
Digital Silk Road and Latin America

数字丝绸之路 - 拉丁美洲

Marco Cepik

Beihang University

January 27

-
- 1. What is the Digital Silk Road ?**
 - 2. Why it matters to Latin America and the Caribbean ?**
 - 3. Digital Transformation in China**
 - 4. Digital Challenges in Latin America**
 - 5. Research Agenda**
-

1. What is the Digital Silk Road ?



Timeline

- **2013: Belt and Road Initiative (BRI)**
 - **2015: RMB Cross-border Payment System**
 - **2015: Digital Silk Road in the OBOR White Paper**
 - **2016: Innovation-Driven Development Strategy**
 - **2017: Artificial Intelligence AI Development Plan**
 - **2018: BRI Digital Economy Strategic Alliance**
-

Timeline

- **2019: 4th Digital Belt and Road Conference (Big Earth Data)**
 - **2020: Global Initiative on Data Security**
 - **2020: China Standards 2035**
 - **2021: 14th Five-Year Plan for National Informatization**
 - **2022: BRI with 147 countries and 2,970 projects (US\$ 4 trillion)**
-

Rationale

- **Dual circulation: ICT independence and interdependence**
 - **Narrow the global digital divide**
 - **Improve competitiveness in digital markets**
 - **Finance and construct digital infrastructure**
 - **Develop and promote PRC standards**
 - **Increase market share in e-commerce and digital services**
 - **Create STEM expertise through educational exchanges**
-

Main Features / Examples

- Land and submarine cables (China Unicom - Global Center HKSAR)
 - 5G cellular and smart cities (Huawei in South Africa and Kenya)
 - Internet Infrastructure (Guangxi "China-ASEAN Information Harbor")
 - Cloud and Big Data (DSR Industrial Alliance with Alibaba and +40)
 - BeiDou Navigation Satellite System (北斗卫星导航系统)
-

DSR Projects in Southeast Asia



Source: POINTE BELLO Report, 2019

DSR Projects in Latin America



- PLAN Base
- E-Commerce
- Fiber Optic Cable
- M&A
- Satellite Infrastructure
- Smart City
- Telecommunications

Source: POINTE BELLO Report, 2019

2. Why it matters to Latin America?

-
- 1. Negative impact of COVID-19**
 - 2. High poverty and informality rates**
 - 3. Infrastructure deficit (2,5% of the region's GDP)**
 - 4. Digital divide by age, gender, race, and rural-urban**
 - 5. High export commodity concentration ratio**
 - 6. Political fragmentation and slow recovery from instability**
 - 7. China and United States are the main commercial partners**
 - 8. LAC has been slower than Africa and Asia to support BRI**
-

Impact of COVID-19

- More than 1,5 million deaths
 - Rich countries response: US\$ 14.9 trillion
 - Emerging countries response: US\$ 2.7 trillion
-

COVID-19 Deaths and Mortality Rates in LAC

(countries with more than 1,000 deaths, as of Jan. 19, 2022)

Country	Deaths	Deaths per 100,000
Brazil	621,803	294.62
Mexico	301,469	236.31
Peru	203,645	626.40
Colombia	131,268	260.77
Argentina	118,420	263.51
Chile	39,427	208.04
Ecuador	34,232	197.03
Bolivia	20,291	176.24
Paraguay	16,844	239.10
Guatemala	16,191	97.51
Honduras	10,457	107.29

Country	Deaths	Deaths per 100,000
Cuba	8,345	73.63
Panama	7,545	177.68
Costa Rica	7,425	147.10
Uruguay	6,253	180.63
Venezuela	5,383	18.88
Dom. Rep.	4,269	39.75
El Salvador	3,837	59.46
Trinidad & Tobago	3,224	231.12
Jamaica	2,551	86.53
Suriname	1,221	210.02
Guyana	1,101	140.66

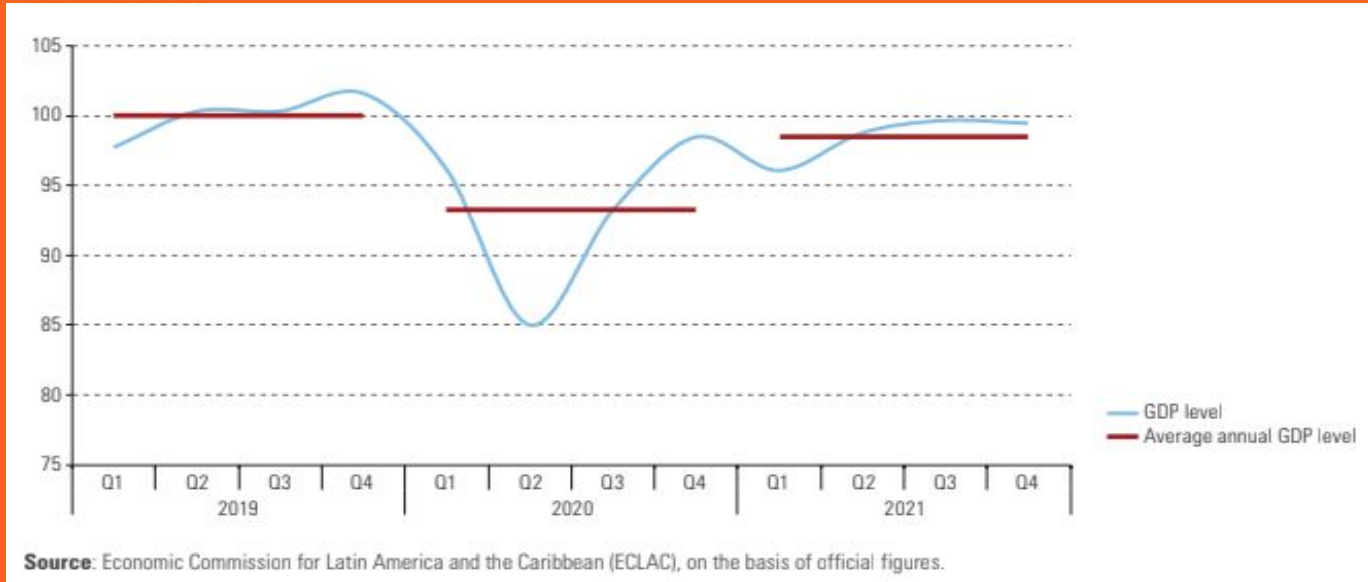
Total LAC

1,568,603

Source: (USA) CRS Reports 2022

Latin America GDP level 2019 - 2021

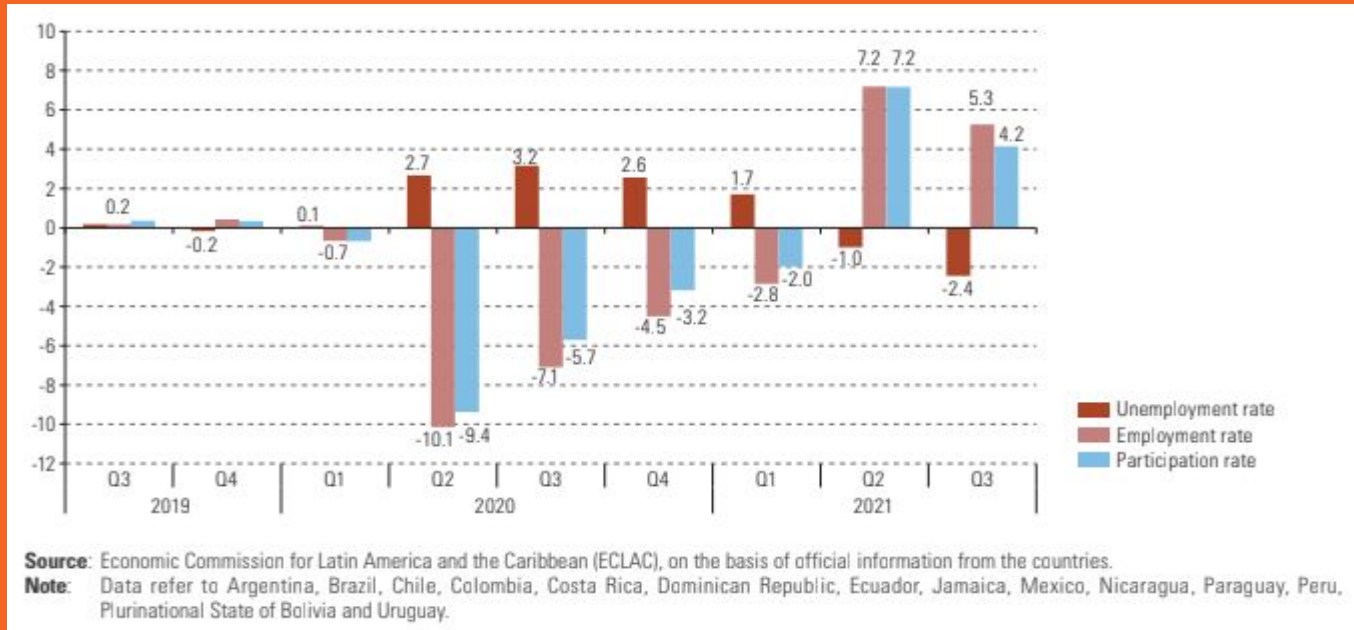
(index 2019-100)



