Digital Futures and Global Power

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INSTITUTO LULA
Power to the People in the Digital Era
International Chair: Professor Aaron Schneider (University of Denver)
March 26

Thanks to Aaron Schneider for the invitation to be part of this important initiative. Congratulations to the Instituto Lula for bringing people together to critically think and act on this topic. Pedro Brancher, thanks for the partnership in this project. Thanks to Arthur Cepik for discussing ideas and assisting with much valued tech insights. Our aim is to contribute to the development of an emancipatory social alternative to the ongoing transformations in the contemporary world.

This talk will be divided into two parts. In the **FIRST** part, we will clarify the meaning we will assign to Digital Era and related concepts. Some empirical information will also exemplify the two general dynamics of digital transformation: datafication and network building. In the **SECOND** part, we will discuss the digital inequalities levels and types. Additional comments will be made regarding international governance deficits and conflicts.

1. Digital Transformation

- Concepts
- Dynamics

Digital Age

By Digital Age, one should understand the historical period since 1971 (the first microprocessor), distinguished by the growing centrality of digitized science, technology, and innovation systems for the production, circulation, and consumption of material and cultural values engendered by networked intellectual work (Cepik; Brancher, 2022). In this sense, the two most important properties and dynamics of the Digital Age are exponential **datafication** and free-of-scale **networking** (Śledziewska & Włoch, 2021).

The transition to the Digital Age is also characterized by the hegemony of financial capital (**financialization**) and the **global power struggle** between the United States of America (USA) and the People's Republic of China (PRC). Our current research project will analyze the strategic response of **Latin American** and **Southeast Asian** peoples and governments to the challenges and opportunities engendered by the advancement of digitalization in various social formations.

Although the Digital Age is not yet a new Mode of Production (Marx), the growing contradictions between the new productive forces, the inherited social relations, and the natural environment in the current phase of capitalism are at least as radical as the processes experienced in the Modern Age. The future of humanity and the planet depend on the **global working class's strategic struggle** to transform the Digital Age into a more democratic, equal, and sustainable system (*Gesellschaftsformation*). Neither dystopian pessimism nor utopian optimism will be able to build a better future.

Cyberspace

Cyberspace is the environment created by people, devices, infrastructure, information, and communication systems using the electromagnetic spectrum. More or less interconnected **analog and digital** networks define cyberspace as temporally and spatially larger than the Internet (Kuehl, 2009).

Digital Transformation

Digital transformation, therefore, is the process through which organizations create and incorporate digital technologies that increasingly integrate the **physical**, **application**, and **cognitive** layers of cyberspace shared by billions of people.

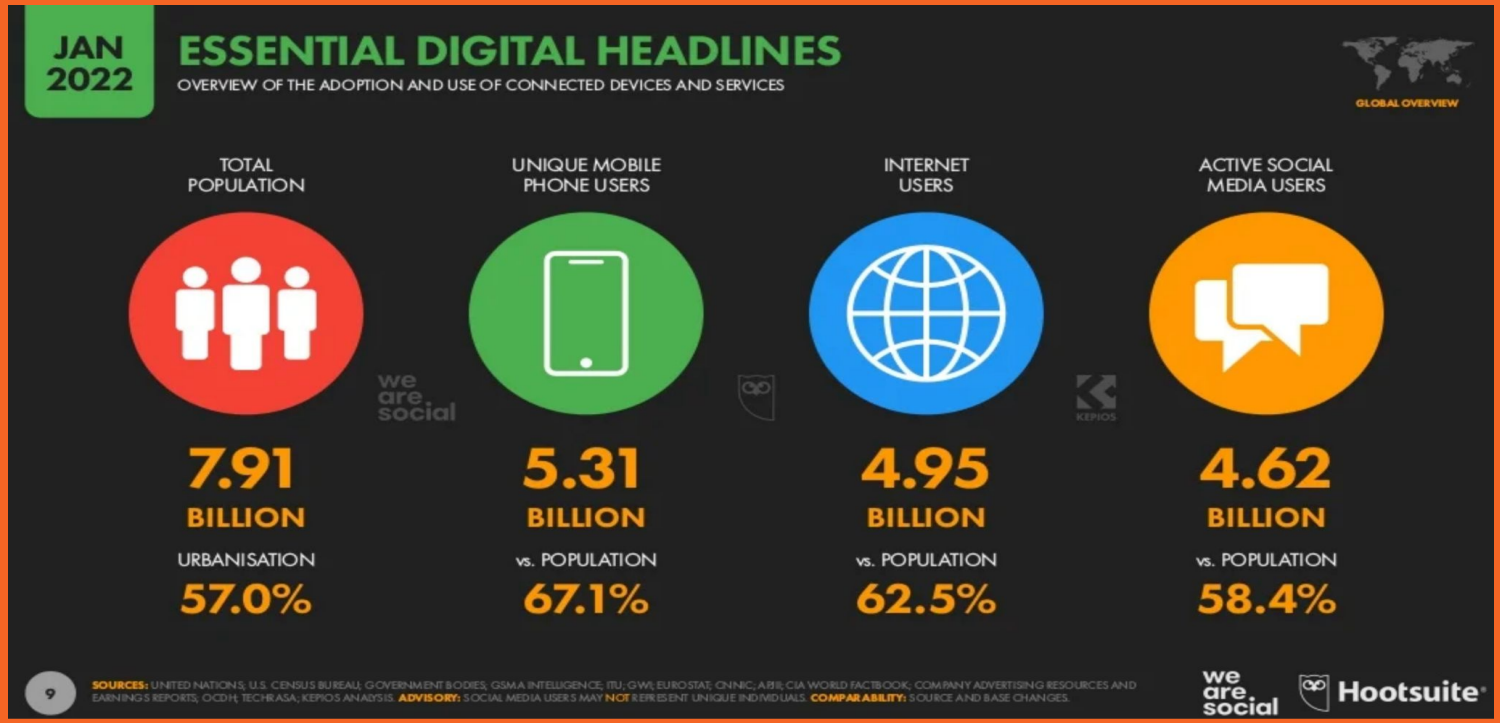
Platformization

Digital platforms are the dominant **organizational form** of firms and institutions in the contemporary world (Srnicek, 2016). First, the platforms' center of gravity is cyberspace itself, where leading corporations impose entry barriers and interaction norms (Djick, Poell & Waal, 2018). Second, platforms develop reprogrammable software. Abundant data and financial concentration allow continuous updating of interfaces and algorithms and novel applications from core components (Helmond, 2015). Third, the market capitalization **value** of the digital platform is not based on earnings, physical assets, or even scale and scope economies but on **network traffic generating Big Data**. The more users operate on the platform, the more valuable it becomes for the users themselves and the company since more personalized products and services can be generated (Cusumano, Gawer & Yoffie, 2019).

Dynamics

According to Lang (2021), general-purpose technologies and specific innovation breakthroughs have defined the Digital Age. Three exponential laws predicted the **general direction** of such changes:

- **Moore's law** (number of processing units in computer chips doubles every 18 months)
- **Butter's law** (network communication speed doubles every nine months)
- **Kryder's law** (storage capacity doubles every 13 months).



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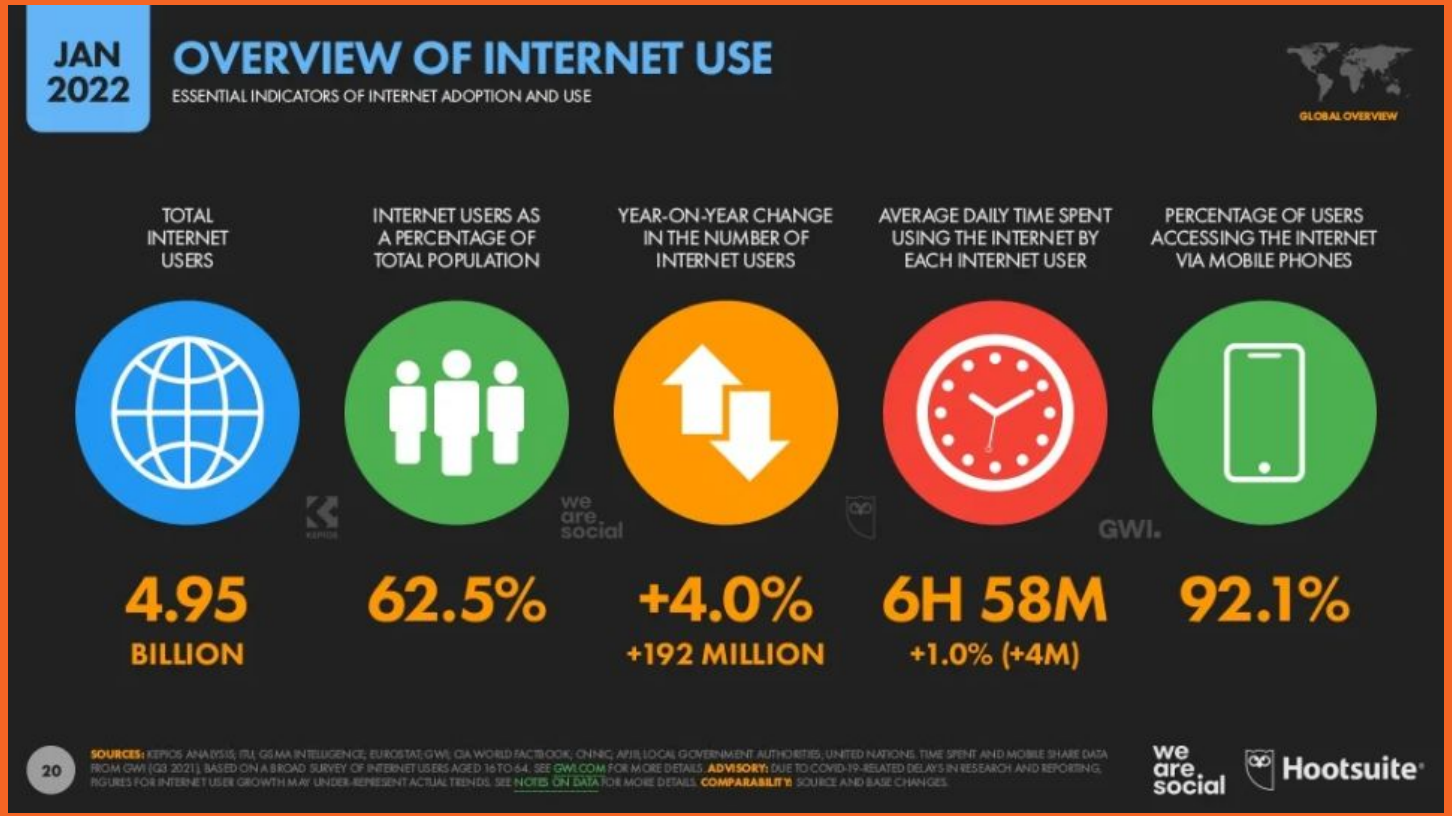

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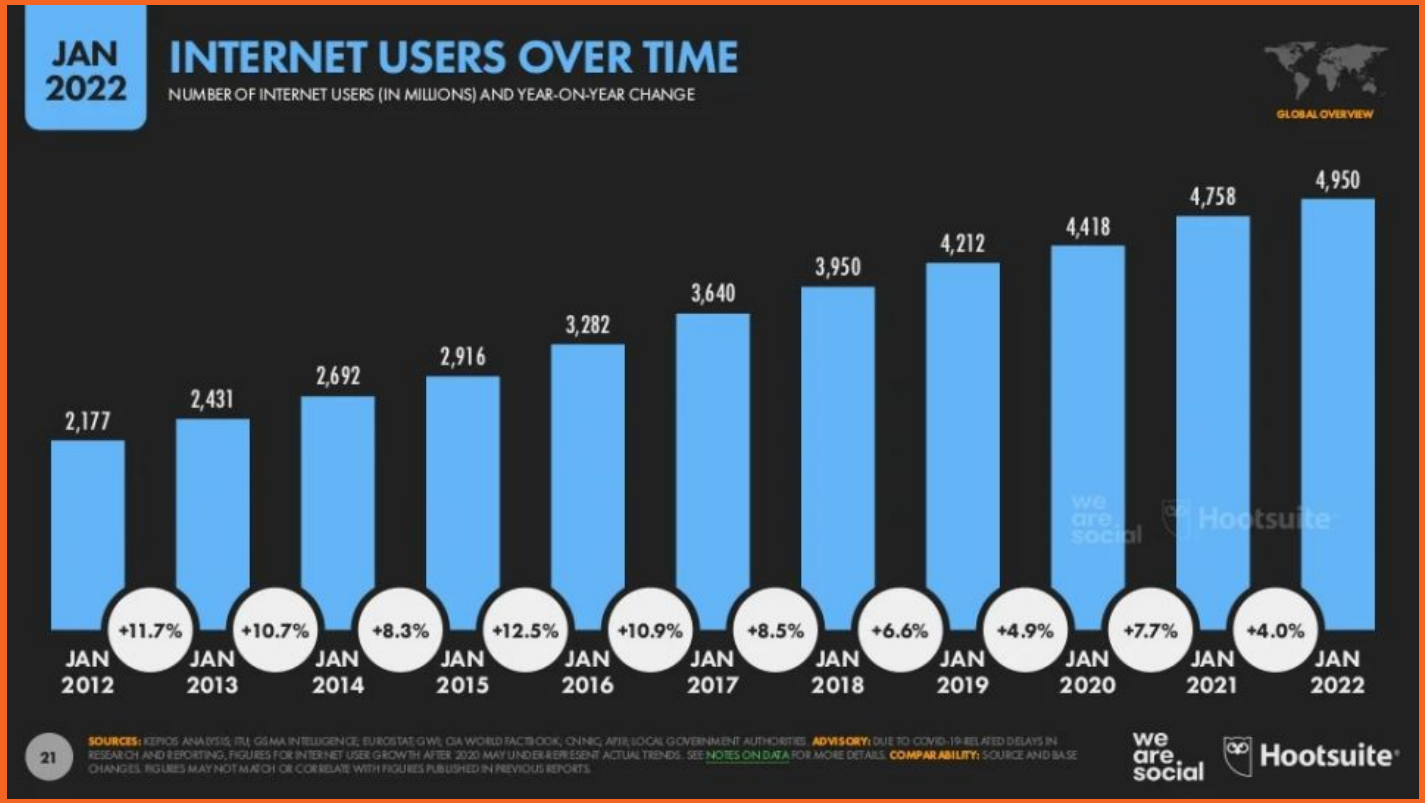

