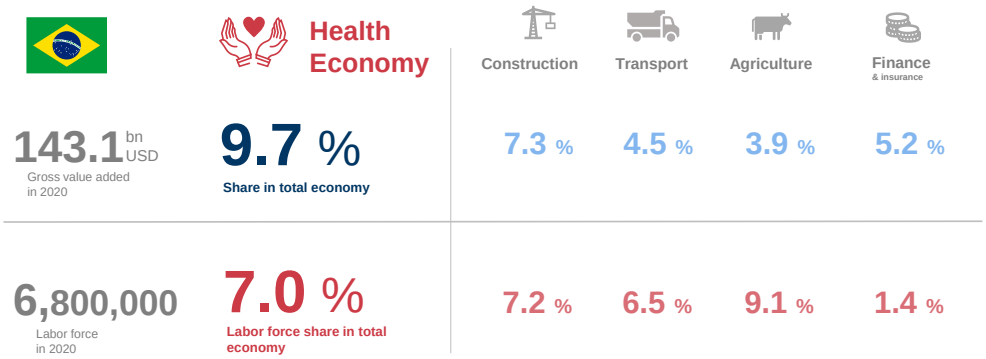

Figure 23: Comparison of the different sectors in the Brazilian Economy in 2020. WifOR calculation; GVA Data based on Q4/2020. Calculations based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), IBGE, ILOSTAT.

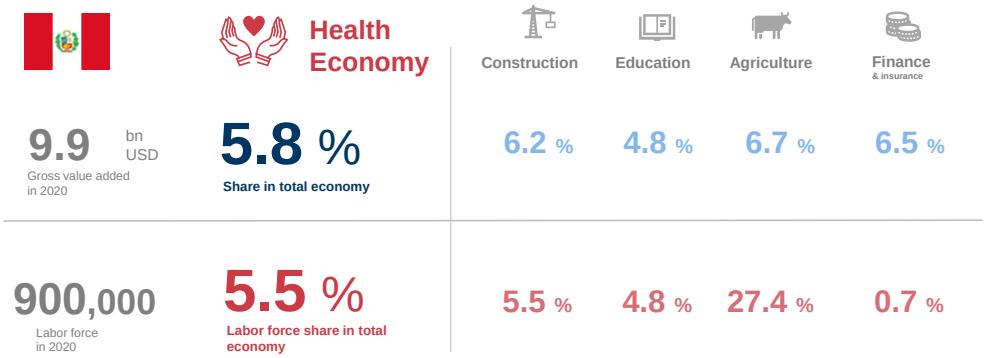

Figure 24: Comparison of the different sectors in the Peruvian Economy in 2020. WifOR calculation; based on World-Input-Output Database (WIOD), Eora Global Supply Chain Database (Eora), INEI, ILOSTAT.

WifOR is an independent economic research institute that originated from a spin-out of the Department of Public Economics and Economic Policy at the Technical University of Darmstadt, Germany. We see ourselves as an academic partner and think tank on a global scale. WifOR's fields of research include Economic, Environmental and Social Impact Analyses as well as Labour Market and Health Economy research.

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