Source: CEPAL, 2022

Employment and unemployment %

(from 4th quarter of 2019 - 3rd quarter of 2021)



Source: CEPAL, 2022

The greatest downturn of the past two centuries

The crisis has damaged some of the last decade's progress in eradicating poverty and inequality

The poverty rate in 2020 reached

33.7%



and extreme poverty

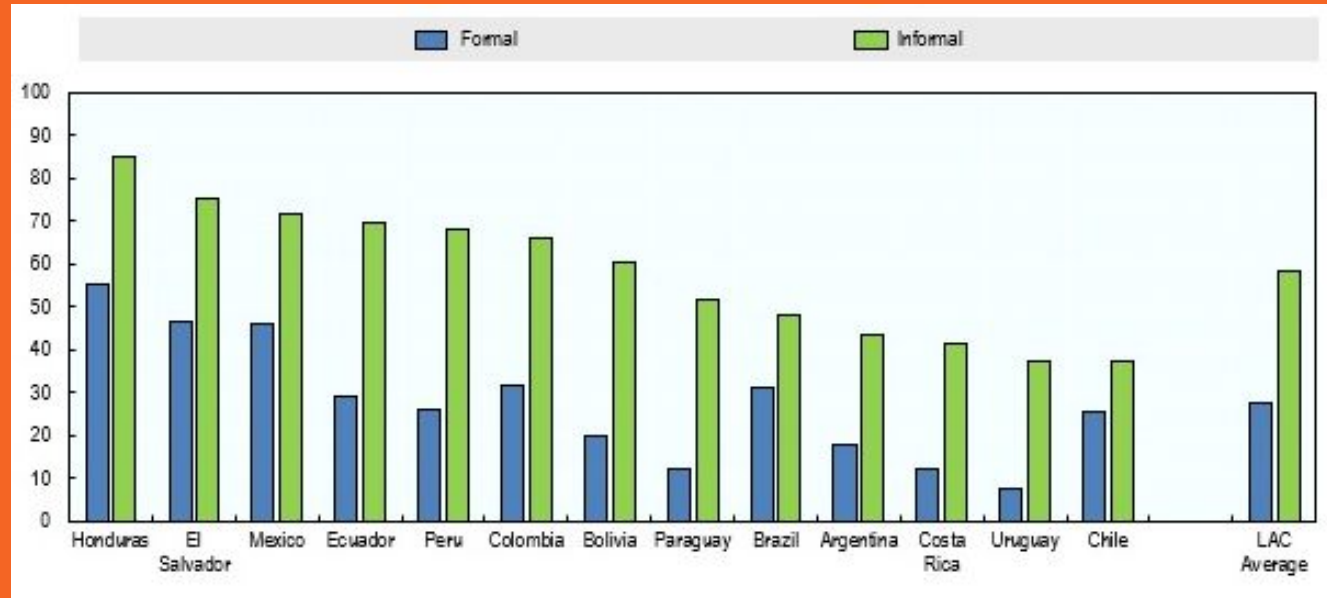
12.5%

This extreme poverty level has not been seen in the past 20 years

Source: OECD, 2021

Share of formal/informal workers living in poverty

(% of total formal or informal workers)



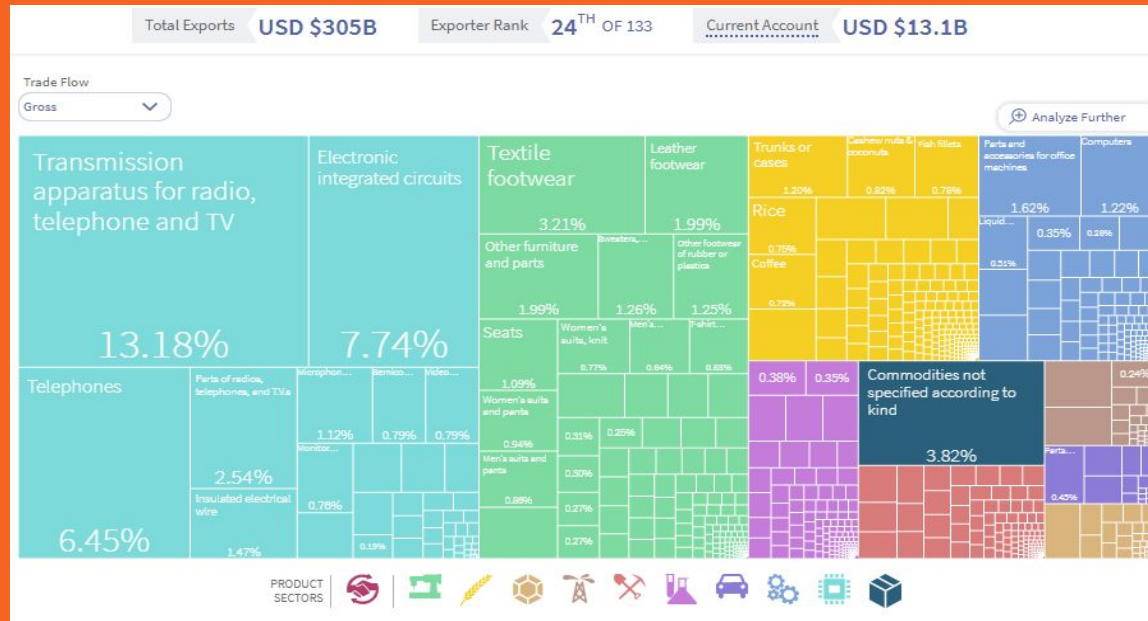
Source: Basto-Aguirre et al. (2020)

Infrastructure gap per sector and country (million USD)

COUNTRY	WATER AND SANITATION			ELECTRICITY		TRANSPORTATION			TELECOMMUNICATIONS		TOTAL INVESTMENT
	WATER ACCESS	SANITATION ACCESS	WASTEWATER TREATMENT	ACCESS	GENERATION AND TRANSMISSION	ROAD	AIRPORT	URBAN MASS TRANSPORT	FIXED BROADBAND	4G	
Argentina	12,296	17,401	2,238	4,743	74,751	67,396	420	5,803	5,849	13,507	204,404
Bahamas	124	159	-	-	-	-	-	-	44	114	441
Barbados	82	101	-	74	-	-	-	-	22	62	342
Belize	164	197	-	59	1,197	-	-	-	84	195	1,895
Bolivia	4,248	5,939	-	1,998	5,051	28,523	70	2,173	2,848	4,422	55,273
Brazil	36,723	59,971	7,549	32,627	157,305	333,475	4,410	80,442	28,113	60,500	801,115
Chile	2,107	3,036	295	2,213	48,281	22,507	670	2,079	2,259	5,715	89,164
Colombia	8,889	18,080	2,009	6,265	34,800	53,627	510	25,741	6,182	12,941	169,044
Costa Rica	804	2,081	-	708	4,535	11,038	-	3,562	465	1,541	24,733
Ecuador	3,705	5,903	554	2,200	21,024	23,202	370	5,330	2,173	7,489	71,950
El Salvador	2,178	3,252	179	1,126	5,838	-	600	3,380	393	3,466	20,413
Guatemala	5,813	12,233	-	2,959	6,257	5,312	210	4,052	1,901	9,462	48,199
Guyana	298	348	-	190	532	-	-	-	175	292	1,836
Haiti	5,305	8,205	-	6,580	179	-	220	1,237	554	6,290	28,571
Honduras	4,119	4,582	-	1,633	3,759	3,808	140	1,046	1,362	4,937	25,387
Jamaica	1,034	1,205	-	490	1,688	5,776	-	263	191	1,217	11,864
Mexico	27,590	35,030	3,001	14,120	84,966	119,448	4,060	51,227	14,495	39,808	393,745
Nicaragua	1,784	3,335	-	696	2,194	5,309	600	474	1,050	3,204	18,647
Panama	1,614	2,148	-	967	4,712	5,110	70	1,549	558	2,282	19,010
Paraguay	1,858	2,356	-	936	3,071	8,285	140	1,488	1,508	2,954	22,596
Peru	7,936	11,943	1,022	3,674	13,680	35,766	730	15,107	5,837	14,422	110,115
Dominican Republic	3,617	4,922	-	1,478	7,149	6,351	70	4,459	844	3,286	32,175
Suriname	190	256	-	162	116	748	70	-	122	291	1,955
Trinidad & Tobago	436	497	-	123	1,319	-	-	243	85	415	3,117
Uruguay	382	1,215	-	417	5,141	2,832	-	2,112	223	840	13,160
Venezuela	9,363	9,986	-	3,101	-	-	1,840	10,609	4,912	11,772	51,583
Total (Latin America and the Caribbean)	142,661	214,381	16,848	89,538	487,545	738,512	15,200	222,376	82,246	211,428	2,220,736