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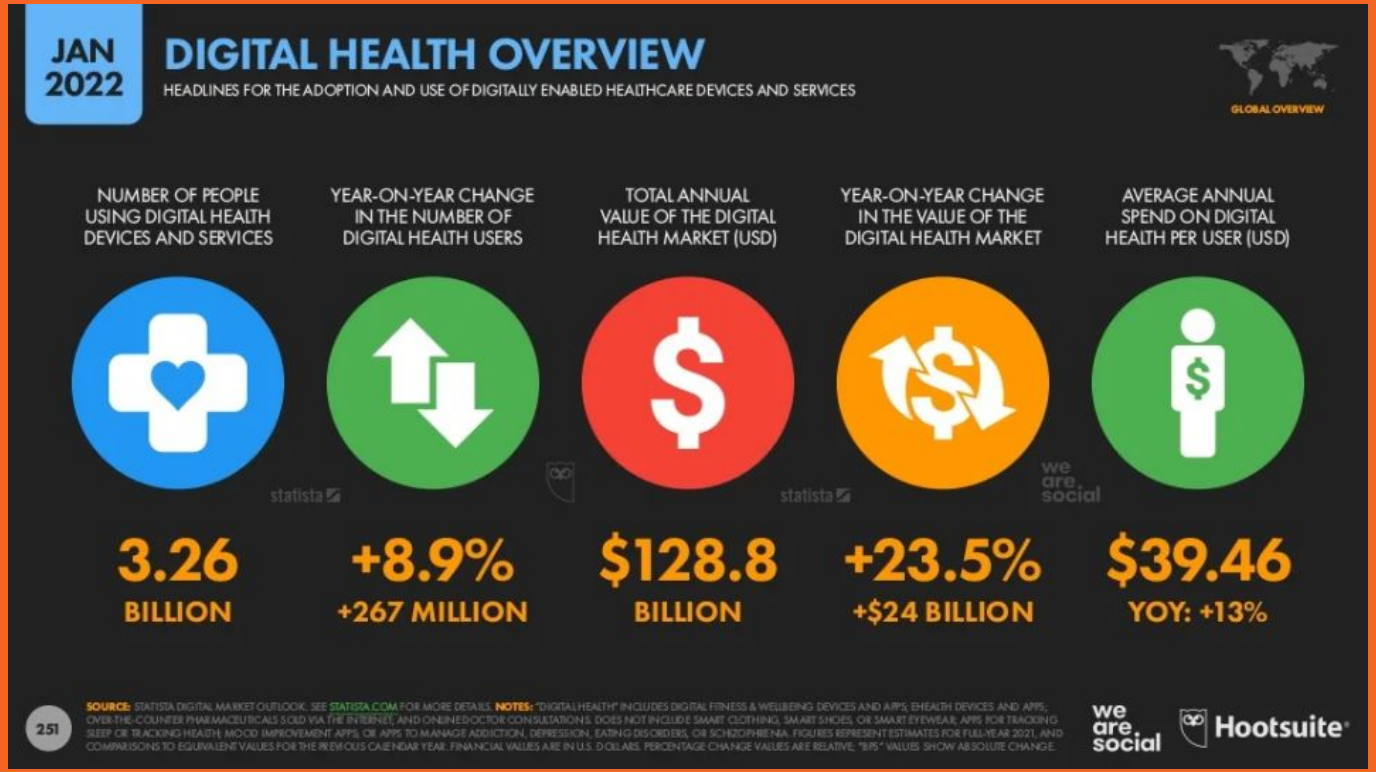

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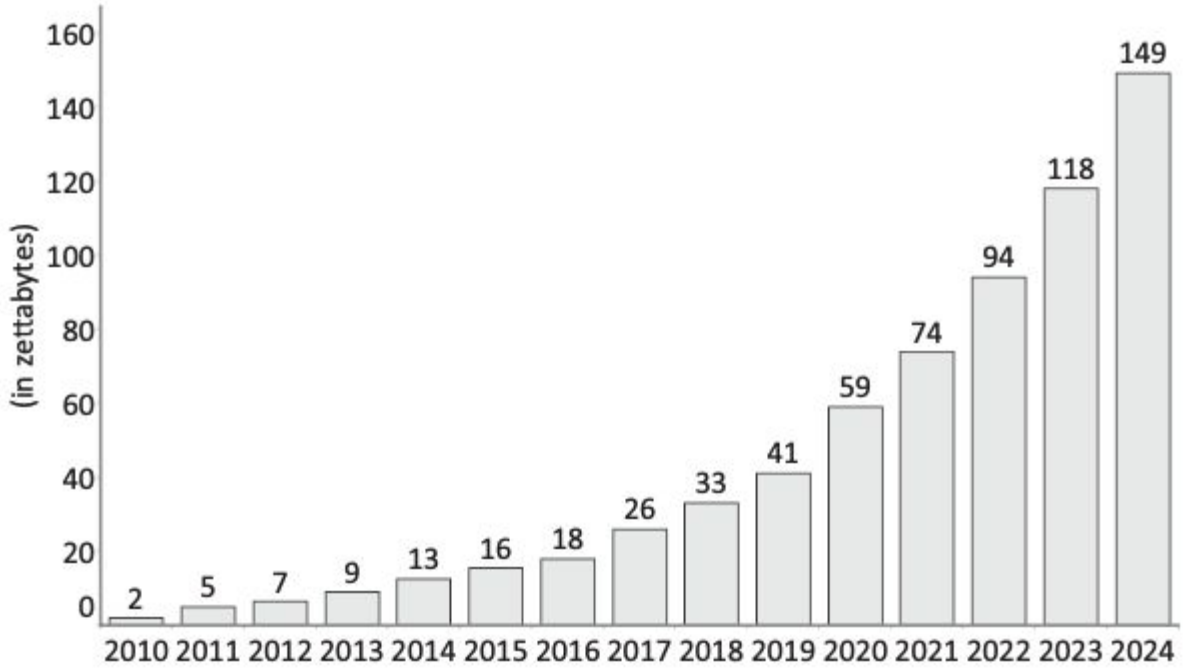


Figure 1.7 Volume of data as an effect of digitalisation (in zettabytes, 2010–2024).

Source: Śledziewska & Włoch, 2021

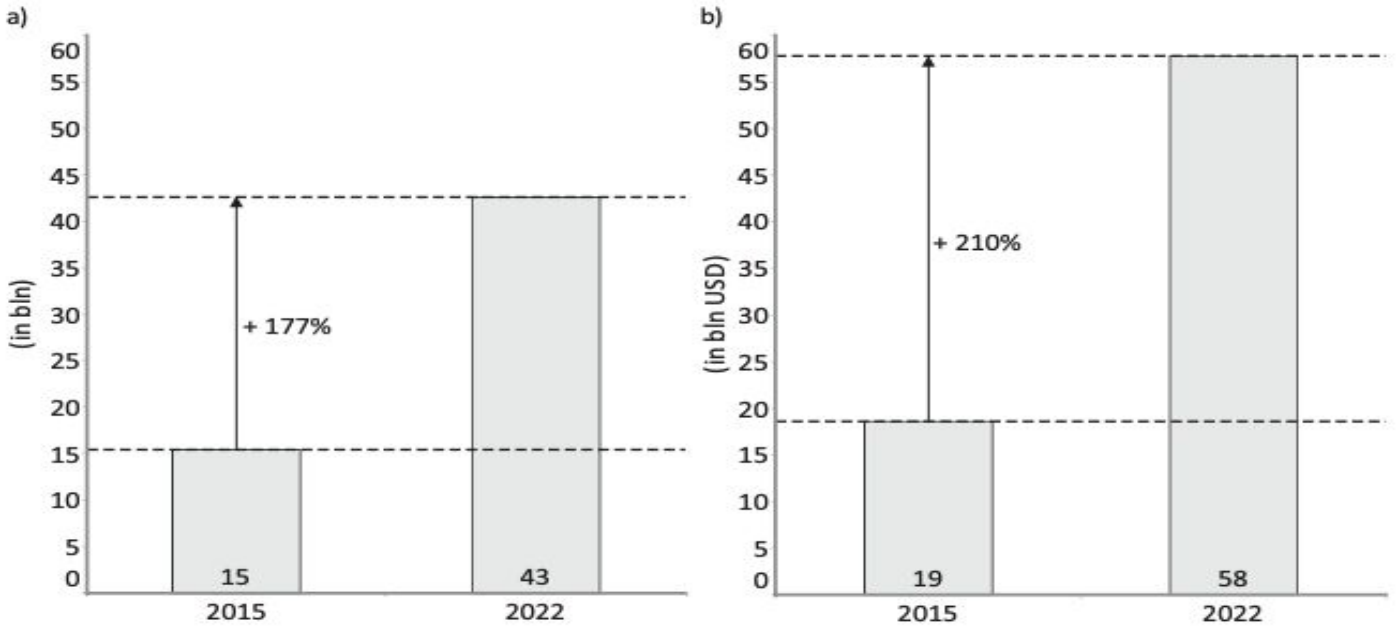


Figure 1.6 (a) Number of interconnected IoT devices (in billion units, worldwide, 2015 and 2022★); (b) global smart sensors market size (in billion USD, 2015 and 2022★).

Source: Śledziewska & Włoch, 2021

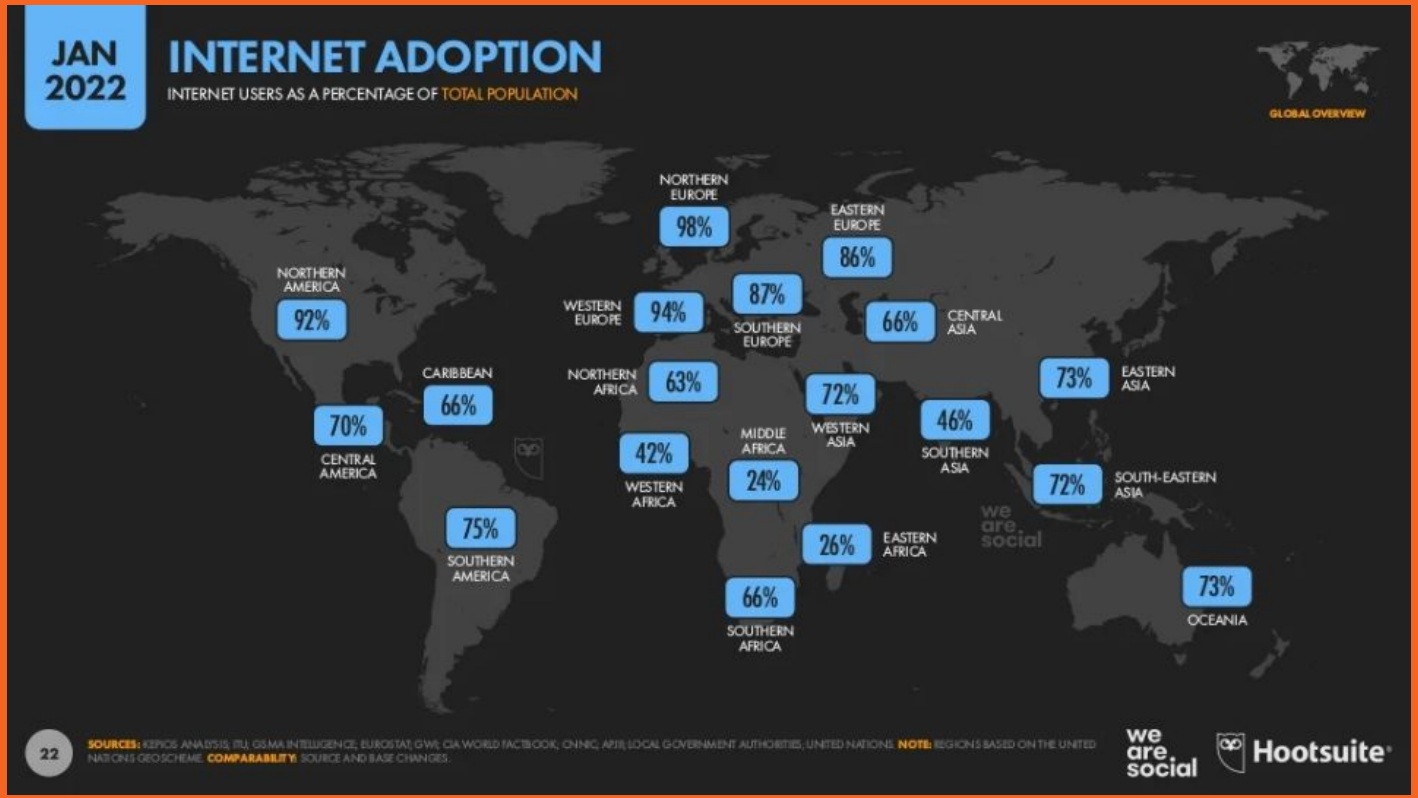
Since the beginning of the **Covid-19 pandemic**, there has been an enormous increase in online activities, measured by the number of new users, consumers, products, and services (private and government). Major platforms have concentrated even more capital and have entered into fierce competition among themselves and less so with governments. For example, the combined market capitalization value of Apple, Microsoft, Alphabet (Google), Amazon, and Meta (Facebook) reached **8.7 trillion** dollars in January 2022. The European Union has fined Google over 8 billion dollars since 2010. Even the so-called China's "regulatory crackdown" on the tech sector has not prevented the combined market capitalization value of Tencent, Alibaba, Meituan, and China Mobile from reaching 1.1 trillion dollars in the same period (https://companiesmarketcap.com).

Firms and governments will dispute emerging general-purpose technologies sustaining **datafication and networks** (*e.g.*, blockchain, cloud computing, artificial intelligence (AI), robotics, semiconductors, 3D printing, internet of things (IoT), 5G mobile, and quantum computing). Along with bio, energy, and space technologies, digital techs will profoundly impact economics, society, and security in the decades ahead (UNCTAD, 2019. Allison et al., 2021). The digital transformation of global capitalist society will continue to advance, as much as the social and international conflicts inherent to such processes. In the second part of this conversation, we shall focus on those conflicts.

2. Digital Conflicts

- Inequalities
- Governance

Digital inequalities are part of a much more significant and persistent structural problem intrinsic to capitalism. According to Ragnedda and Gladkova (2017), we can talk about three levels of digital inequalities. The **first** level is a divide between those who have and do not have adequate access to the required devices and the Internet. The **second** level relates to how different sociodemographic groups and individuals' use digital technologies and data. The **third** level of the digital divide is related to unequal capacities to create tangible and intangible benefits and outcomes from digital technologies.



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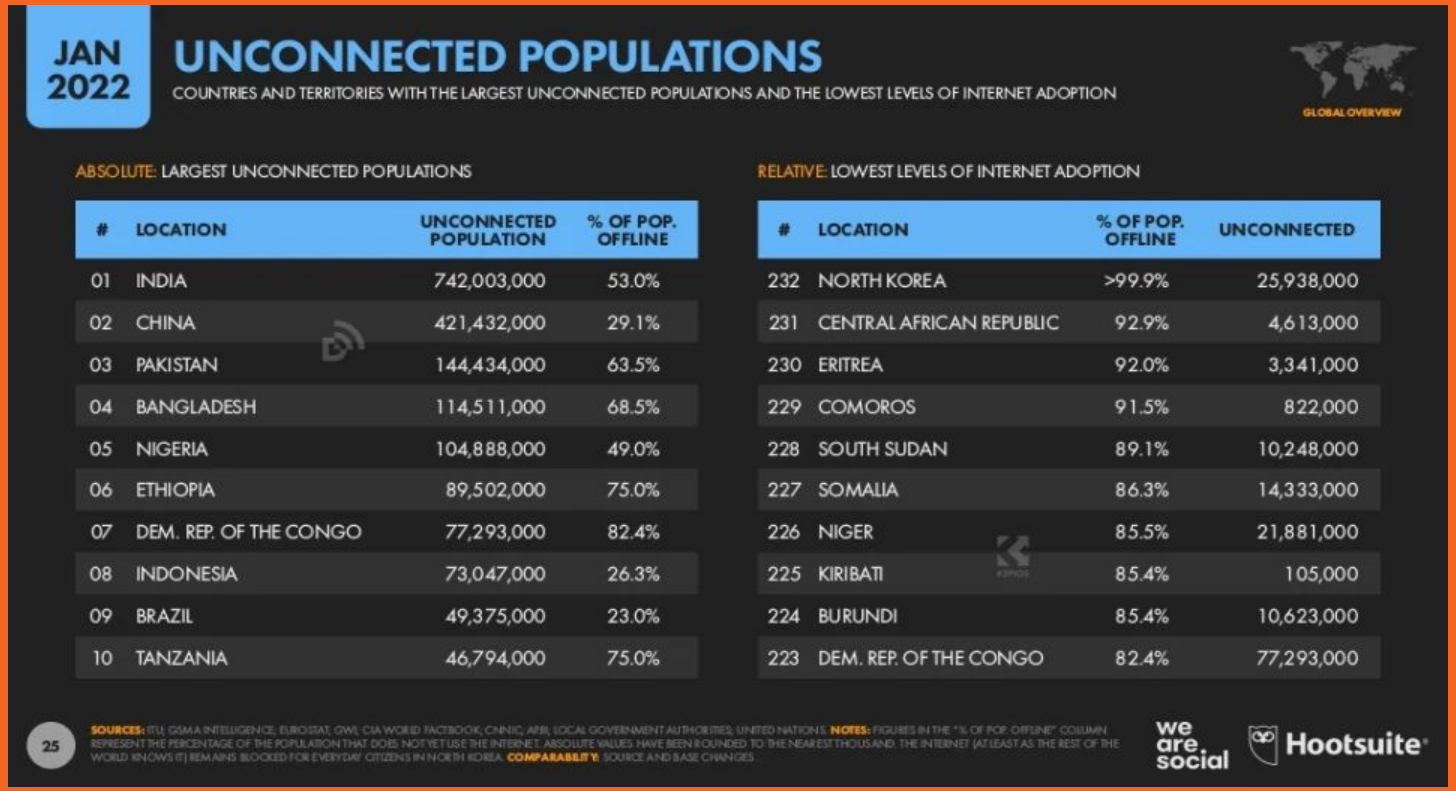