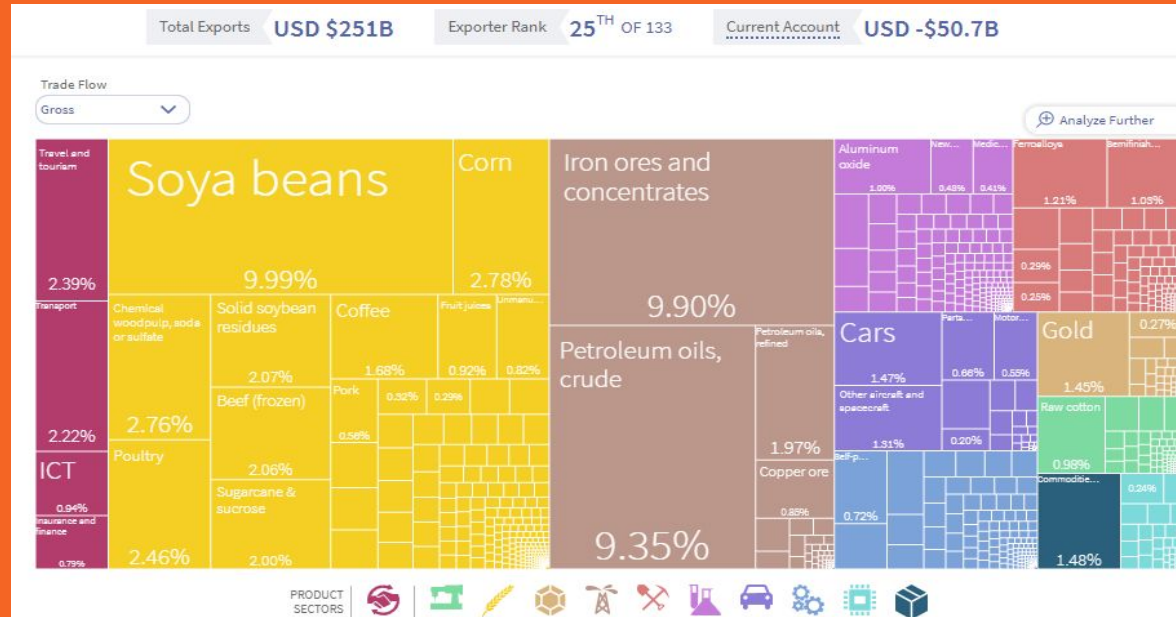
Source: IADB, 2021

Profile of Vietnamese exports in 2019



Source: Atlas of Economic Complexity, 2022

Profile of Brazilian exports in 2019



Source: Atlas of Economic Complexity, 2022

Expenditure on R&D (in billions of current PPP dollars)



Source: UNESCO, 2022

Science and technology people in four countries

Alianza del Pacífico: Indicadores de capital humano especializado, último año disponible

Indicador	Chile	Colombia	México	Perú
Porcentaje de graduados en educación terciaria en programas de Tecnologías de Información y Comunicación	2,92%	4,99%	5,38%	5,79%
Porcentaje de graduados en educación terciaria en programas de Ciencia, Tecnología, Ingeniería y Matemáticas (STEM)	20,47%	23,66%	25,24%	29,64%
Cantidad de graduados en STEM (por 1,000,000 habitantes)	2 619	2 237	1 602	2 246
Desarrolladores de Software (% población)*	0,23%	0,10%	0,11%	0,09%

Fuente: United Nations Educational, Scientific and Cultural Organization (UNESCO) (2020), "UNESCO statistics" [en línea], <http://data.uis.unesco.org/>.

Nota: * El dato de desarrolladores de Software (% población) data de 2016.

Source: CEPAL, 2021

Latin America and the BRI

- 19 countries have signed MOUs → BR, MX, CO, and AR have not
 - Pre-existing projects entered the BRI umbrella
 - 2010-2014 → 31 projects in LAC = over US\$ 21 billion investment and 130.122 jobs
 - 2015-2019 → 51 projects = over US\$54 billion investment and 134,801 jobs
 - Energy and transport = 70% of projects
 - Plus: Ports, telecommunications, health, water and military
-

3. Digital Transformation in China

Chinese Digital Ecosystem

- Massive scale of internet users
 - Developed and insulated national digital platform ecosystem
 - Public policies through gov and big tech platforms cooperation
-

Travel card (left) and health code (right)



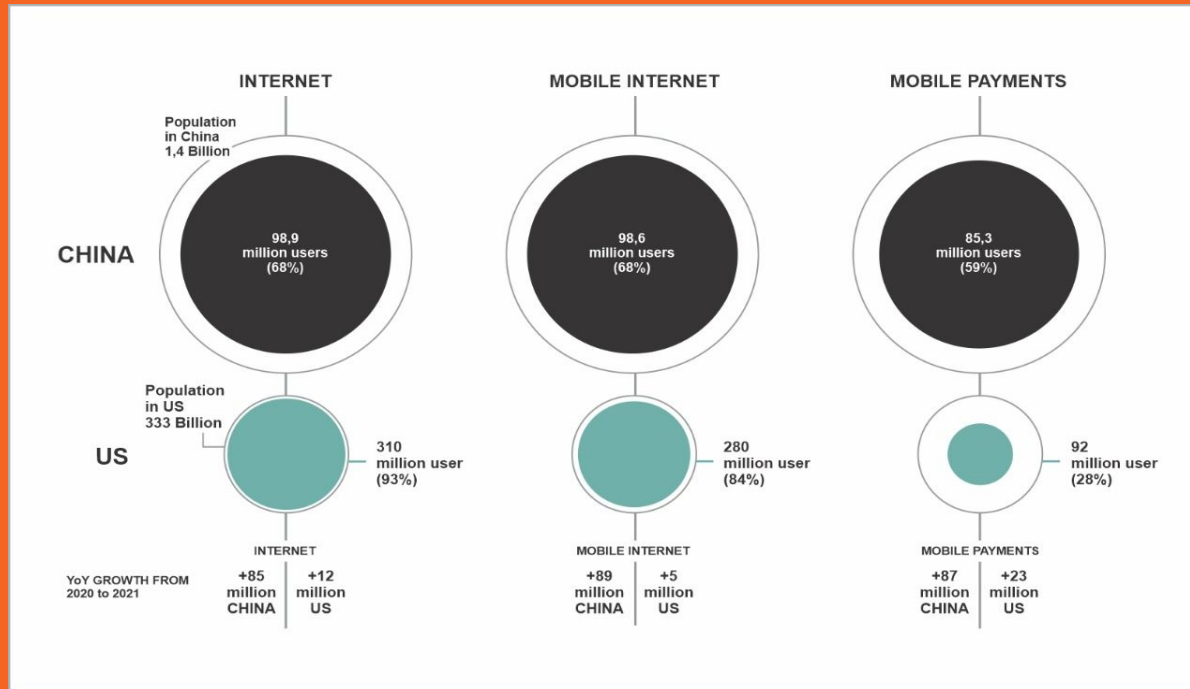
Note: The travel card reports where the individuals traveled to during the previous two weeks, while the health code is designed to identify individuals' risk levels of exposure to the pandemic. Green code means normal, yellow code refers to possible presence in some risk areas during the previous weeks, and red code indicates close contact with confirmed COVID-19 cases.

Source: HUANG et al, 2021

China Digital Trends

- **Closing the gap between urban and rural**
 - **Struggling for the innovation leadership of the Digital Age**
 - **Towards a digital cash society**
-

Digital Ecosystem: China and USA



Source: SCMP, 2021

Digital Players: China and USA

	Alibaba Group 阿里巴巴集团	淘天集团 TAO.COM							钉钉 DINGTALK
	Baidu 百度								
	ByteDance 字节跳动	头条							
	Tencent 腾讯								
	Others								
	E-commerce	Content & media					Gaming		Blockchain
		News aggregator	Music	Podcasts	Short-form video	Other videos	Gaming	Video game streaming	
	Others	ebay Walmart	F	TIDAL Spotify	TRILLER tiktok	hulu Disney	ACTIVISION BLIZZARD R		IBM master card
	amazon	a	amazon				amazon game studios		
	Apple		Apple Music				Apple Arcade		
	f	f					oculus	f	diem
	Google							YouTube	
	Microsoft						Microsoft Studios		