JAN 2022

UNCONNECTED POPULATIONS

COUNTRIES AND TERRITORIES WITH THE LARGEST UNCONNECTED POPULATIONS AND THE LOWEST LEVELS OF INTERNET ADOPTION

GLOBAL OVERVIEW

ABSOLUTE: LARGEST UNCONNECTED POPULATIONS

#	LOCATION	UNCONNECTED POPULATION	% OF POP. OFFLINE
01	INDIA	742,003,000	53.0%
02	CHINA	421,432,000	29.1%
03	PAKISTAN	144,434,000	63.5%
04	BANGLADESH	114,511,000	68.5%
05	NIGERIA	104,888,000	49.0%
06	ETHIOPIA	89,502,000	75.0%
07	DEM. REP. OF THE CONGO	77,293,000	82.4%
08	INDONESIA	73,047,000	26.3%
09	BRAZIL	49,375,000	23.0%
10	TANZANIA	46,794,000	75.0%

RELATIVE: LOWEST LEVELS OF INTERNET ADOPTION

#	LOCATION	% OF POP. OFFLINE	UNCONNECTED
232	NORTH KOREA	>99.9%	25,938,000
231	CENTRAL AFRICAN REPUBLIC	92.9%	4,613,000
230	ERITREA	92.0%	3,341,000
229	COMOROS	91.5%	822,000
228	SOUTH SUDAN	89.1%	10,248,000
227	SOMALIA	86.3%	14,333,000
226	NIGER	85.5%	21,881,000
225	KIRIBATI	85.4%	105,000
224	BURUNDI	85.4%	10,623,000
223	DEM. REP. OF THE CONGO	82.4%	77,293,000

25

SOURCES: ITU; GSMA INTELLIGENCE; EUROSTAT; GWI; CIA WORLD FACTBOOK; CNNIC; APJII; LOCAL GOVERNMENT AUTHORITIES; UNITED NATIONS. NOTES: FIGURES IN THE "% OF POP. OFFLINE" COLUMN REPRESENT THE PERCENTAGE OF THE POPULATION THAT DOES NOT YET USE THE INTERNET. ABSOLUTE VALUES HAVE BEEN ROUNDED TO THE NEAREST THOUSAND. THE INTERNET (AT LEAST AS THE REST OF THE WORLD KNOWS IT) REMAINS BLOCKED FOR EVERYDAY CITIZENS IN NORTH KOREA. COMPARABILITY: SOURCE AND BASE CHANGES.

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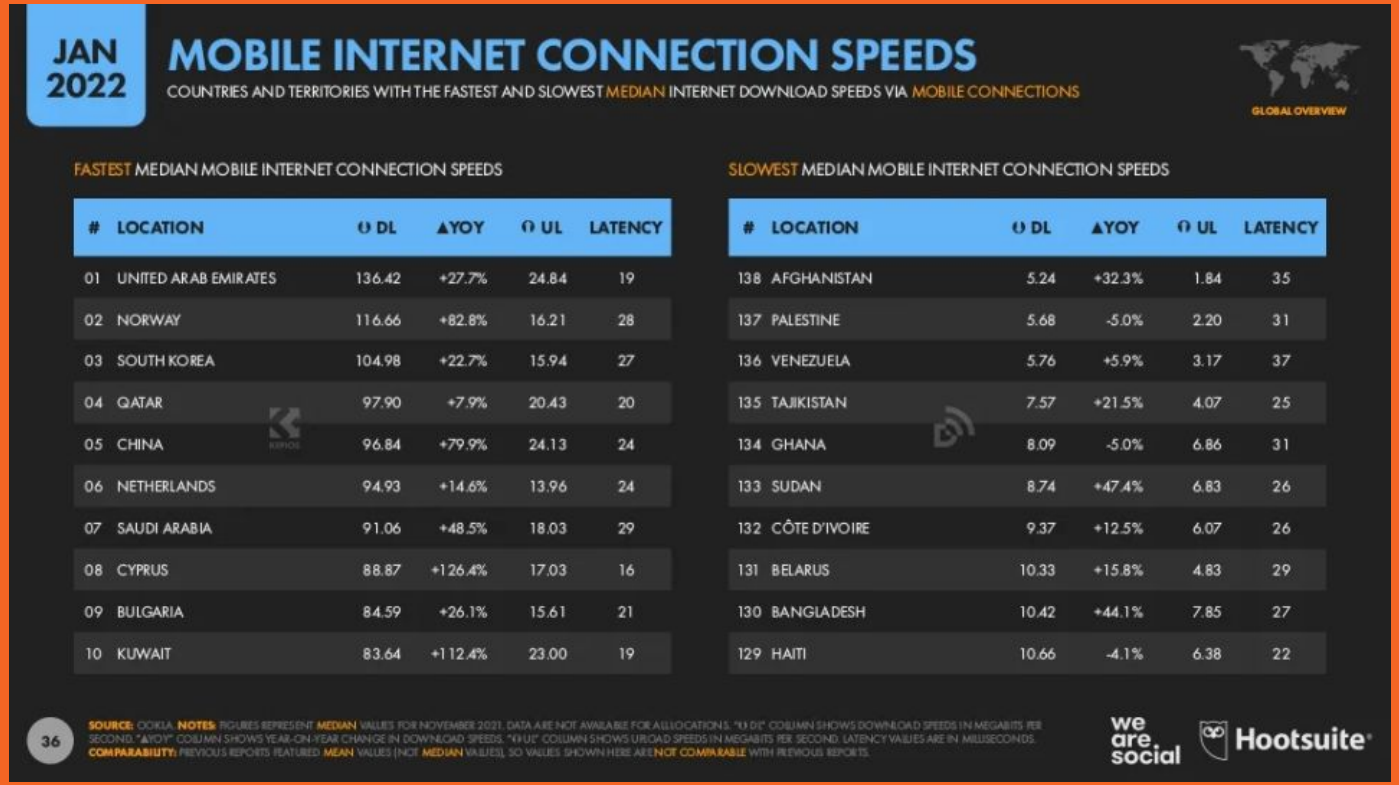

JAN 2022

MOBILE INTERNET CONNECTION SPEEDS

COUNTRIES AND TERRITORIES WITH THE FASTEST AND SLOWEST MEDIAN INTERNET DOWNLOAD SPEEDS VIA MOBILE CONNECTIONS

GLOBAL OVERVIEW

FASTEST MEDIAN MOBILE INTERNET CONNECTION SPEEDS

#	LOCATION	DL	▲YOY	UL	LATENCY
01	UNITED ARAB EMIRATES	136.42	+27.7%	24.84	19
02	NORWAY	116.66	+82.8%	16.21	28
03	SOUTH KOREA	104.98	+22.7%	15.94	27
04	QATAR	97.90	+7.9%	20.43	20
05	CHINA	96.84	+79.9%	24.13	24
06	NETHERLANDS	94.93	+14.6%	13.96	24
07	SAUDI ARABIA	91.06	+48.5%	18.03	29
08	CYPRUS	88.87	+126.4%	17.03	16
09	BULGARIA	84.59	+26.1%	15.61	21
10	KUWAIT	83.64	+112.4%	23.00	19

SLOWEST MEDIAN MOBILE INTERNET CONNECTION SPEEDS

#	LOCATION	DL	▲YOY	UL	LATENCY
138	AFGHANISTAN	5.24	+32.3%	1.84	35
137	PALESTINE	5.68	-5.0%	2.20	31
136	VENEZUELA	5.76	+5.9%	3.17	37
135	TAJIKISTAN	7.57	+21.5%	4.07	25
134	GHANA	8.09	-5.0%	6.86	31
133	SUDAN	8.74	+47.4%	6.83	26
132	CÔTE D'IVOIRE	9.37	+12.5%	6.07	26
131	BELARUS	10.33	+15.8%	4.83	29
130	BANGLADESH	10.42	+44.1%	7.85	27
129	HAITI	10.66	-4.1%	6.38	22

36

SOURCE: OOKLA. NOTES: FIGURES REPRESENT MEDIAN VALUES FOR NOVEMBER 2021. DATA ARE NOT AVAILABLE FOR ALL LOCATIONS. "DL" COLUMN SHOWS DOWNLOAD SPEEDS IN MEGABITS PER SECOND. "▲YOY" COLUMN SHOWS YEAR-ON-YEAR CHANGE IN DOWNLOAD SPEEDS. "UL" COLUMN SHOWS UPLOAD SPEEDS IN MEGABITS PER SECOND. LATENCY VALUES ARE IN MILLISECONDS. COMPARABILITY: PREVIOUS REPORTS FEATURED MEAN VALUES (NOT MEDIAN VALUES), SO VALUES SHOWN HERE ARE NOT COMPARABLE WITH PREVIOUS REPORTS.

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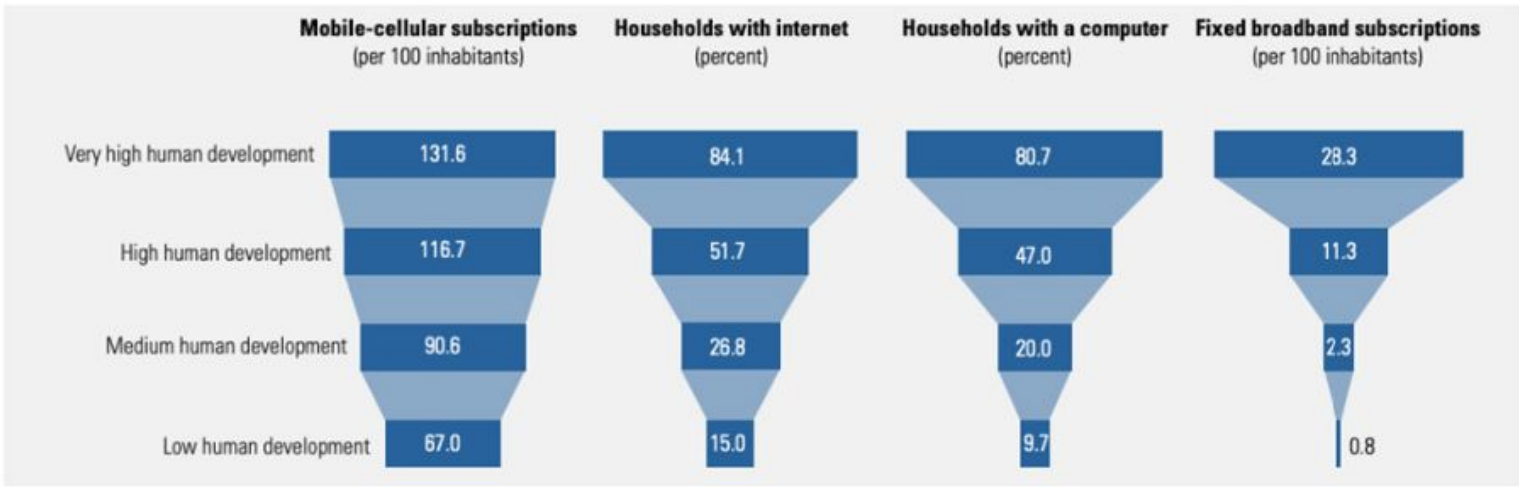
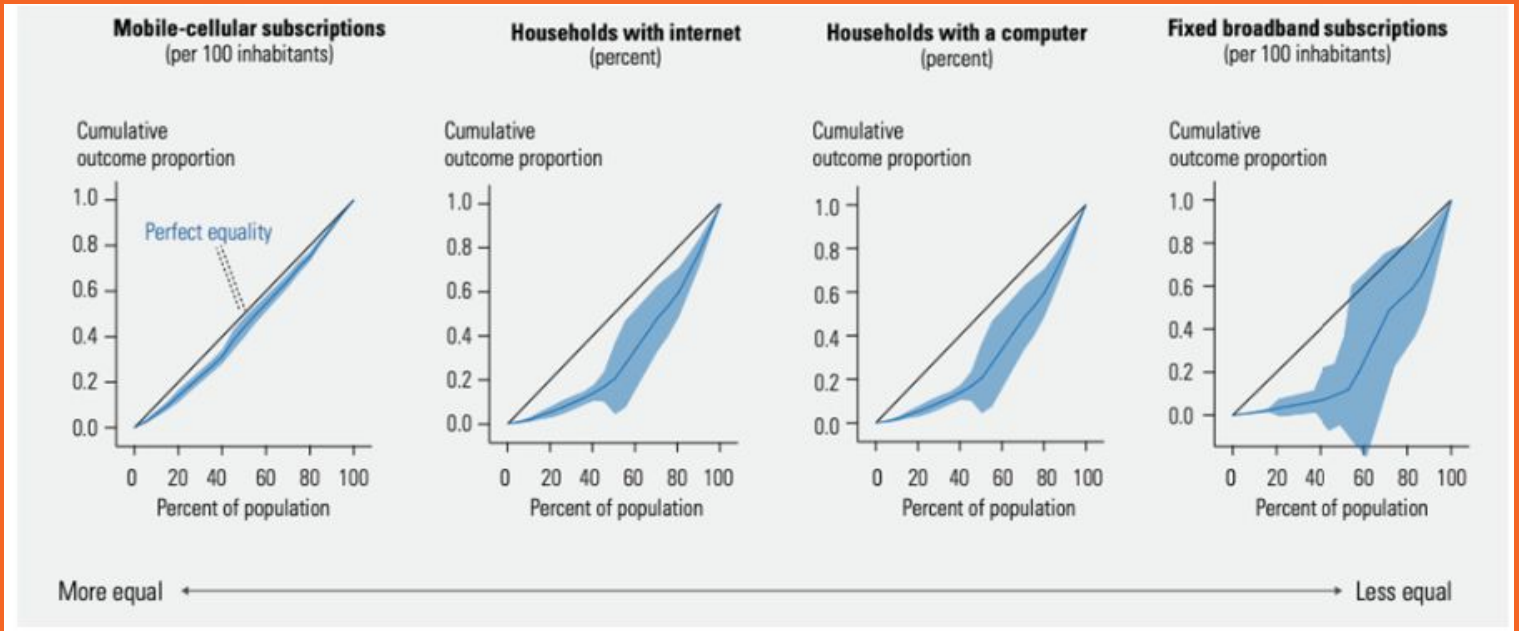


Note: Data are simple averages across human development groups.
Note that for advanced technologies and more intensives ICTs, inequalities are much greater. See Figure 25.