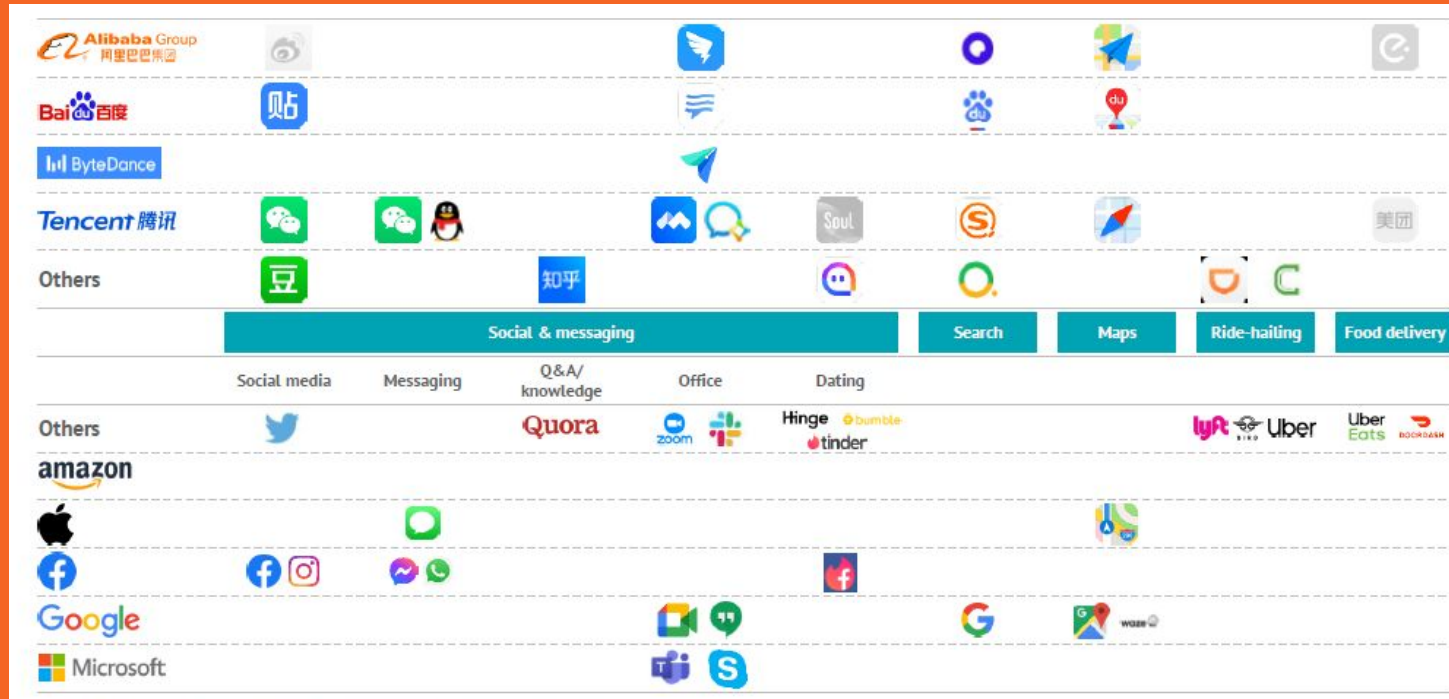
Source: SCMP, 2021

Digital Players: China and USA

Alibaba Group 阿里巴巴集团	支	花呗	余额宝	蚂蚁保	阿里健康	X P E N G	auton-	METAVU 乐视	酷喵	
Baidu 百度	爱奇艺	百信银行 AIBANK	度小满理财	100	3D	WELTAPSTER 威立士	小鹏汽车	CIDR 车路协同	Baidu 百度	
ByteDance				大力	h			GCRAFT	ByteDance AI Lab	
Tencent 腾讯	QQ钱包	微信支付	京东支付	美团	美团	美团	美团	美团	Tencent AI Lab	
Others										
	Fintech				Online education	Healthtech	Smart cars		5G	AI
	Payment	Digital-only banking	Wealthtech	Insurtech			Electric cars	Autonomous cars		
Others	Pay	Varo only	Public	Linowade NEXT	edX	edX	特斯拉	cruise	Qualcomm	NVIDIA
amazon	Pay				amazon pharmacy			ZOOX	amazon project kuiper	a
Apple	Apple Pay									
Facebook								WAYMO		FACEBOOK AI
Google	Google Pay									DeepMind Google AI
Microsoft					Microsoft LEARNING					

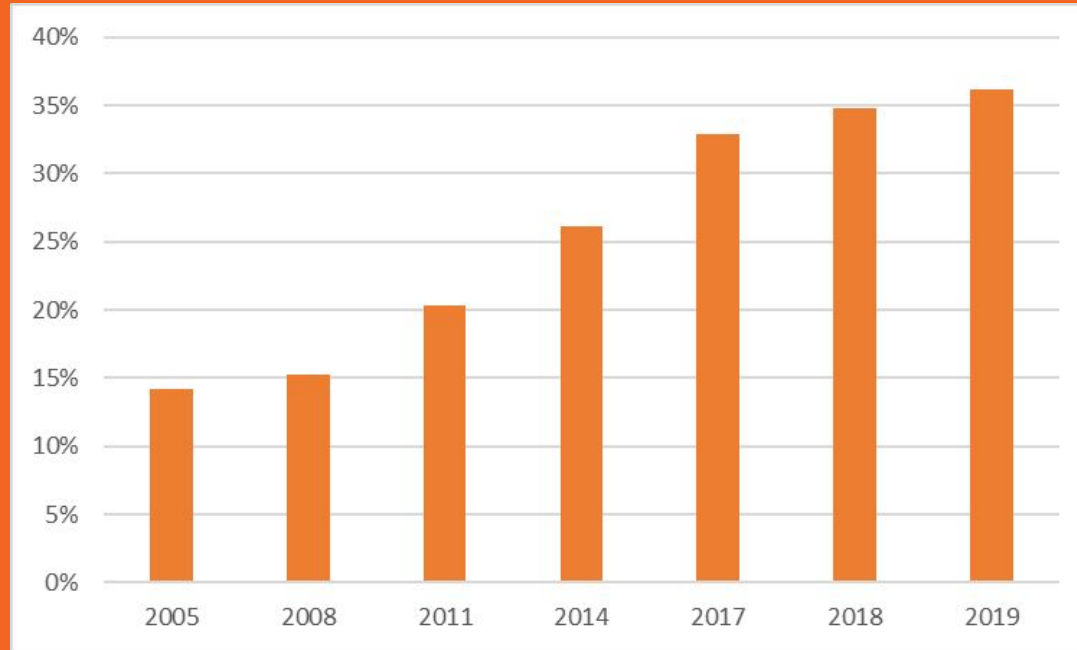
Source: SCMP, 2021

Digital Players: China and USA



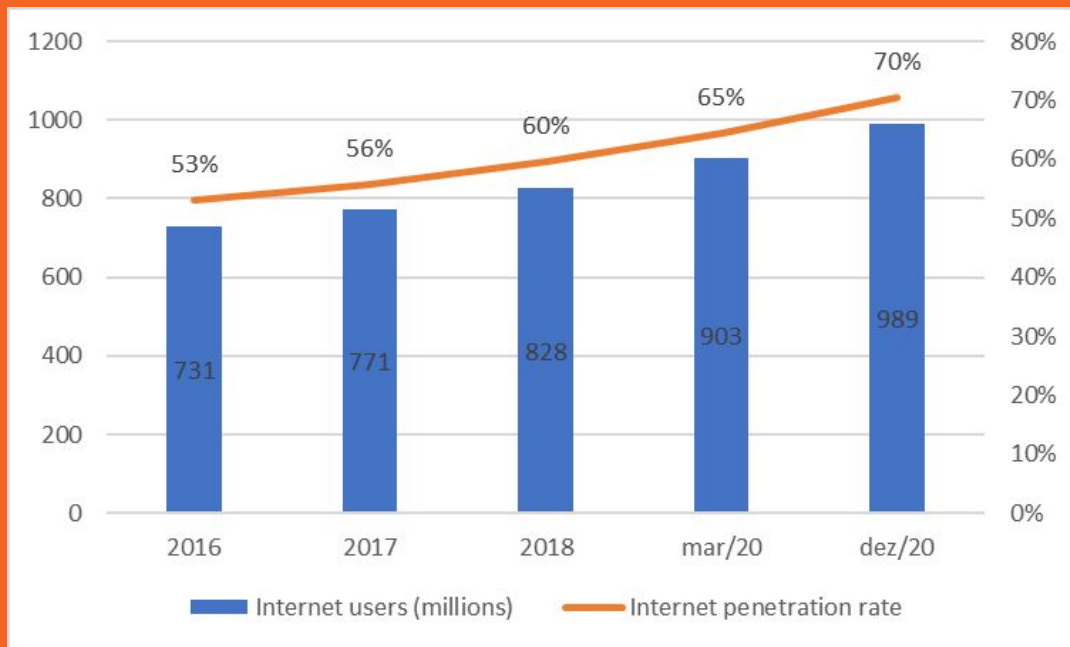
Source: SCMP, 2021

Proportion of digital economy in China's GDP



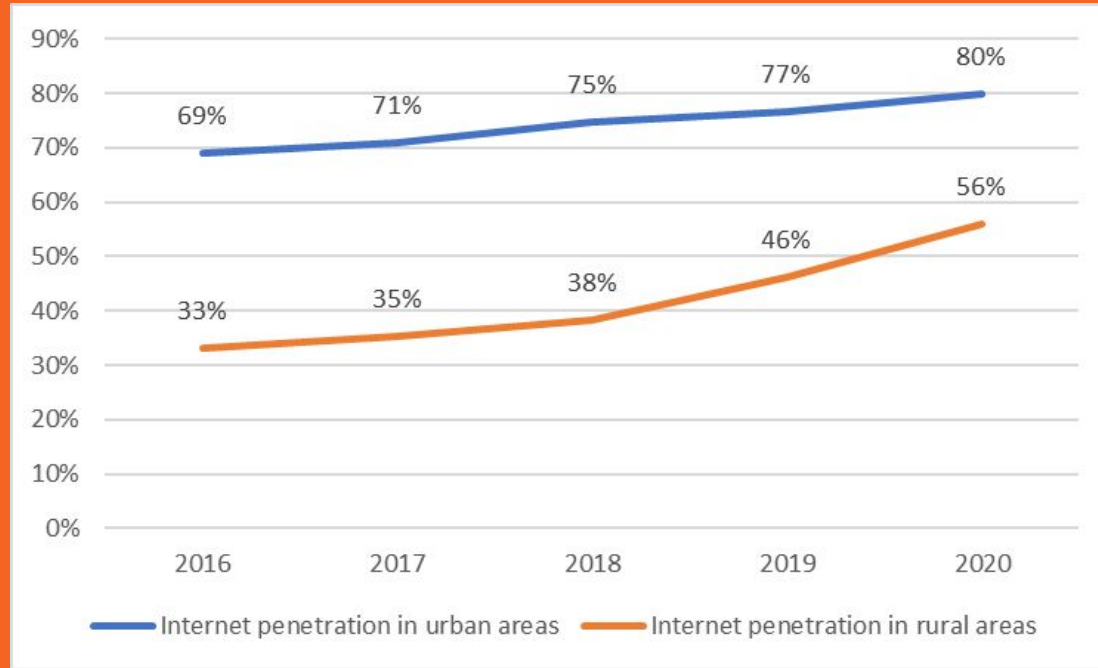
Source: CAICT, 2020

Internet users and penetration rate in China (2016-2020)



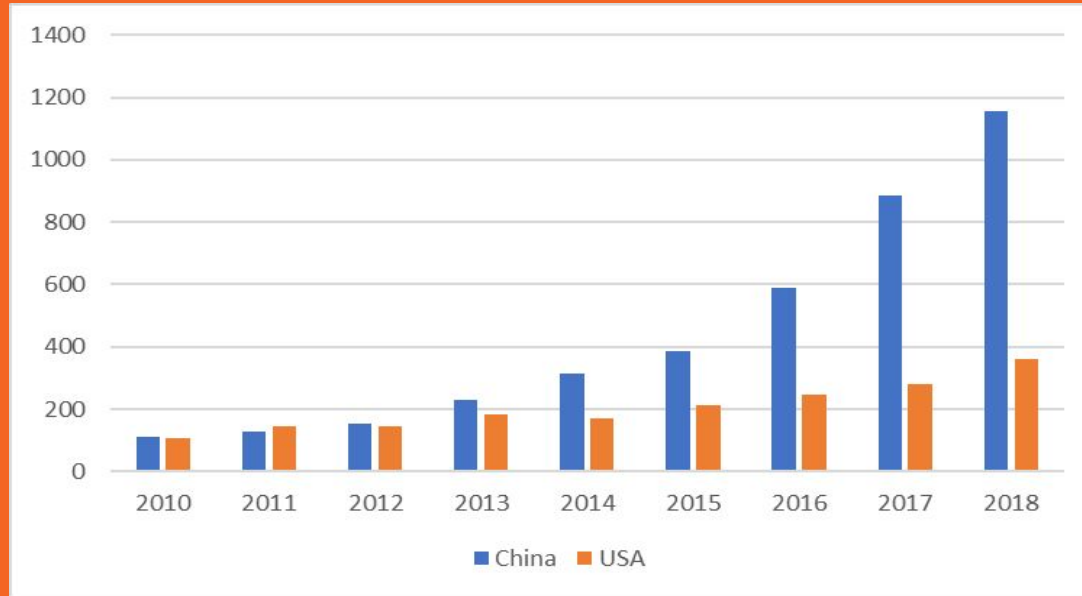
Source: CNNIC, 2021

Internet penetration rate in urban and rural areas China (2016-2020)



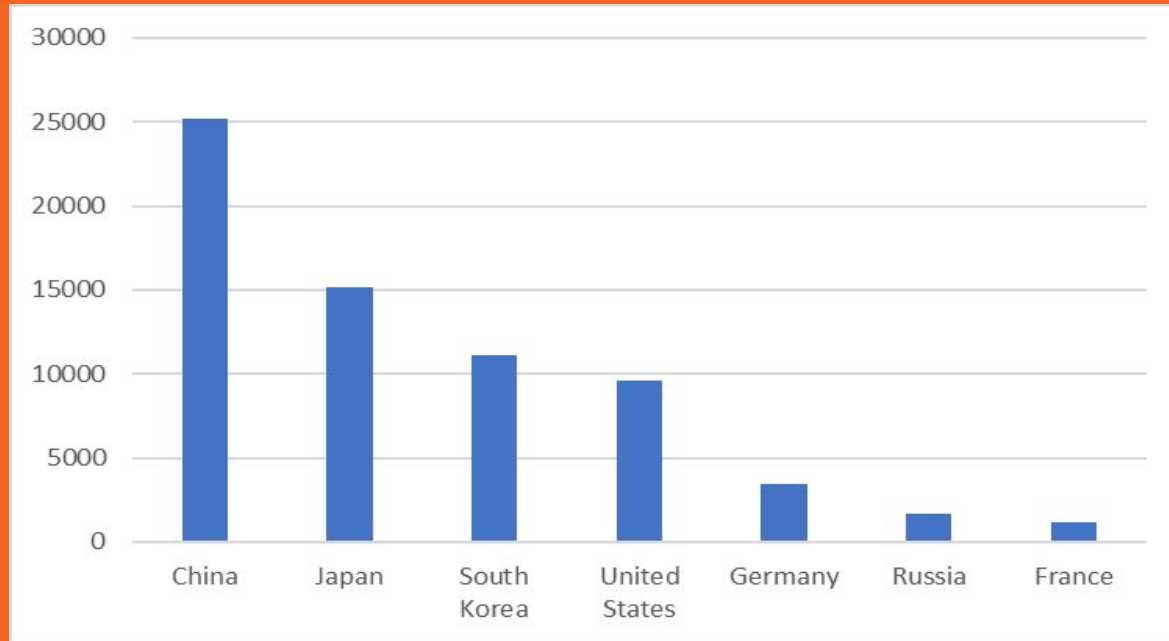
Source: CNNIC, 2021

USA and China: quantum patents per year (2010-2018)



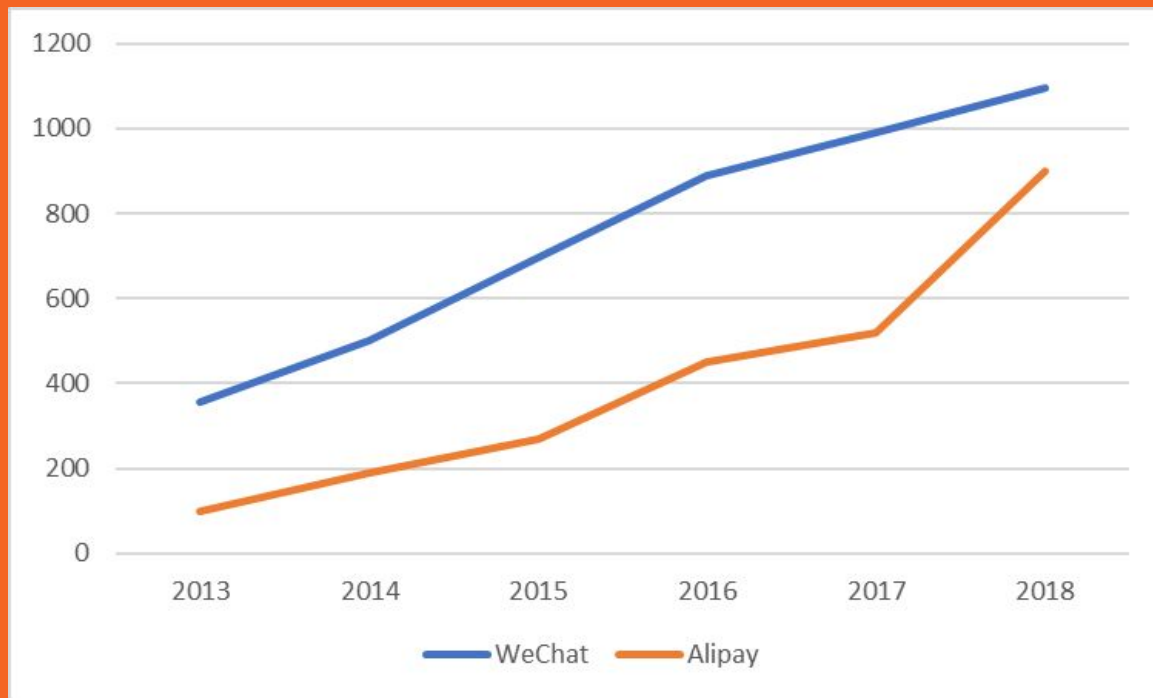
Source: ALLISON et al, 2021

Top 10 countries by granted robotics patents (2005-2019)