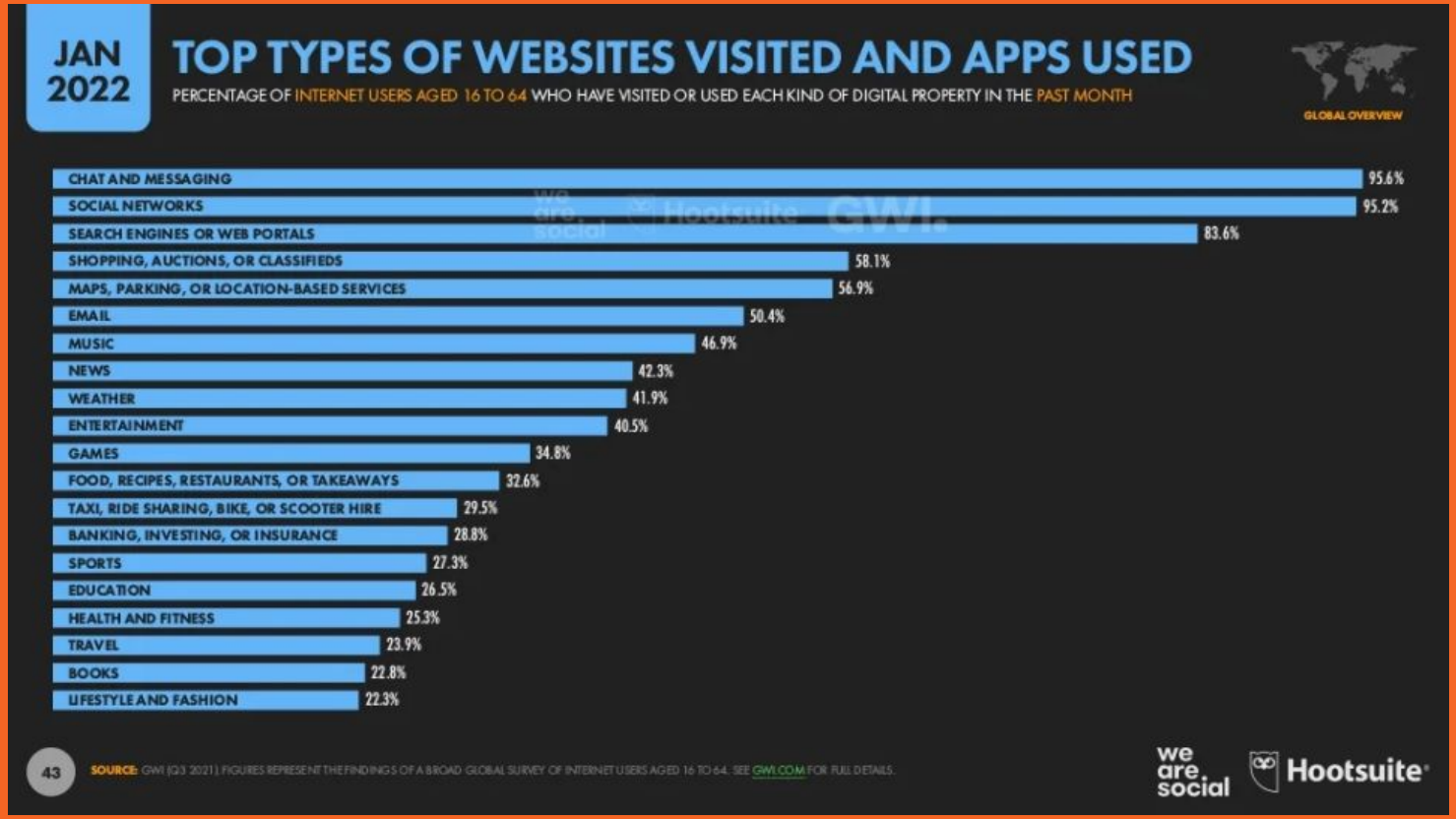
Source: ITU UNESCO (2020)



Note: Shaded areas are 95%confidence intervals.

Source: ITU UNESCO (2020)

At the **second level** of Digital inequalities, various barriers (economic, age, gender, linguistic, educational, cultural, and geographic) prevent or hinder individuals and groups from accessing relevant content and technologies. This second level of digital exclusion is a significant problem in the Global South, particularly in the Covid-19 pandemic, where many services and activities have become available only online.



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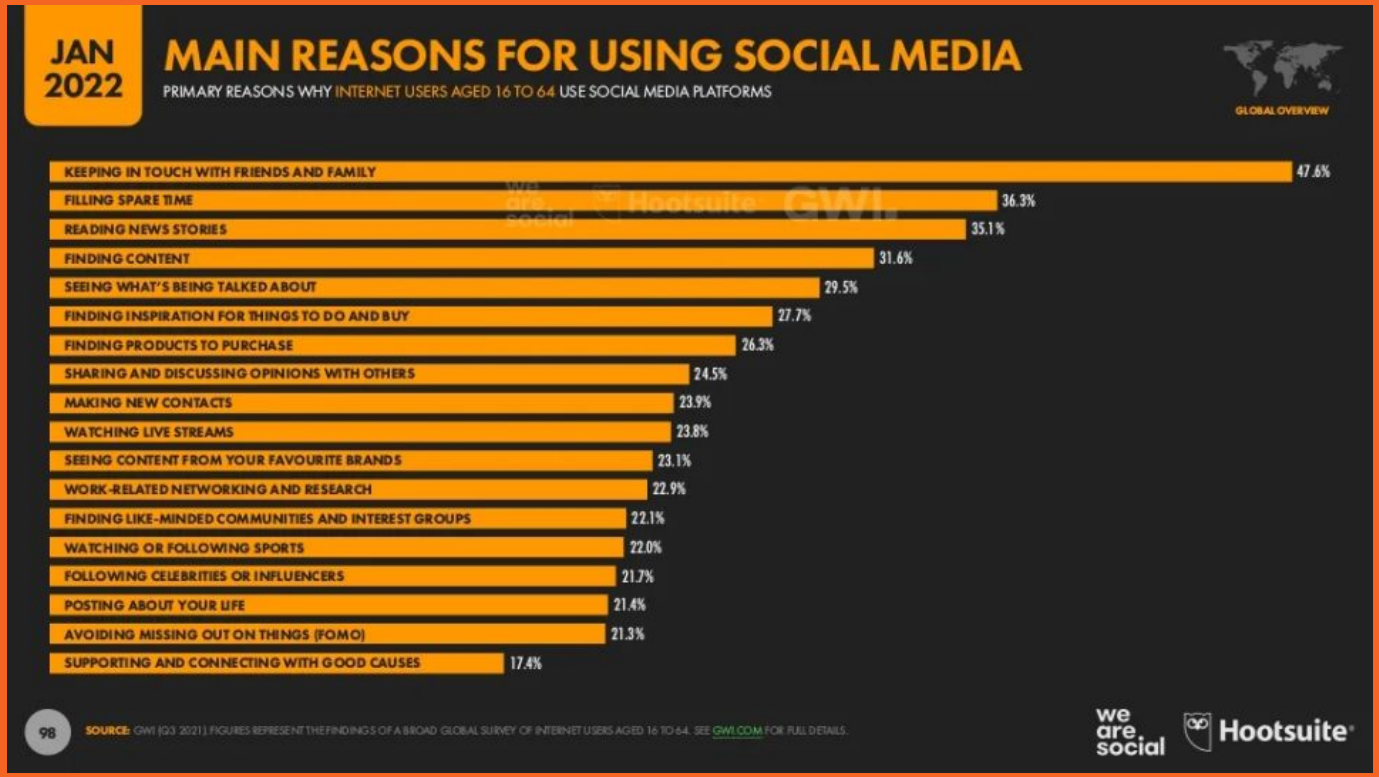

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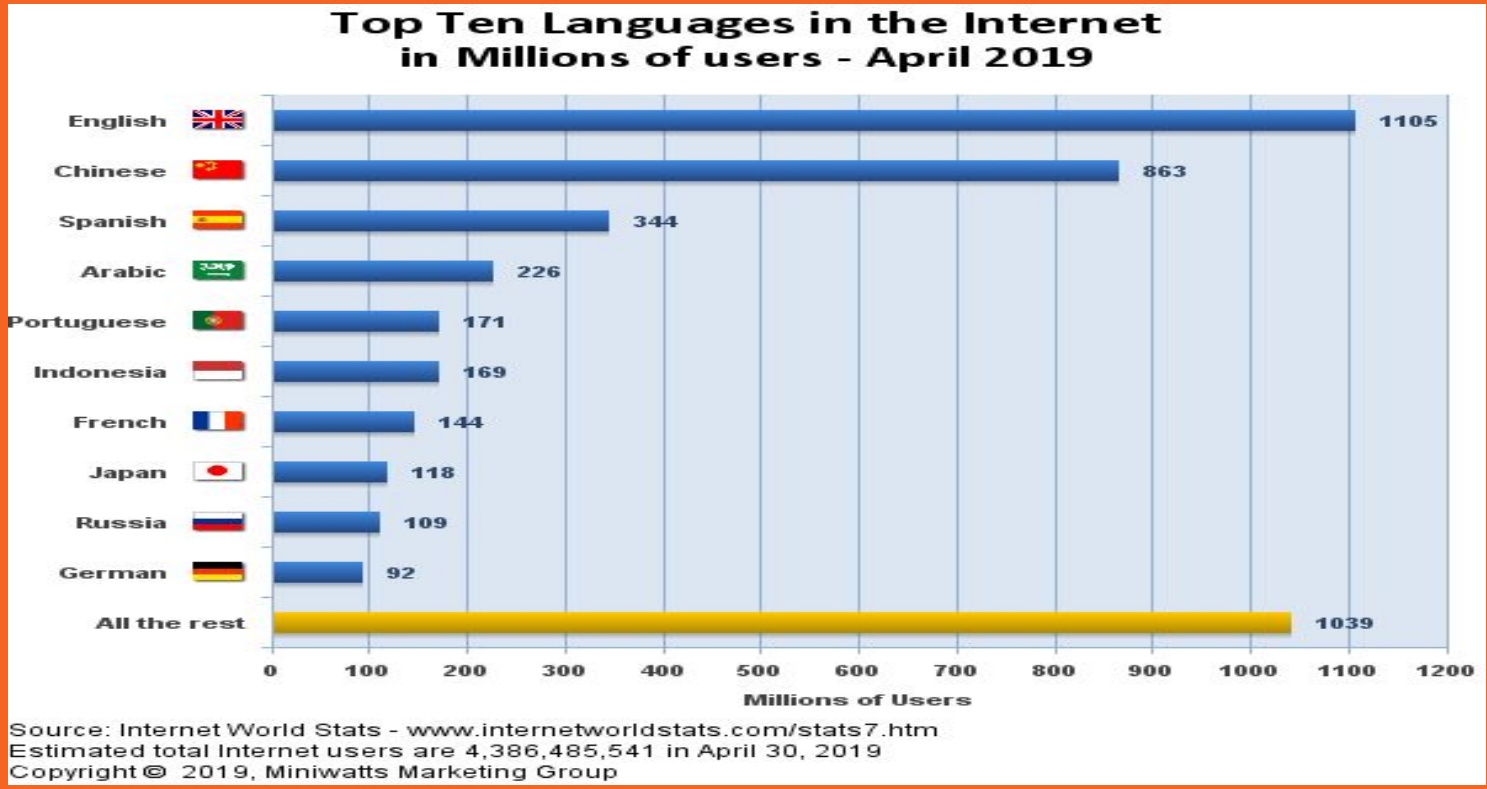
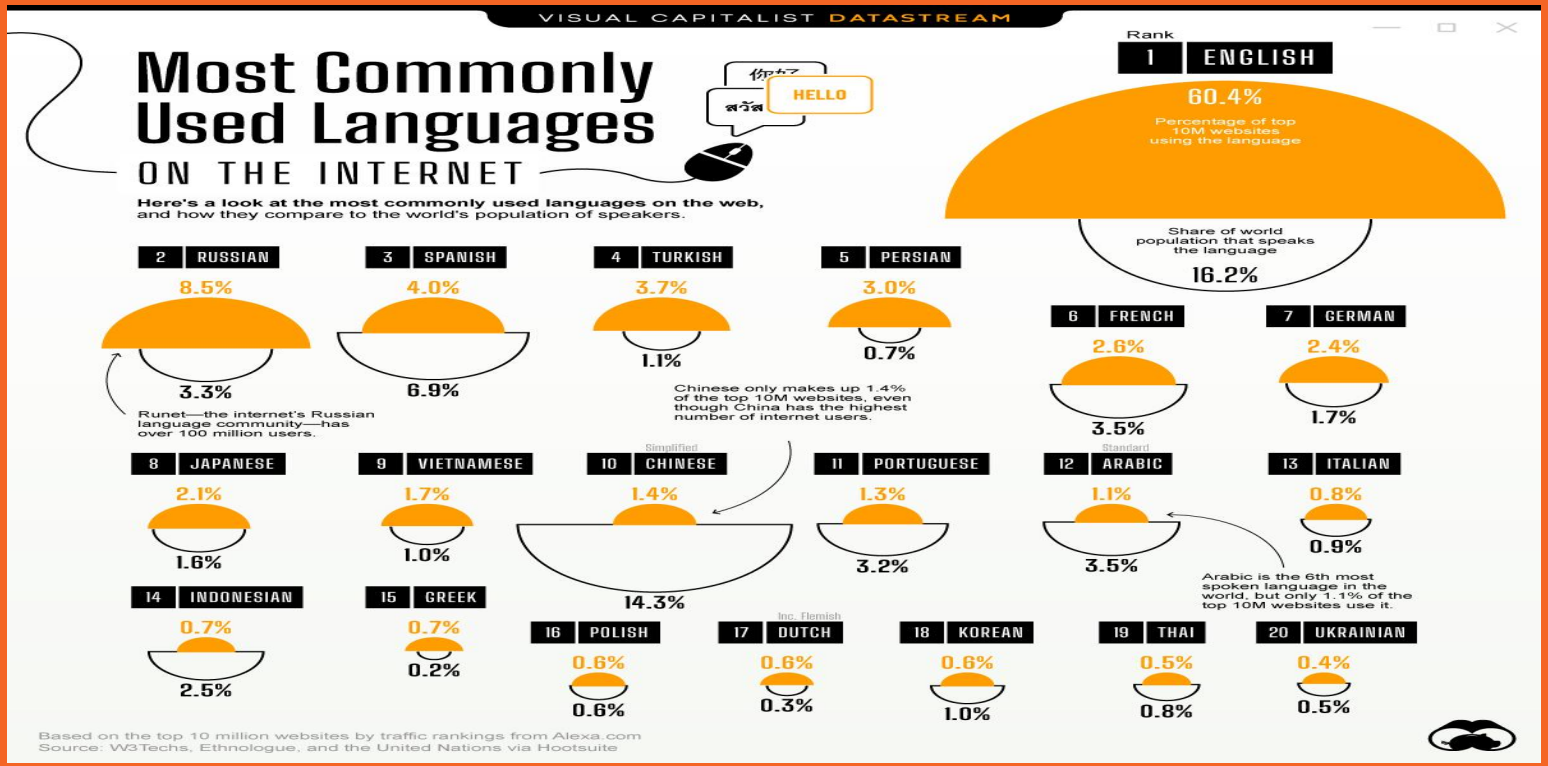


Source: https://www.internetworldstats.com/stats7.htm



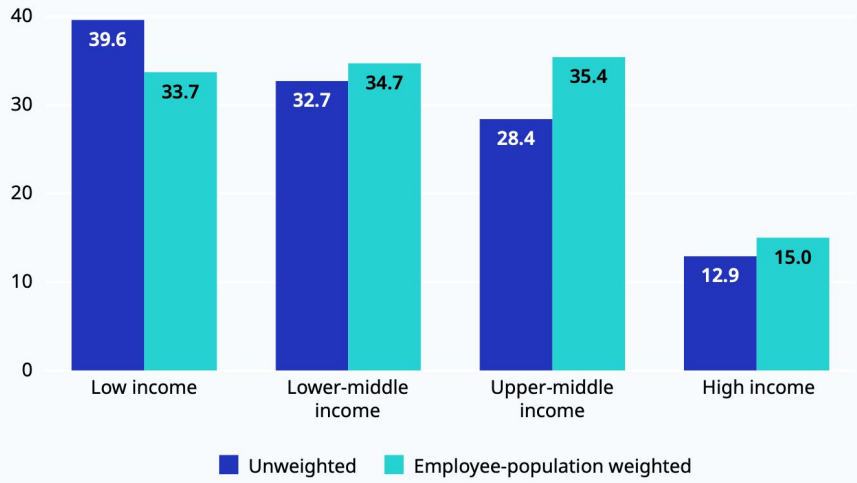
Source: https://www.visualcapitalist.com/the-most-used-languages-on-the-internet/

At the **third level** of Digital inequalities, women, young, non-white people, and older people are exposed to different levels of risk regarding unemployment, exploitation at work, school exclusion, and the violation of online rights (from privacy to moral and physical integrity).