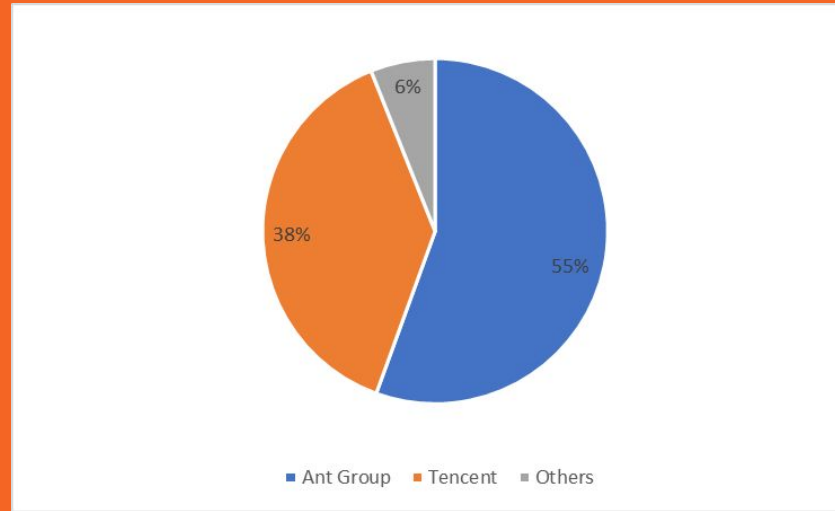
Source: CSET, 2021

Number of active users of Alipay and WeChat



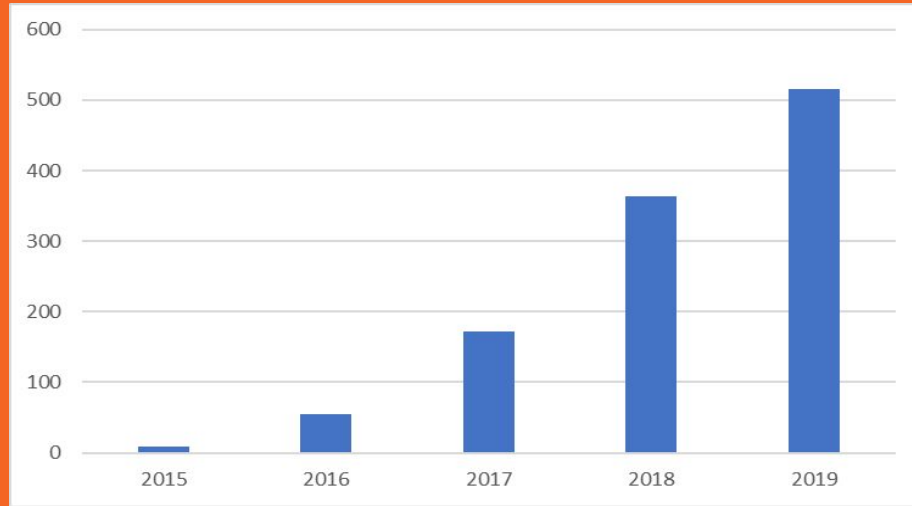
Source: HUANG et al, 2021

Mobile payment market share in China (2020 2Q)



Source: SCMP, 2021

Lending by Big Tech in China (billion US\$)



Source: SCMP, 2021

4. Digital Challenges in Latin America

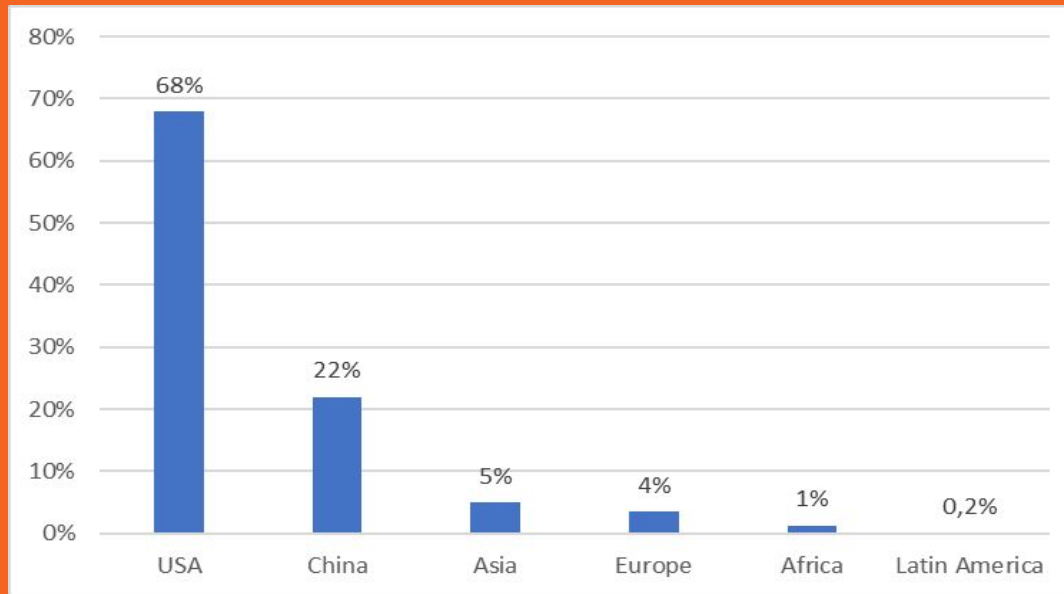
LAC Digital Ecosystem

- Underdeveloped regional digital platform ecosystem
 - Widening the urban-rural divide
 - Affordability as the main factor of digital exclusion
 - Lagging behind on 5G infrastructure
-

Timeline

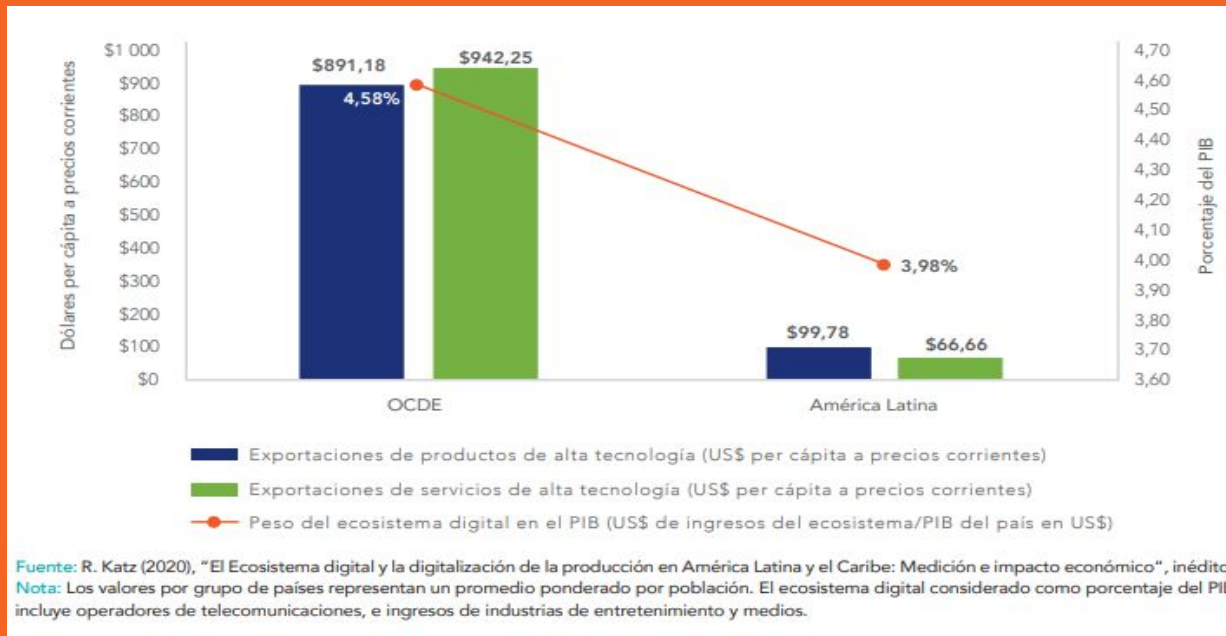
- **2005: Plan of Action on the Information Society in Latin America eLAC 2007**
 - **2008: Plan of Action eLAC 2010**
 - **2010: Plan of Action eLAC2015**
 - **2013: Ministerial Conference on the Information Society in Latin America**
 - **2015: Plan of Action eLAC2018**
 - **2018: Digital Agenda for Latin America and the Caribbean**
-