Impact of COVID-19

- More than 470 million cases and 6 million deaths
- Rich countries response: US$ 14.9 trillion
- Emerging countries response: US$ 2.7 trillion

Figure 3.3 Temporary employees as a proportion of all employees, by country income group (percentages)



Note: Latest year of available data within the period 2011–19 for countries with available annual data. See note to figure 3.2.

Source: ILOSTAT database.

Source: https://www.ilo.org

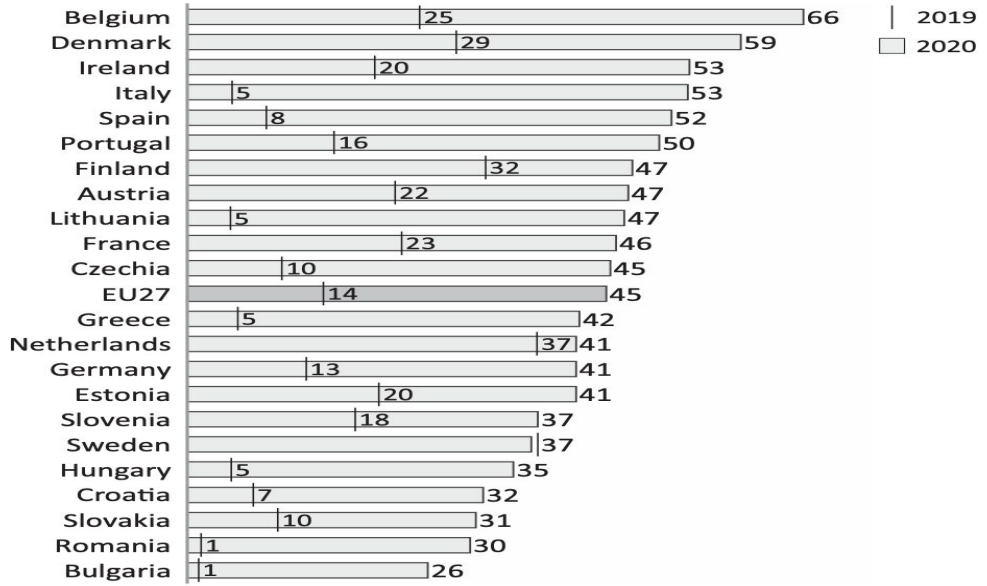
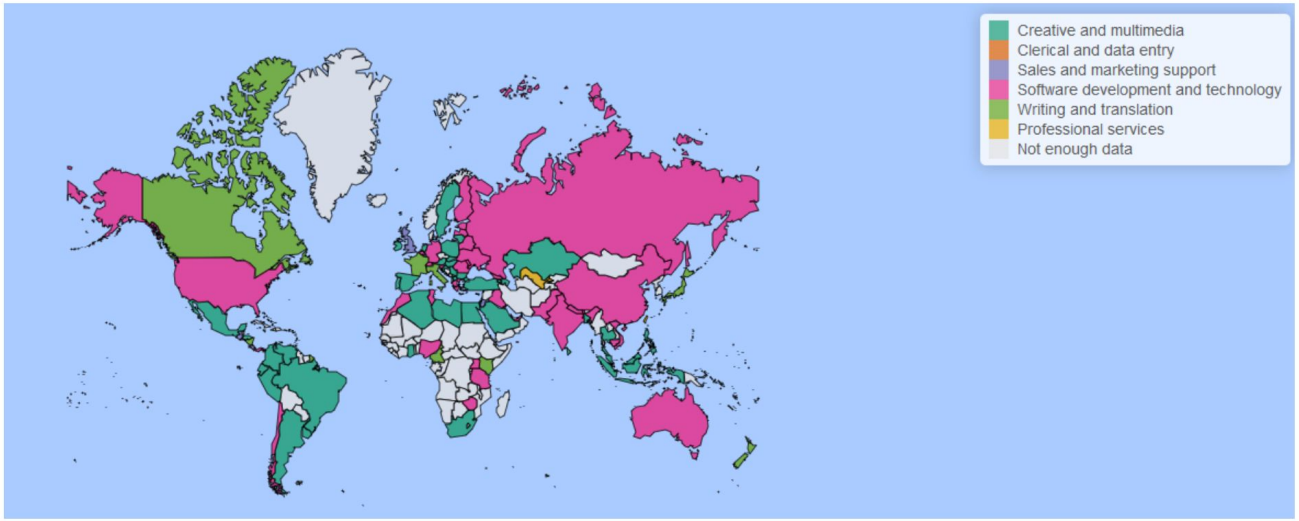


Figure 7.9 Percentage of employed individuals working remotely before (2019) and during (2020) Covid-19 pandemics (in %, EU countries with available data, 2019 and 2020).

Source: Own work based on Eurofound data (2020) [% of 'Yes' answers for: During the Covid-19 pandemic, where did you work? – At home] and Eurostat data (2019) [Employed persons working from home – Usually and Sometimes, [lfsa_ehomp]].

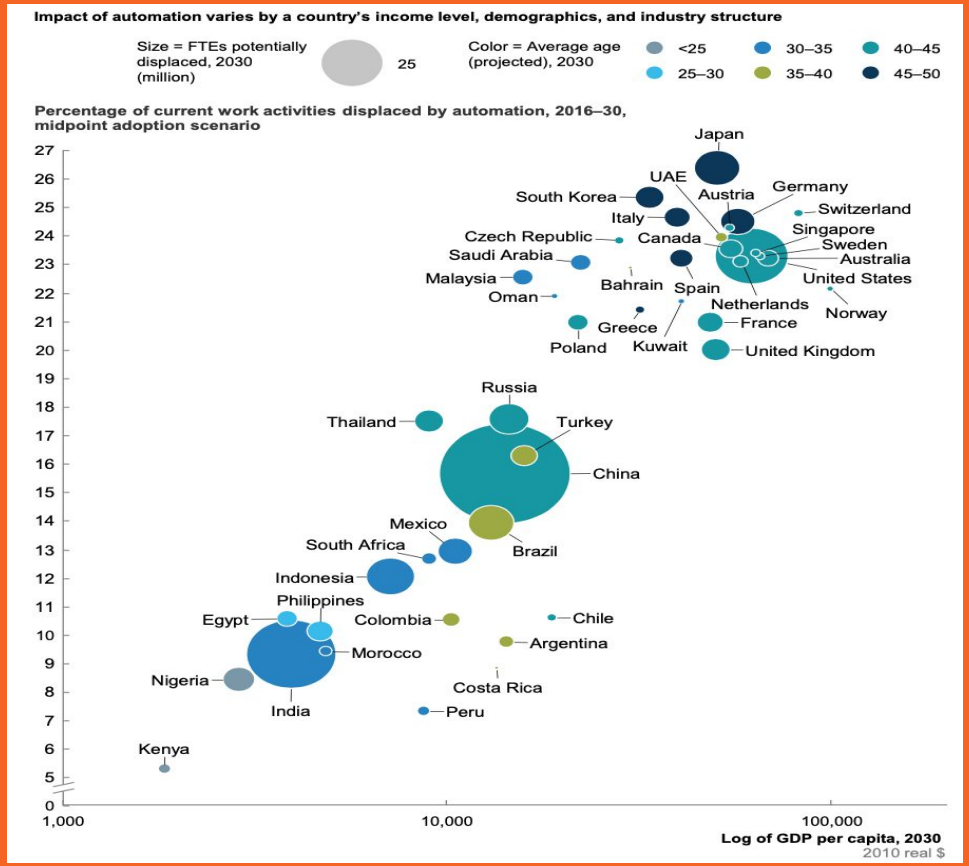
Source: Śledziewska & Włoch, 2021

Figure 3. Top occupations by country of origin



Source: Online Labour Index

Source: https://www.ilo.org



Source: McKinsey (2017)

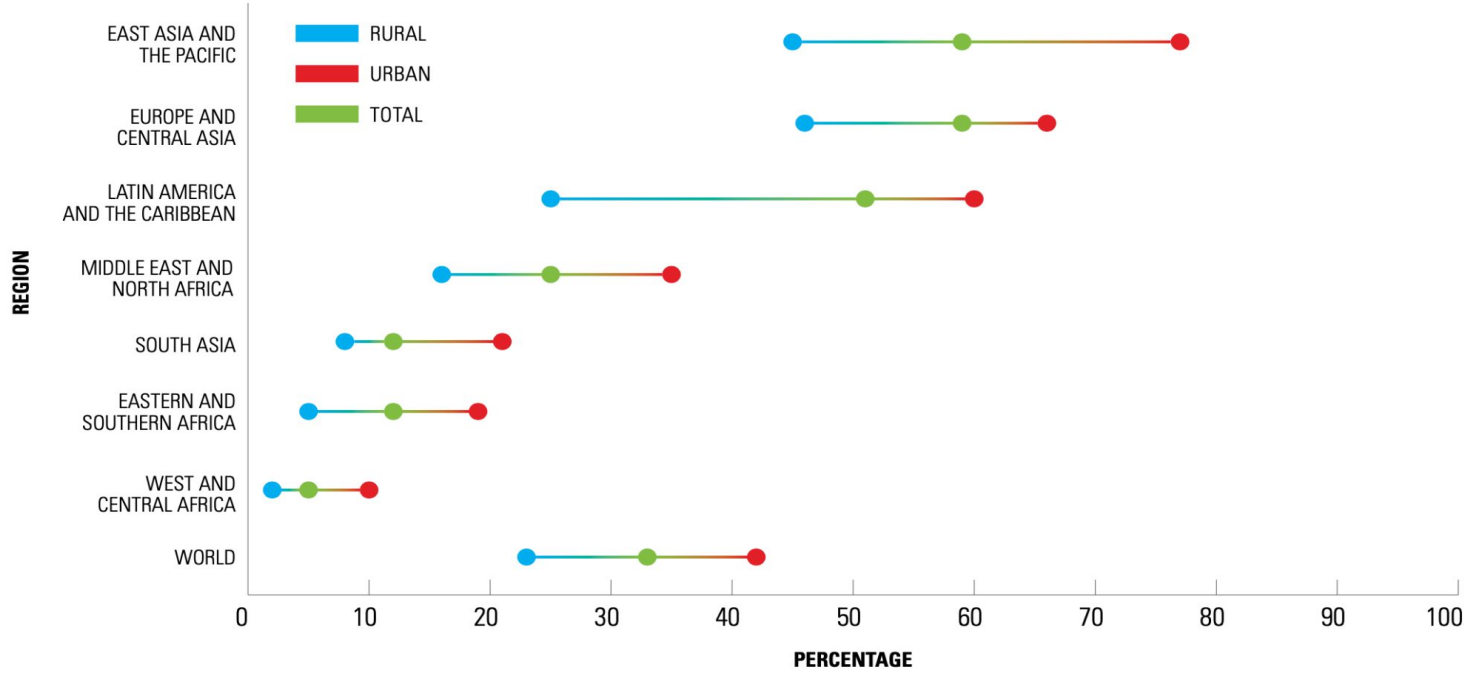
Alianza del Pacífico: Indicadores de capital humano especializado, último año disponible

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

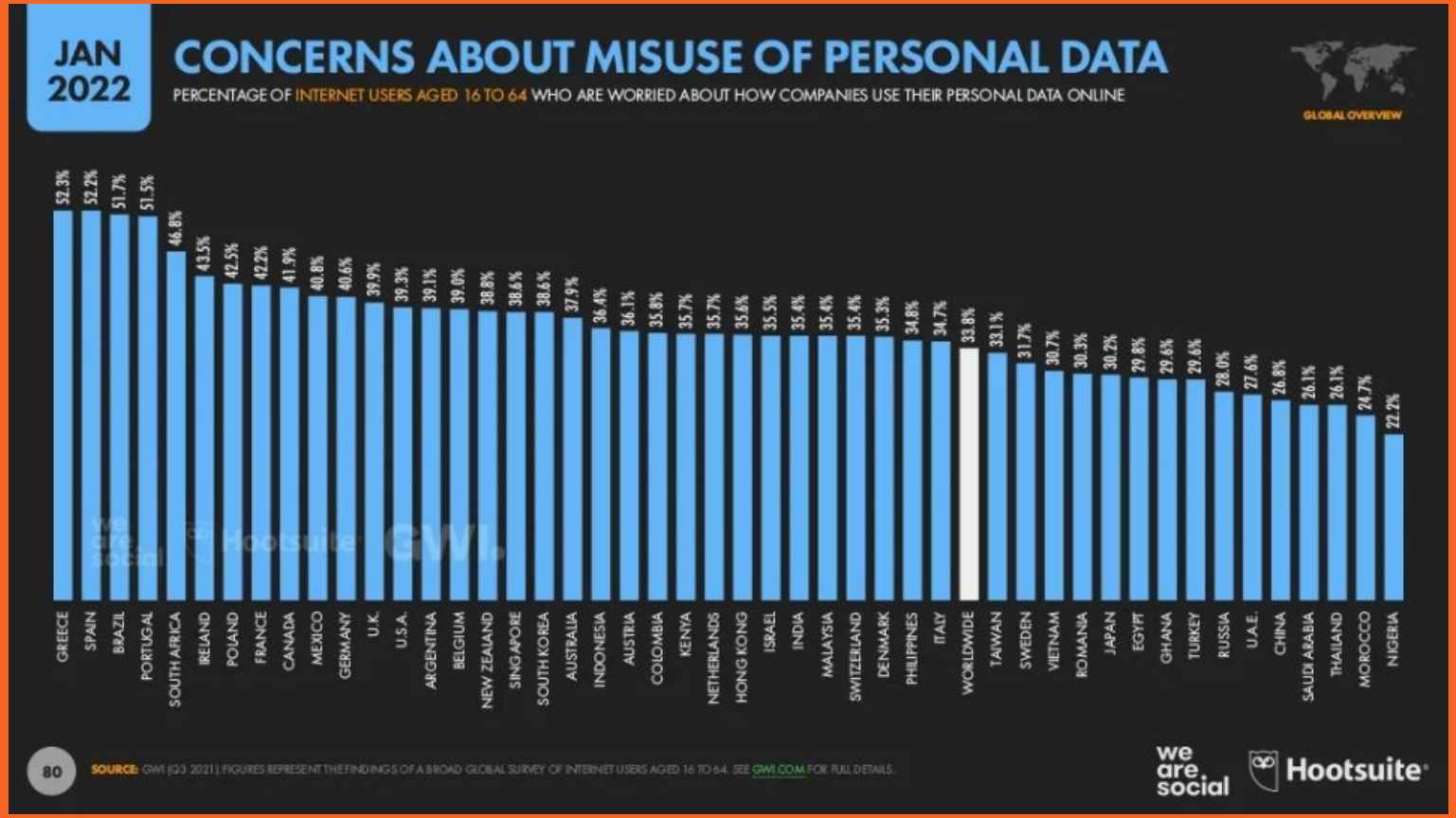
FIGURE 9: Share of school-age children with internet access at home, by region and by area