Market capitalization of 70 largest digital platforms by region (2019)



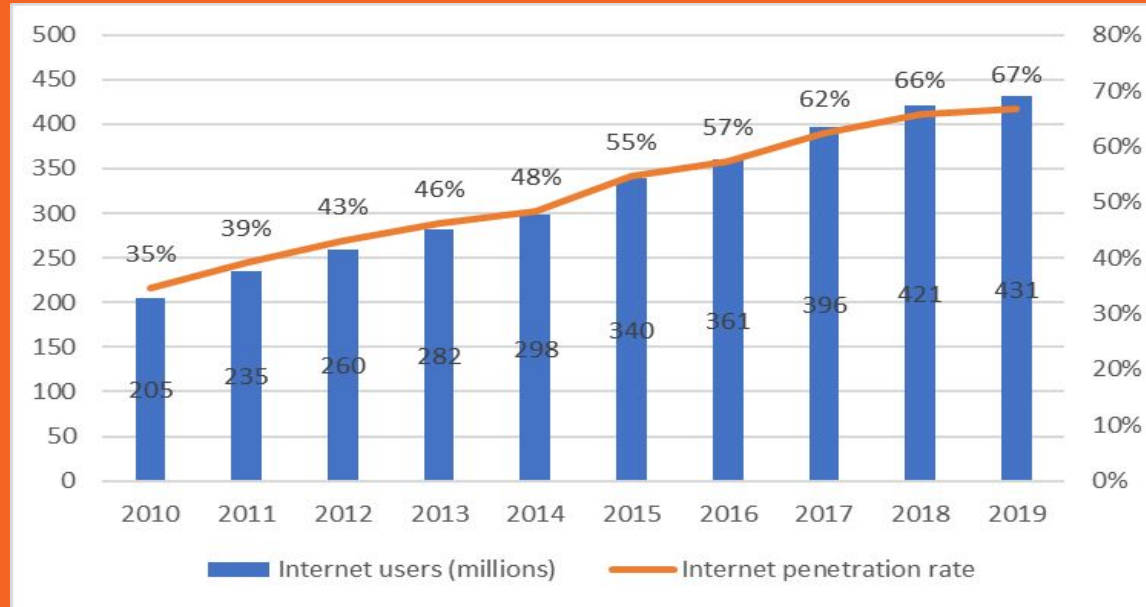
Source: UNCTAD, 2019

Digital Ecosystem (GDP and exports): OECD and LAC



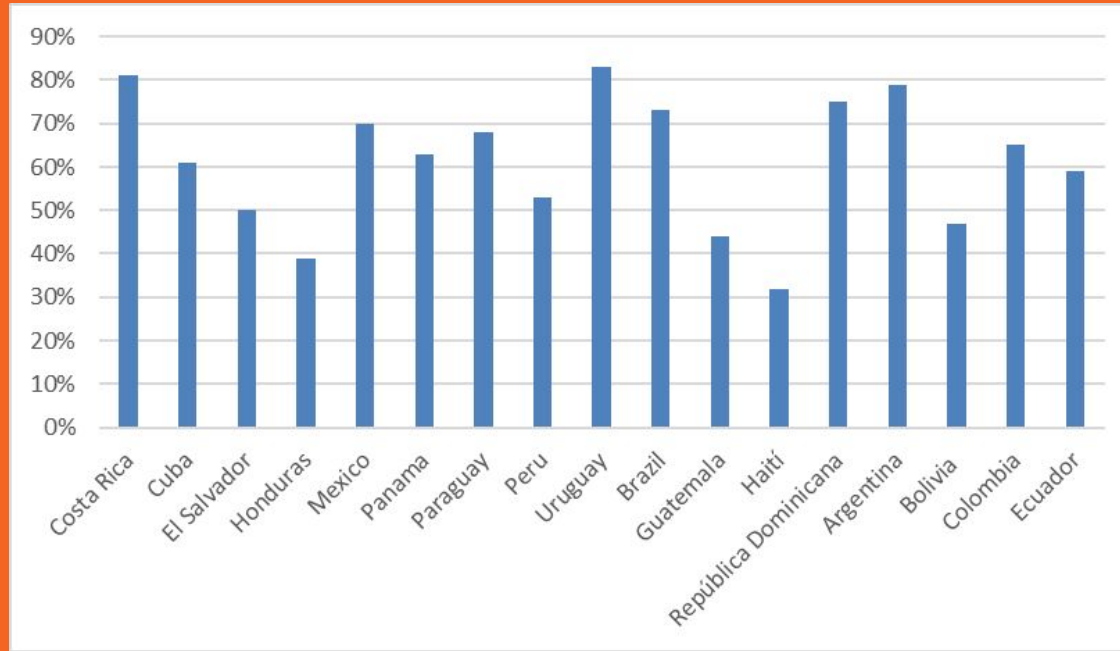
Source: CEPAL, 2021

Users and Internet penetration rate in LAC (2020)



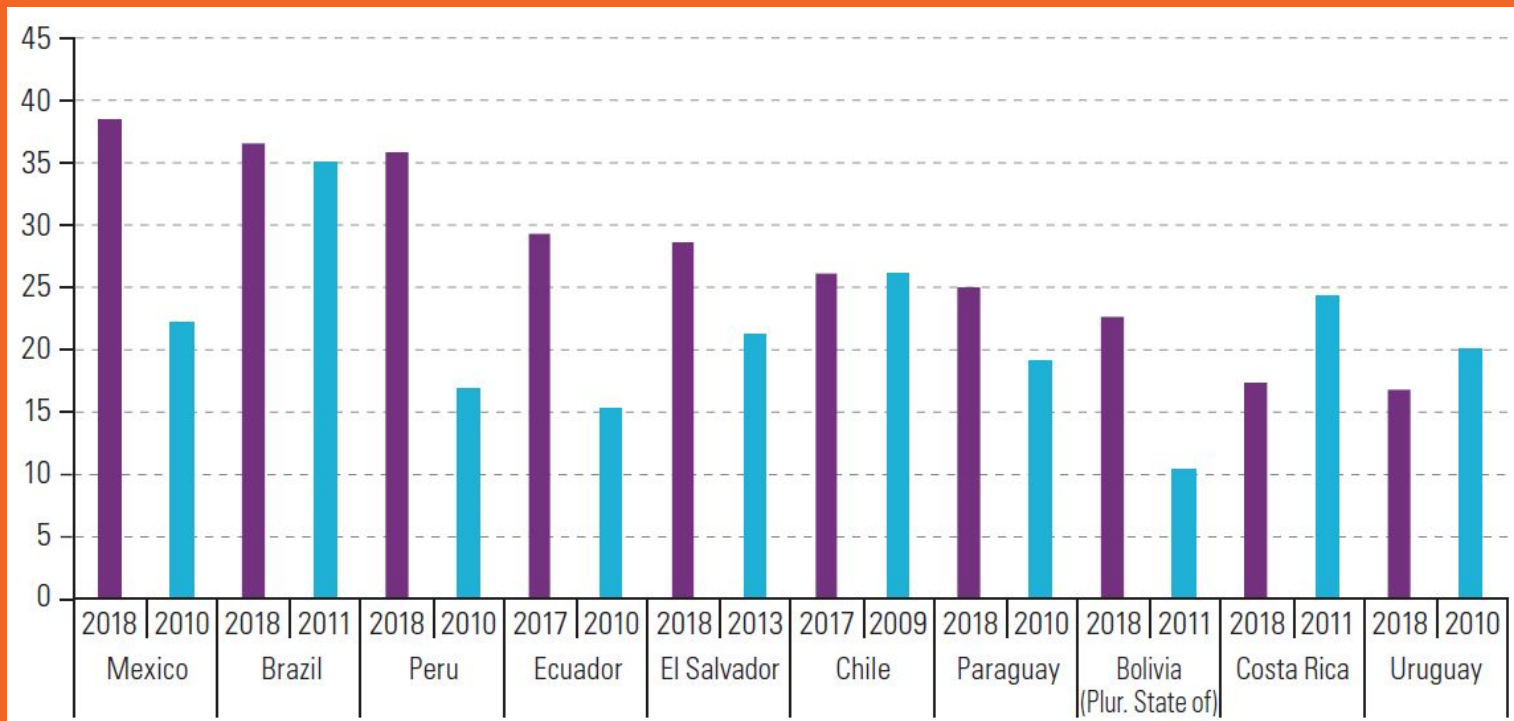
Source: CEPAL, 2020

Internet Penetration Rate in LAC (2019)