Note: *Elaborated based on available Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surverys (MICS) data, 2010-2020. (source: Wang et al.2021). Data are aggregated by UNICEF Regional Offices.*

Source: *UNICEF. 2021. Reopening with resilience: Lessons from remote learning during COVID-19.*

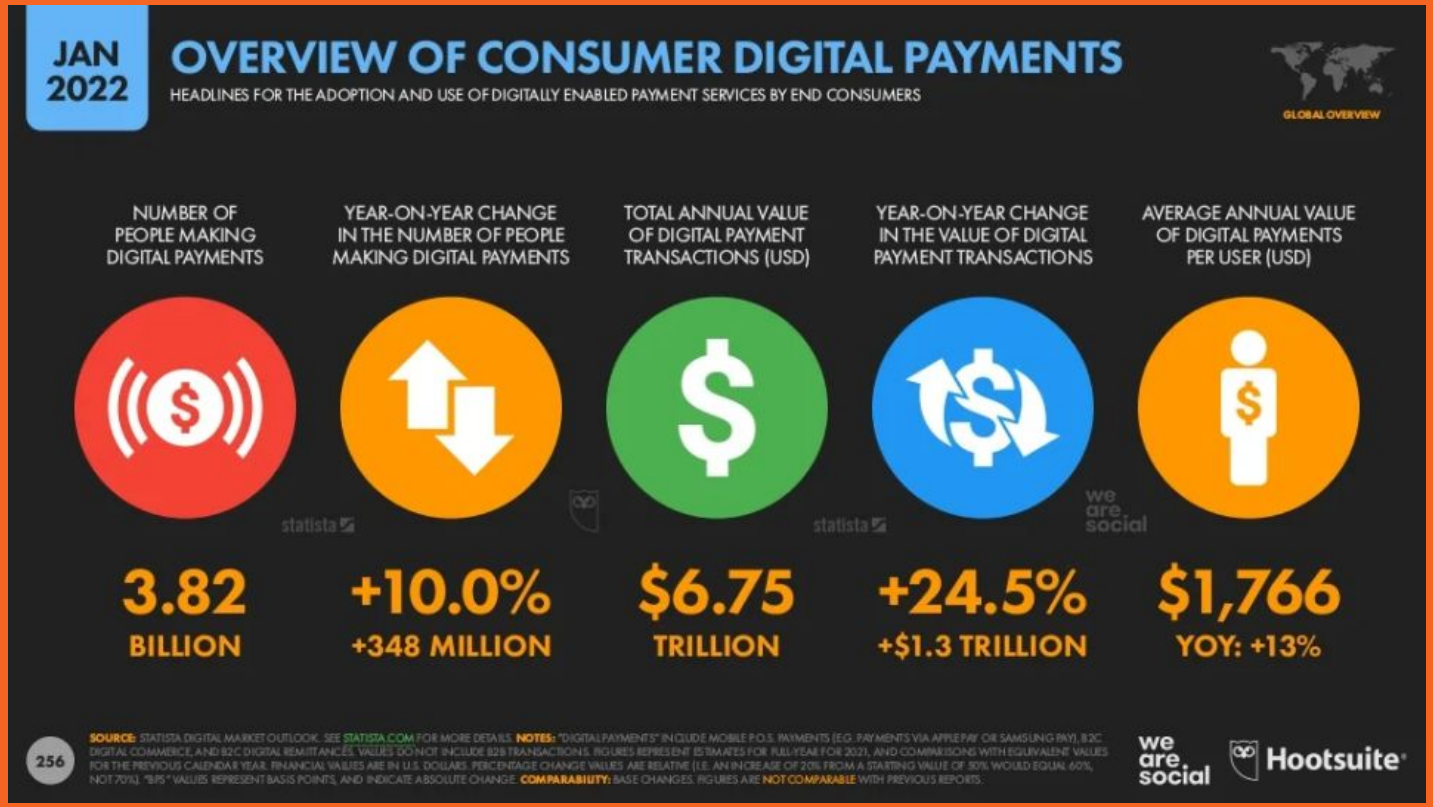
Source: https://www.unesco.org



Source: https://datareportal.com/reports/digital-2022-global-overview-report

The **governance** challenges of the Digital Age are local, national and international. For example, at the **local** level, social movements compete for digital resources, such as access to the internet and online public services. In different **countries**, laws and policies on internet governance, access to information, privacy, cybersecurity, and data location are examples of disputes that demand organization and energy. **Internationally**, states and oligopolistic platforms compete and exercise gatekeeping powers in areas critical to a global digital regime, such as taxation, e-commerce, AI development, data flows, and internet protocols.

Source: https://datareportal.com/reports/digital-2022-global-overview-report



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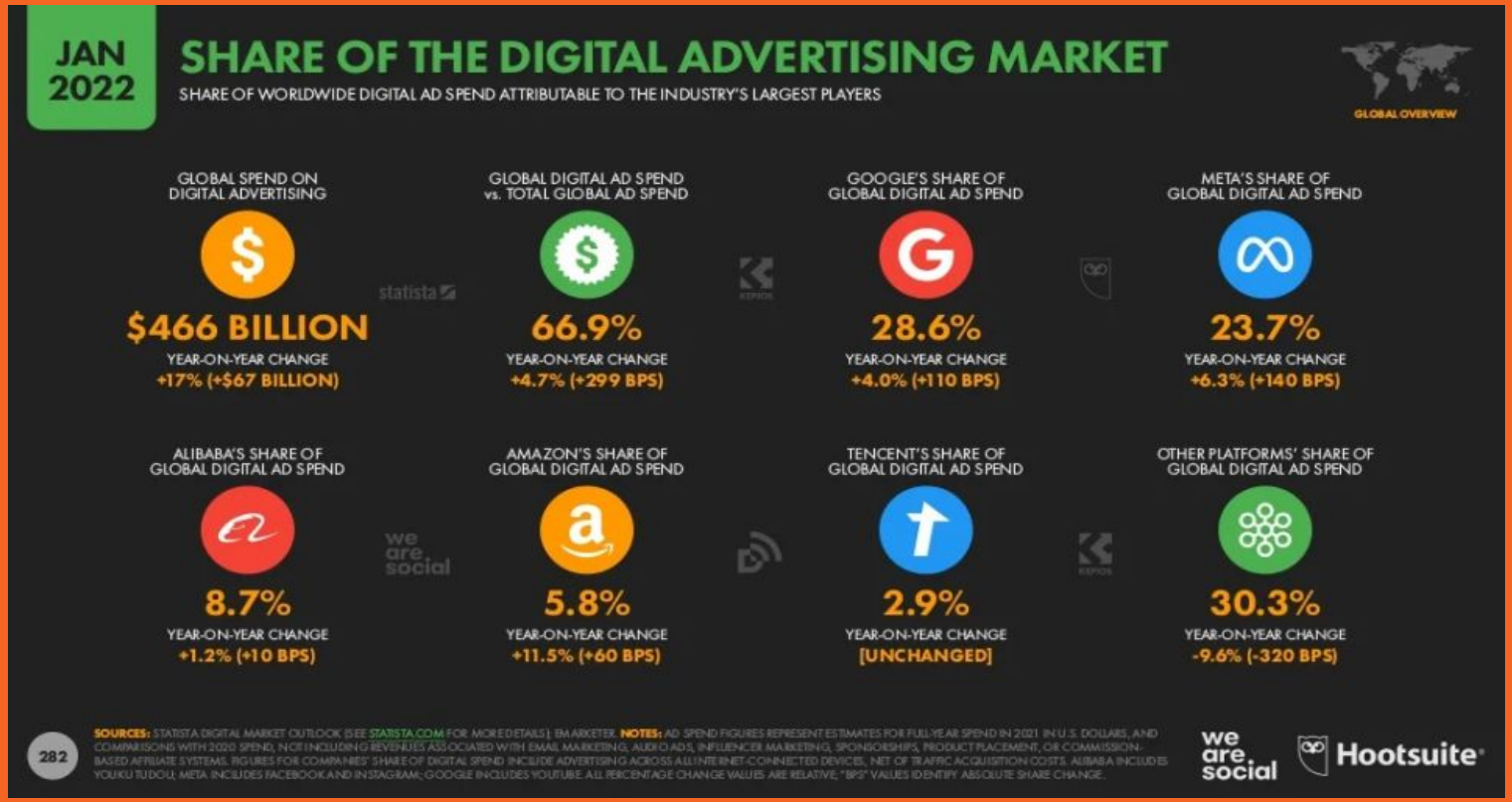

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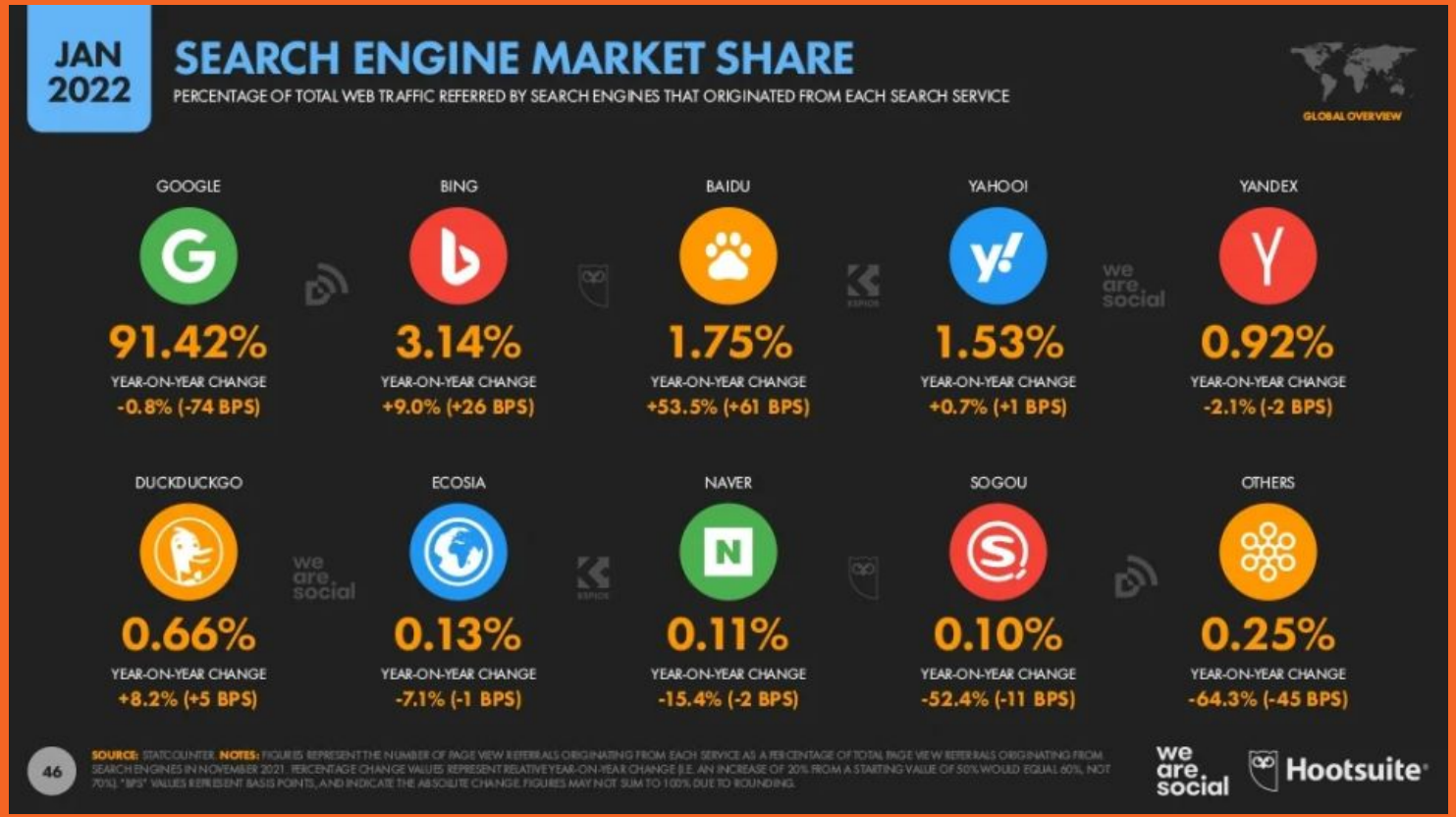
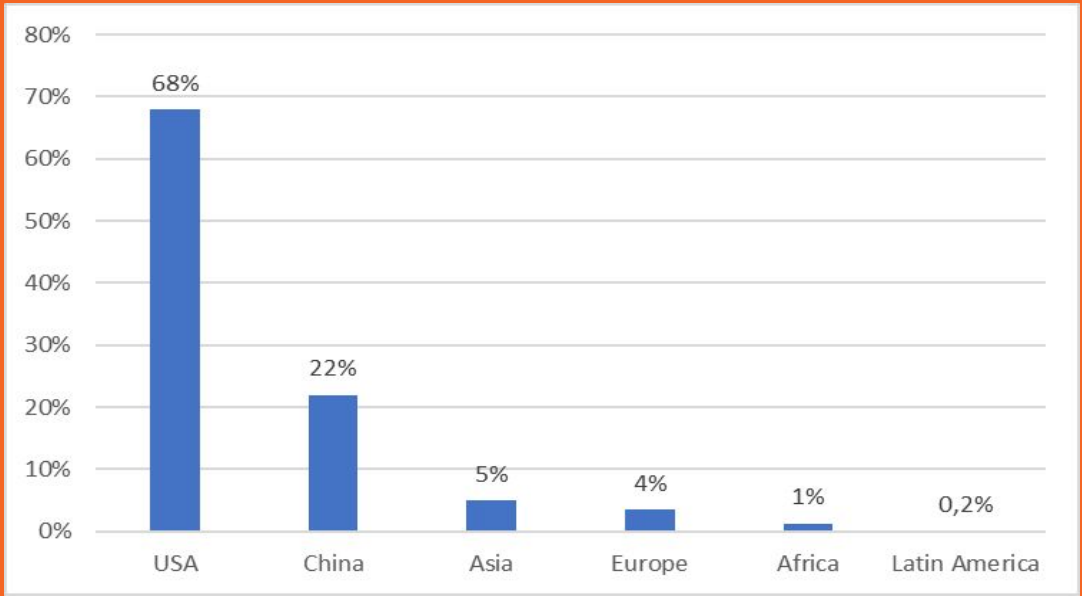


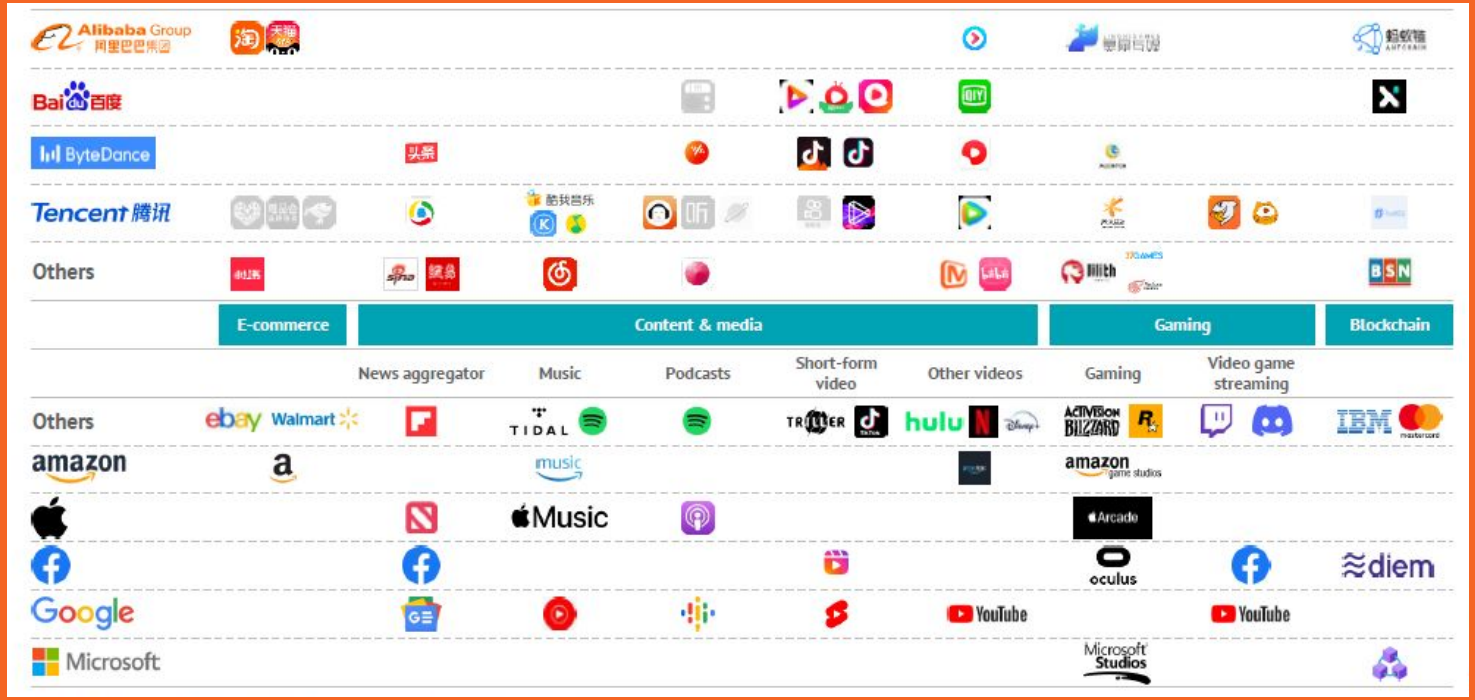
Source: https://datareportal.com/reports/digital-2022-global-overview-report

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

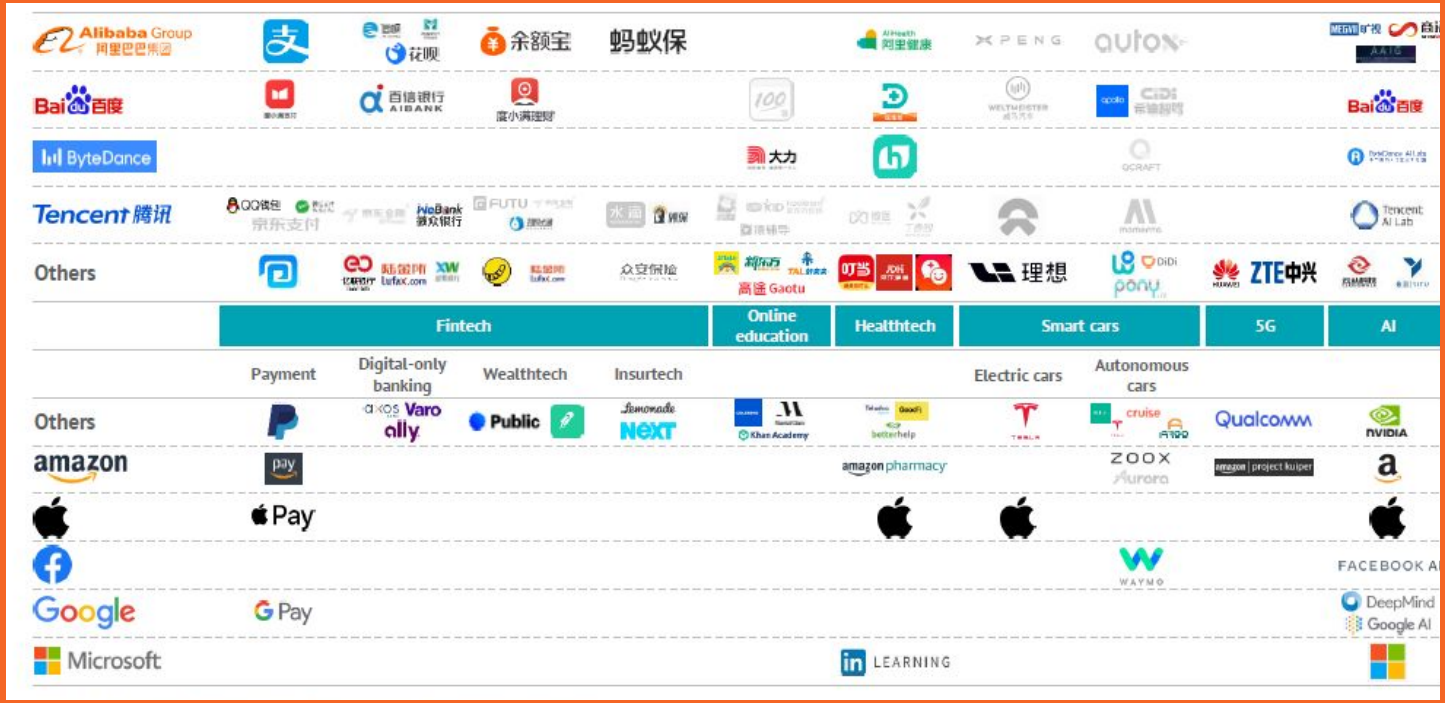


Source: UNCTAD, 2019

Digital Players: China and USA



Source: SCMP, 2021



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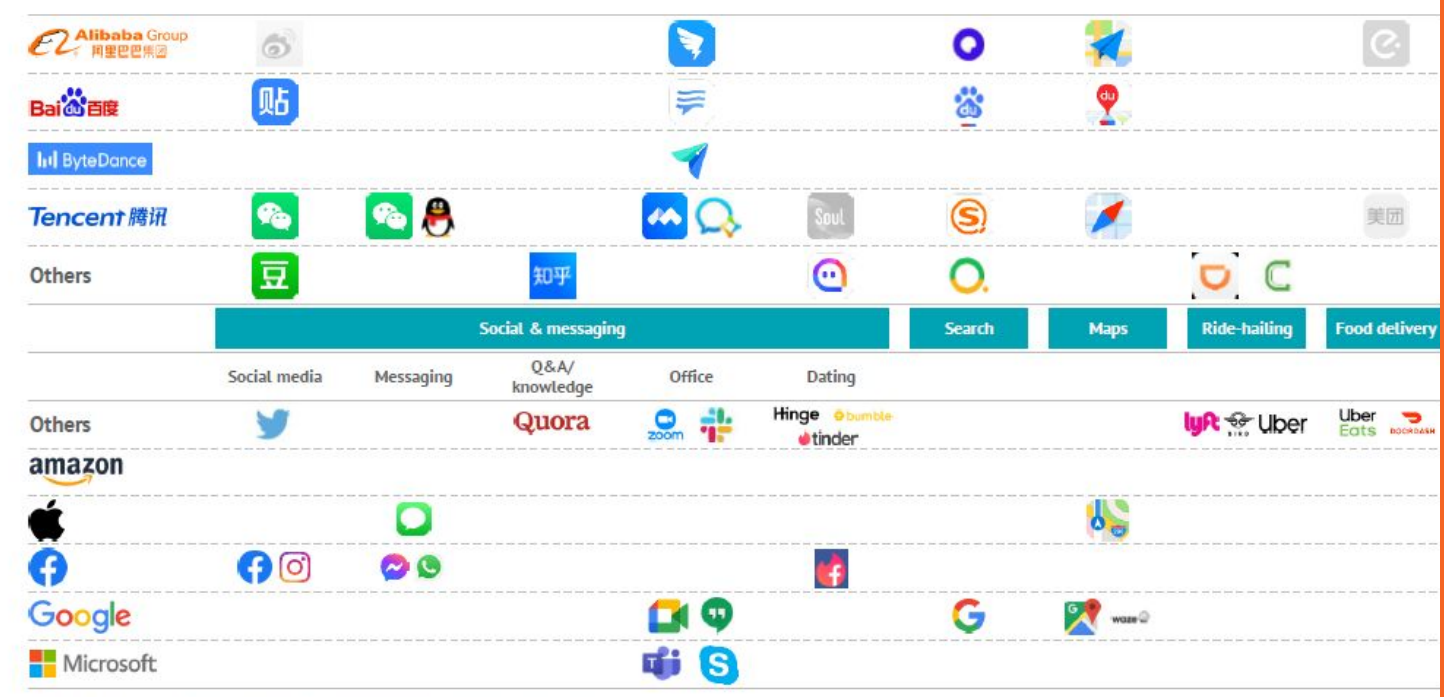
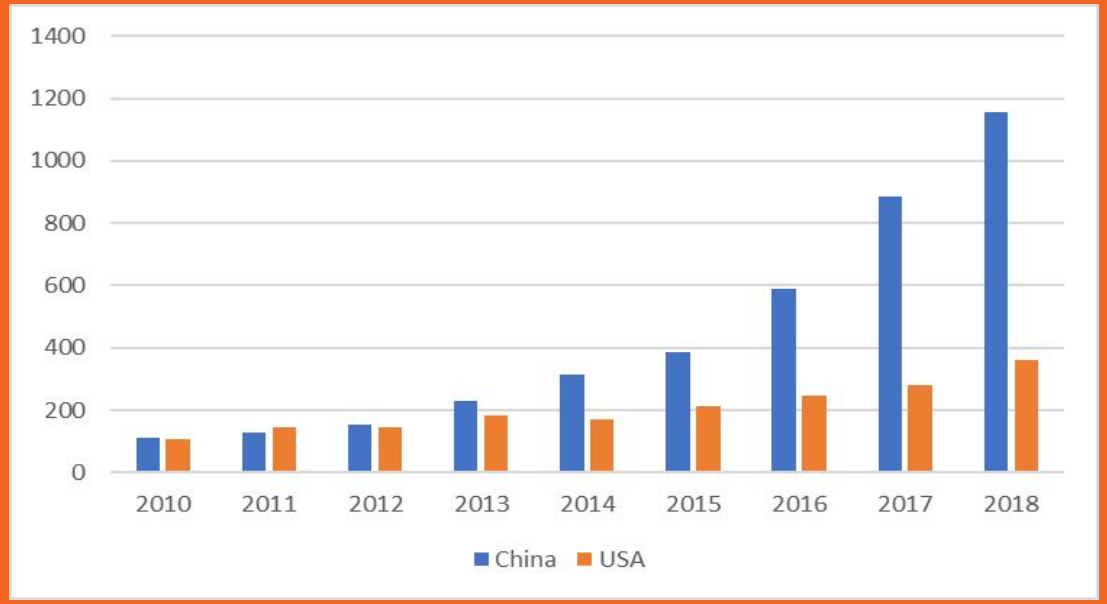