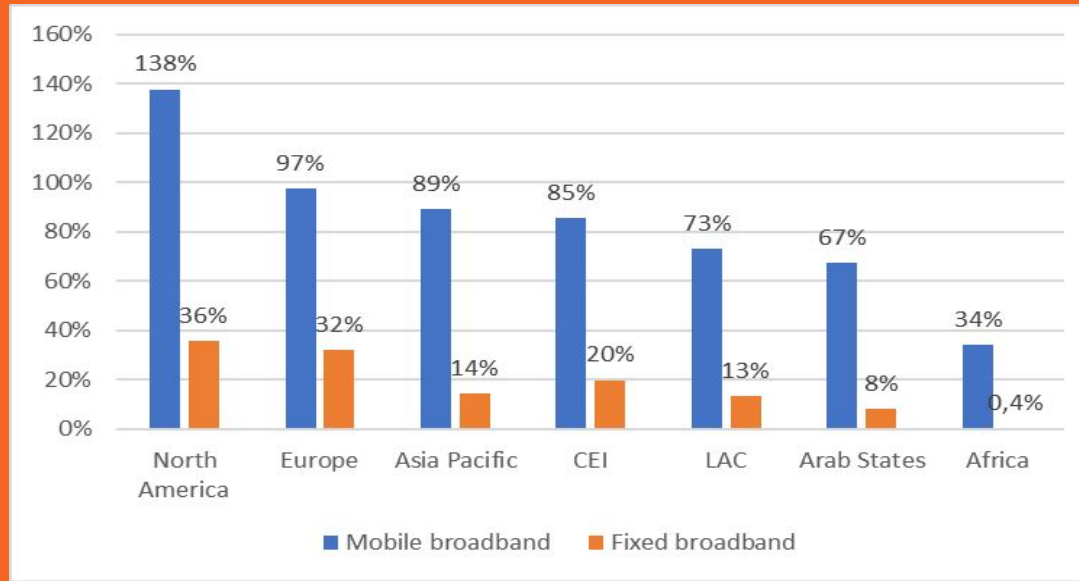
Source: CEPAL, 2022

Urban-Rural Digital Divide in LAC (2010 - 2018, percentage points)



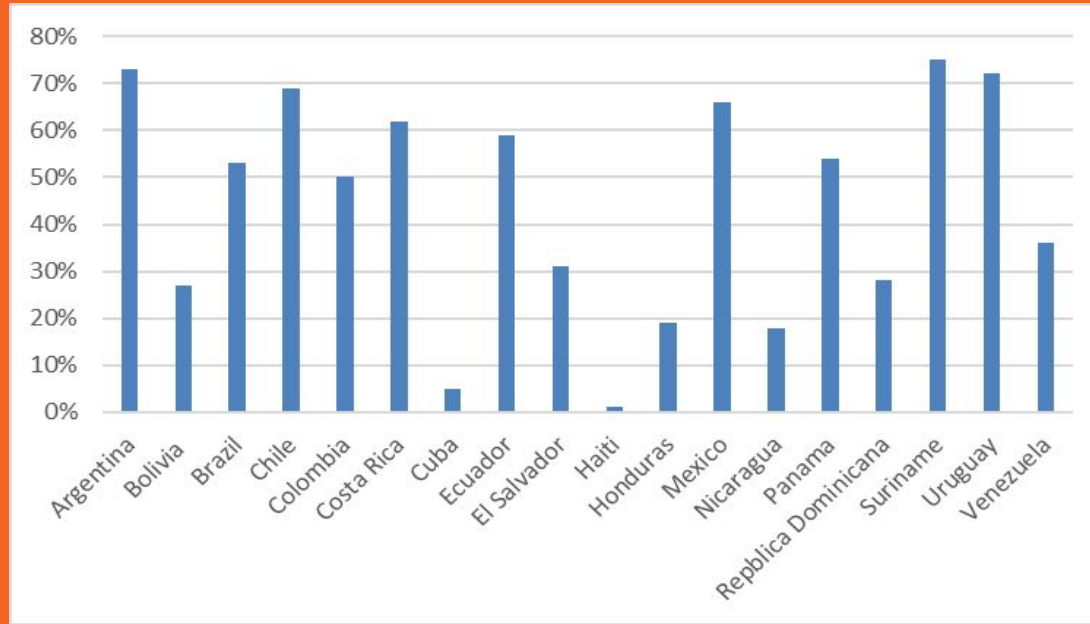
Source: CEPAL, 2021

Fixed and mobile broadband subscription (2019, % of total population)



Source: CEPAL, 2021

Household fixed broadband subscription LAC (2019, % of total)



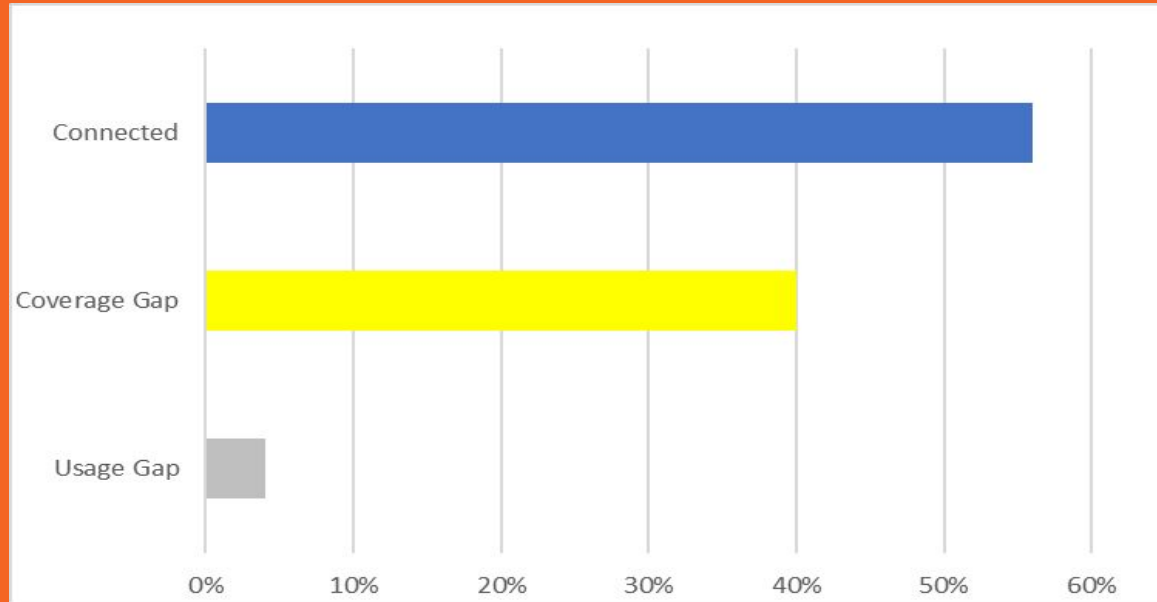
Source: CEPAL, 2022

5G population coverage (2020)



Source: Global System for Mobile Communications Association, 2021

State of mobile internet connectivity LAC (2020)



Source: Global System for Mobile Communications Association, 2021

Mobile Connectivity Index (2019)

Country	Index Score	Infrastructure	Affordability	Consumer Readiness	Content and Service
China	76	76.5	68.9	78.2	81
Brazil	63.5	69.8	41.6	77.3	72.5
Mexico	67.6	65.9	58.3	72.4	74.9
Chile	73.2	74	60	86.2	74.5
Argentina	67.2	70.5	46.9	85.0	72.3

Source: Global System for Mobile Communications Association, 2020

Digital Competitiveness Index (2021)

Country	Global rank	Knowledge	Technology	Future Readiness
China	15	6	20	17
Brazil	51	51	55	45
Mexico	56	54	57	51
Chile	39	49	35	36
Argentina	61	55	62	52

Source: Institute for Management Development, 2021

Global Innovation Index (2021)

Country	Overall Ranking	Institutions	Human capital and research	Infra structure	Market sophistication	Business sophistication	Knowledge and technology outputs	Creative outputs
China	12	61	21	24	16	13	4	14
Brazil	57	78	48	69	75	34	51	66
Mexico	55	77	56	67	55	56	53	52
Chile	53	40	51	47	66	48	58	60
Argentina	79	102	50	64	110	57	73	73

Source: World Intellectual Property Organization , 2021

5. Research Agenda

-
- 1. How disputes between USA and PRC impact the international strategies of Southeast Asian (SEA) and Latin American and the Caribbean (LAC) countries?**
 - 2. Why different levels of regional cohesion affect LAC and SEA adaptation capabilities to the second phase of the Digital Age?**
 - 3. Does the internationalization of China's Big Tech generate networked relations between Chinese corporate elites and business elites in SEA and LAC?**
 - 4. How Digital Silk Road (DSR) initiatives impact the STEM personnel availability in the SEA and LAC countries?**
-

My wholehearted thanks to Camila Souza and Pedro Brancher for their partnership in this endeavor.

Thank You

谢谢

mcepik@gmail.com