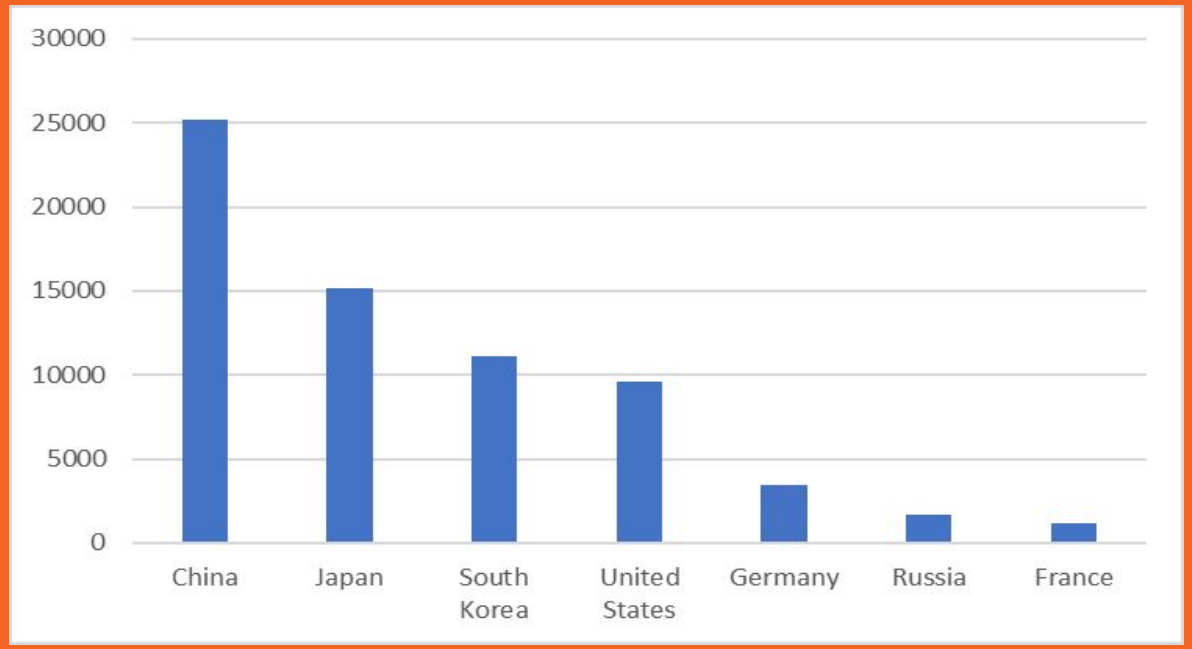
Source: SCMP, 2021

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



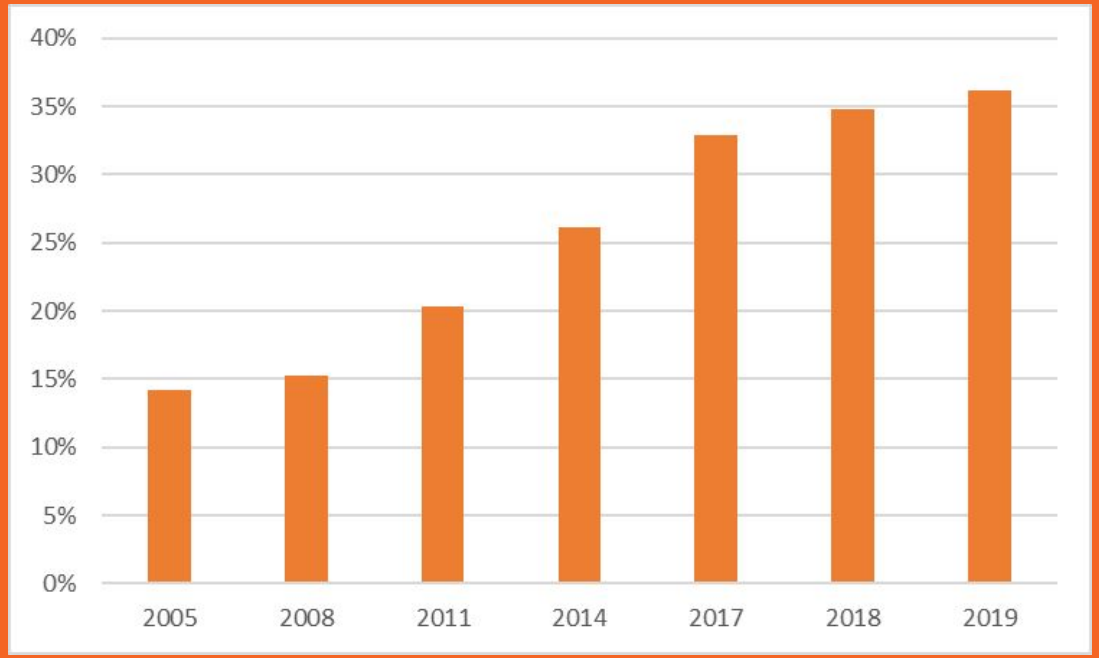
Source: ALLISON et al, 2021

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



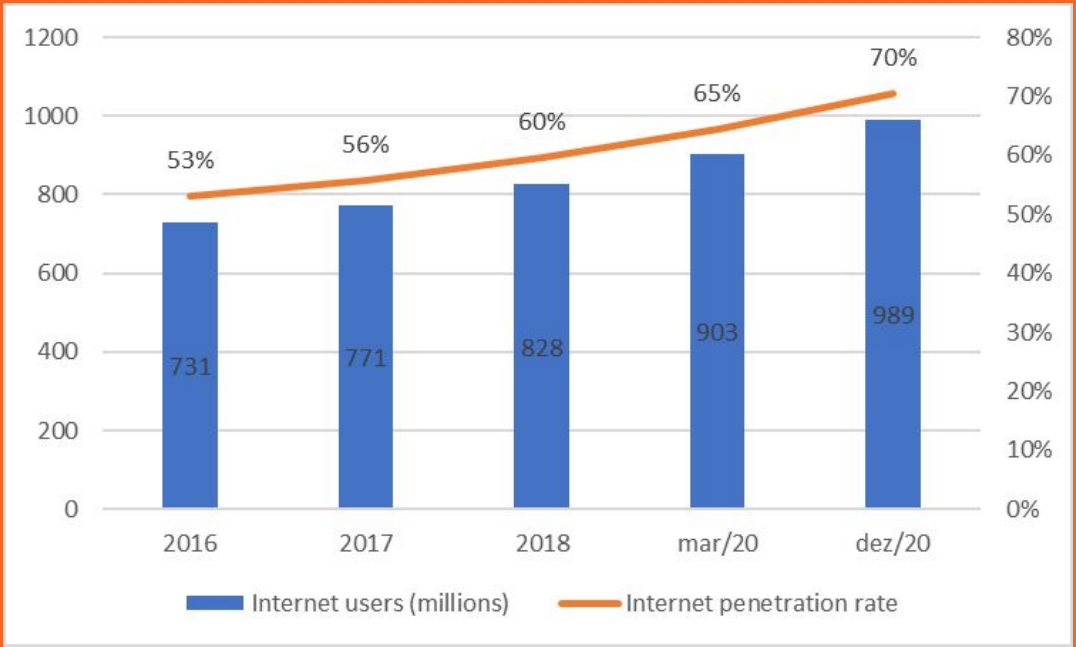
Source: CSET, 2021

Proportion of digital economy in China's GDP



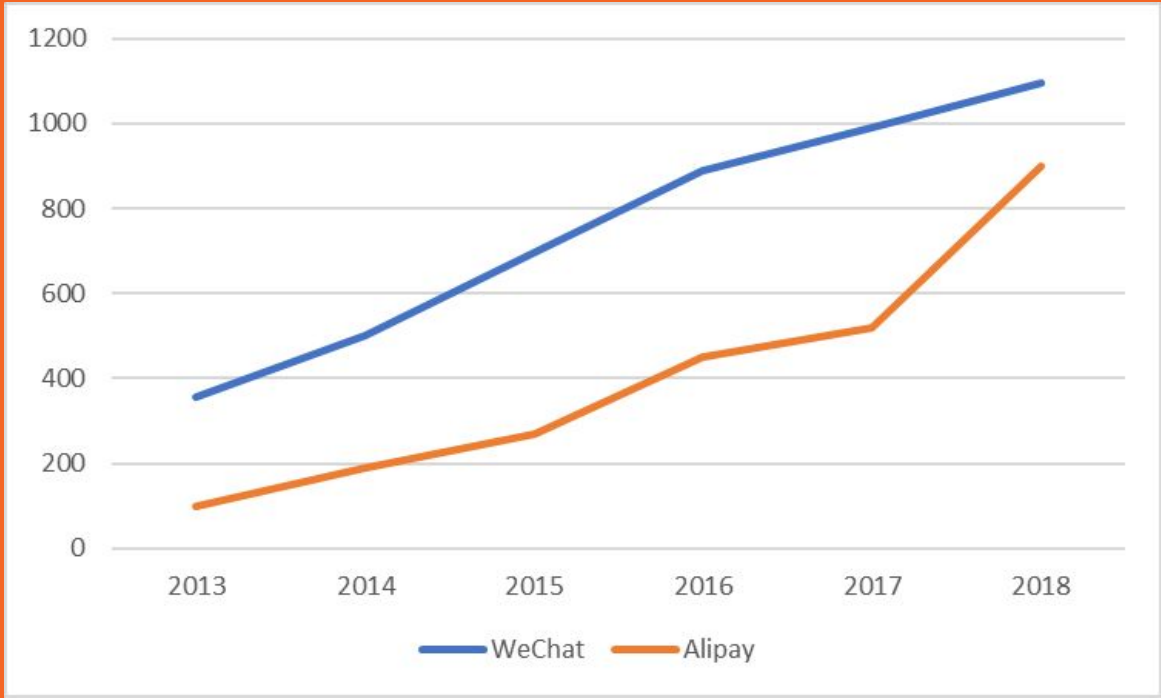
Source: CAICT, 2020

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



Source: CNNIC, 2021

Number of active users of Alipay and WeChat



Source: HUANG et al, 2021


BUILDING A DIGITAL SILK ROAD FOR WIN-WIN COOPE
Information Infrastructure Partnership
数字丝路·合作共赢论坛
息基础设施共建
CONFERENCE
网大会
WORLD
INTERNET
CONFERENCE
CYBERSPACE
人民网
people.cn
IT

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)

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

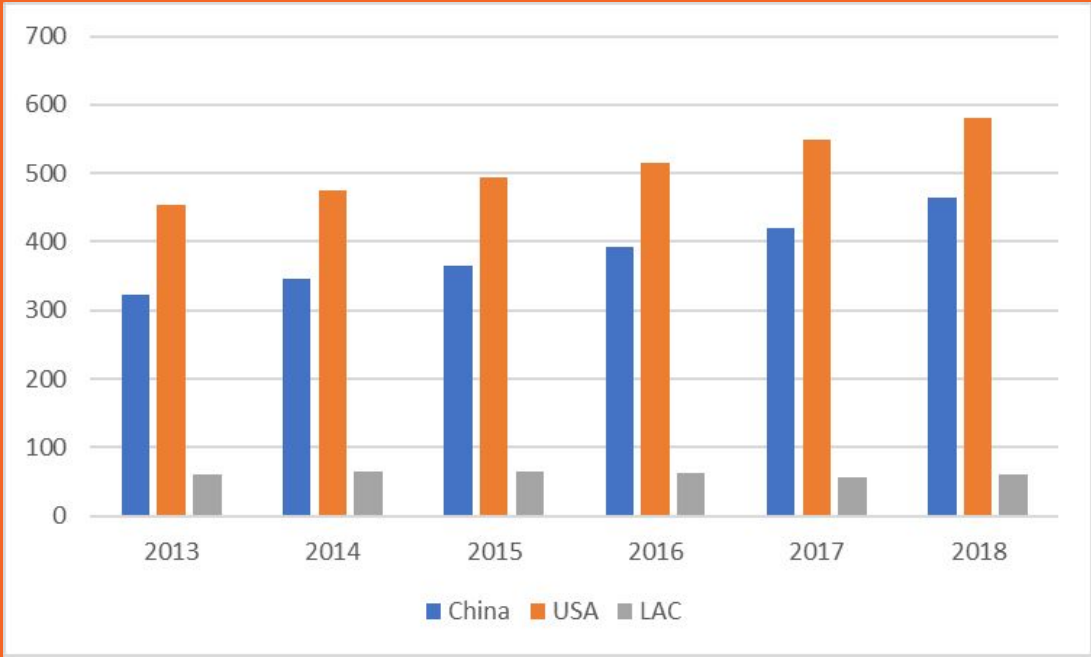
Source: World Intellectual Property Organization , 2021

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

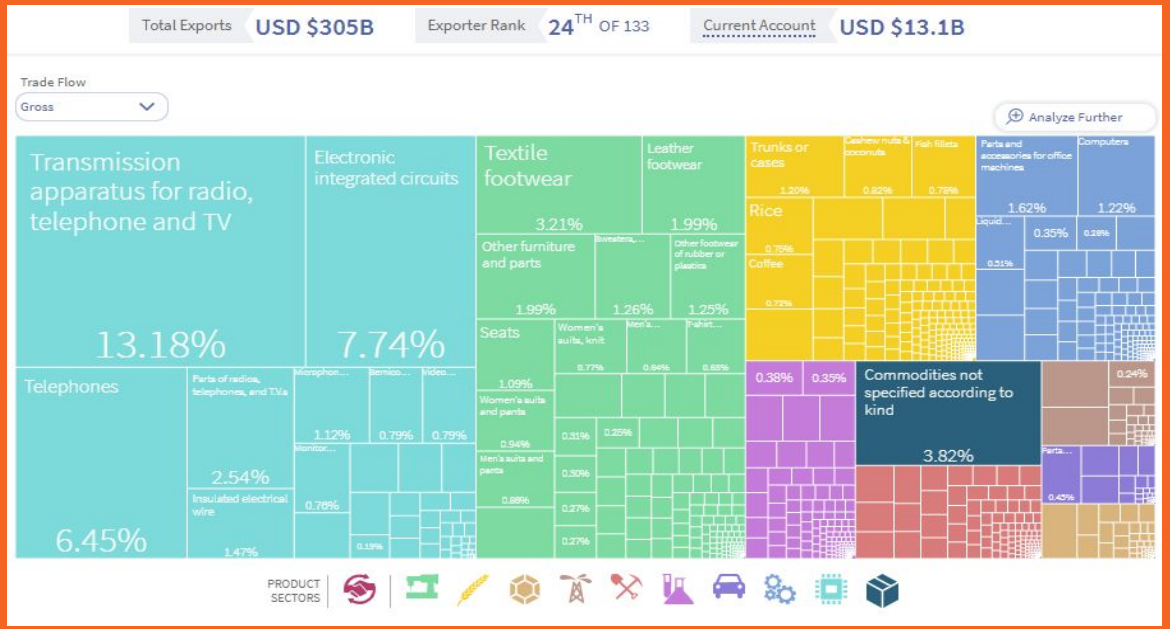
Source: Global System for Mobile Communications Association, 2020

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



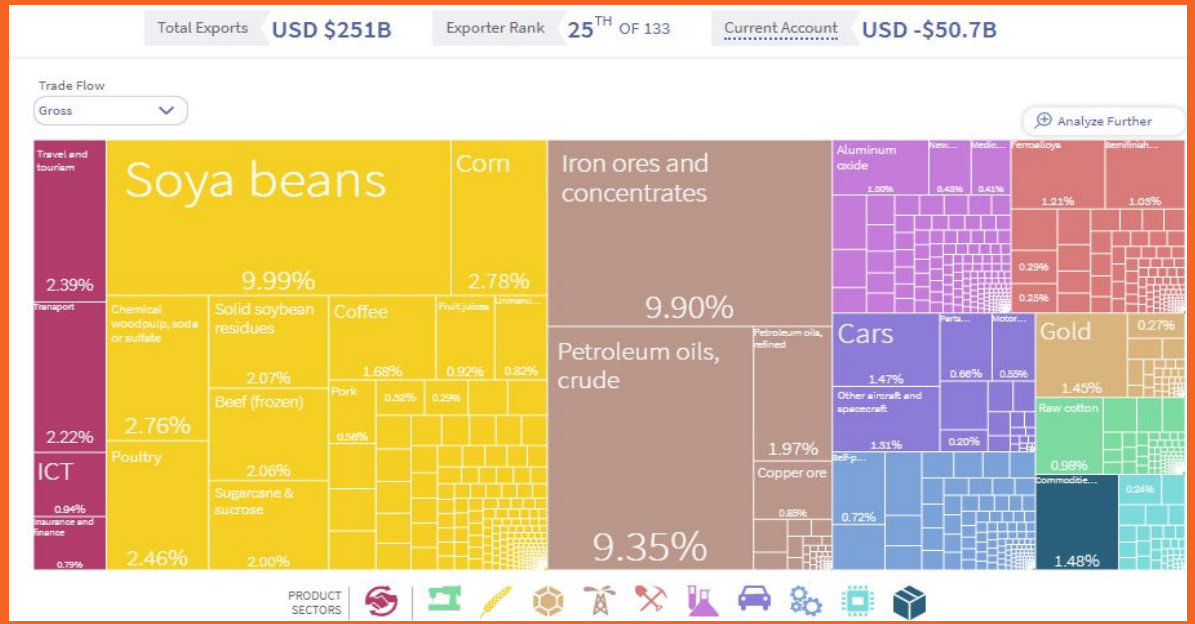
Source: UNESCO, 2022

Profile of Vietnamese exports in 2019



Source: Atlas of Economic Complexity, 2022

Profile of Brazilian exports in 2019



Source: Atlas of Economic Complexity, 2022

3. Conclusions

1. AI driven Digital Transformation will be even more disruptive
2. Conflicts about wealth and power distribution demand strategy
3. Investments in digital infrastructure and social value creation
4. Social protection and education are crucial in the Global South
5. Global governance for e-commerce, internet, and AI

4. References

ALLISON, Graham *et al.* The Great Tech Rivalry: China vs the U.S. [*s. l.*], p. 52, 2021. Disponível em: https://www.belfercenter.org/publication/great-rivalry-china-vs-us-21st-century. Acesso em: 28 jan. 2022.

CEPIK, Marco; BRANCHER, Pedro. *Digital Futures and Global Power: Southeast Asia and Latin America in Comparative Perspective*. Research Project. Porto Alegre, UFRGS, 2022.

CHANDLER, David; FUCHS, Christian. [editors]. *Digital Objects, Digital Subjects: Interdisciplinary perspectives on Capitalism, Labour and Politics in the Age of Big Data*. London, University of Westminster Press, 2019.

LANG, Volker. *Digital Fluency: Understanding the Basics of Artificial Intelligence, Blockchain Technology, Quantum Computing, and Their Applications for Digital Transformation*. Berkeley, CA: Apress, 2021.

LOHMANN, Larry. "Interpretation Machines: Contradictions of 'Artificial Intelligence' in the 21st Century Capitalism". In: PANITCH, Leo; ALBO, Greg. [editors]. *Beyond Digital Capitalism: New Ways of Living*. London, The Merlin Press, 2020, pp. 50-70.

RAGNEDDA, Massimo; GLADOVKA, Anna. [editors] *Digital Inequalities in the Global South*. Cham, Switzerland, Palgrave Macmillan, 2020.

RENNSTICH, Joachim K. *The making of a digital world: the evolution of technological change and how it shaped our world*. 1st ed. New York: Palgrave Macmillan, 2008.

ŚLEDZIEWSKA, Katarzyna; WŁOCH, Renata. *The Economics of Digital Transformation: The Disruption of Markets, Production, Consumption, and Work*. New York, Routledge, 2021.

SRNICEK, Nick. *Platform capitalism*. Cambridge, UK ; Malden, MA: Polity Press, 2016.

UNCTAD (org.). *Technology and Innovation Report (Catching technological waves: innovation with equity)*. New York / Geneva: United Nations, 2021.

Thank You

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