

'BIG TECH'

**& THE GLOBAL
ECONOMY:
A PRIMER**

Jai Vipra

January 2021

FOCUS
ON THE
GLOBAL
SOUTH

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INTRODUCTION

Digital technologies feature in the most visible and powerful innovations that have occurred in the last few decades. Yet these new technologies preside over a world that is still partly mired in the old. The old world represents not only a lack of access to connectivity, smartphones or knowledge, but the conditions of staggering inequality and exploitation at a global scale. This is not to say that digital technologies have had no effect on the economy – in fact, they have led to a reorganisation of the world economy such that digital technology giants now sit at the helm of global value chains. In interaction with national policies, they have created the remarkable situation where corporations from the United States dominate in these technologies, challenged only by those in China.

It thus becomes important for progressive actors to map the growth of digital technology through the companies that have risen through the application of such technology. These companies are now colloquially known as Big Tech. Big Tech derives its influence from the centrality of data to the new technologies, and their exclusive control over large troves of data generated by their users. Big Tech has also achieved scale through its platform nature, which reinforces its data capturing and use capabilities.

These capabilities are allowing Big Tech companies' value and influence to soar. By using their users' data for targeting, Google and Facebook have become the recipients of 65% of digital advertising spending globally. Personal data has also been used by financial institutions to predict loan repayments and by governments to predict where child welfare interventions will be needed, raising fears of "rule by algorithm".

Big Tech companies are heavily incentivised to collect as much personal data as possible. The more data you have, the better your algorithms; and the better your algorithms, the better you can attract more advertisers and users, who then generate more data. Years of experience collecting and managing this data have equipped a few Big Tech companies, including Microsoft and Amazon, to pivot to providing cloud and computing services to other organisations, from other companies to government agencies like the Pentagon and the CIA. The degree to which Big Tech firms use the data they store for other entities for their own benefit remains an open question.

What is clear is that the concentration of data in a few hands means that information is not freely available in the market, assuring an unfair and self-replicating advantage for the Big Tech companies at the expense of newer or smaller players. Big Tech players can offer deep discounts to users that smaller players cannot afford, and supply useful data to their subsidiaries that competitors cannot access. They can buy out start-ups to acquire new technology and to make sure competitors do not emerge.

Through their influence within the US government and the World Trade Organization, many Big Tech companies have succeeded in staving off regulations that would even the playing field and give consumers more control over their digital futures.

As entire economies digitalise, they face a choice: whether to allow this digitalisation, and consequently the entire economic arrangement, to be carried out on the terms of Big Tech, or whether to develop democratic alternatives. Democratic alternatives can range from regulations for privacy, competition, and taxation to public participation, ownership, and control.

This brief will provide company profiles of the largest digital technology companies, explain how they wield economic control, and discuss some of the regulatory actions and proposals that are available to progressive actors worldwide, especially in Asia-Pacific. Also included is a glossary of key terms.

GLOSSARY

Artificial intelligence (AI)

The definition of artificial intelligence changes as does our understanding of what is artificial and what is intelligent. For the purposes of this document, we can understand artificial intelligence as a group of technologies that use digital data to make decisions at high levels of autonomy. One way of achieving artificial intelligence is through machine learning algorithms. An image recognition example might help to understand how certain machine learning algorithms are different from other simpler algorithms. Normally, we would tell our software that a baby is small, has two hands and two feet, and is often crawling, and then hope that the software learns to recognise when a picture has a baby. Instead, a machine learning algorithm allows us to simply show the software millions of pictures of babies, through which it identifies by itself what babies look like. When we show it a new picture, AI will be able to tell us if the picture has a baby in it.

In a more generalised form: to code a certain type of machine learning algorithm, instead of telling the software to “do x, y and then z”, we can tell it to “achieve x result” and feed it troves of data so it can identify patterns and figure out ways of achieving the result by itself.

Cloud

Servers are computers that provide various functions to other computers in a network. These functions include file storage, sharing, computation, etc. The word “cloud” is a way to refer to servers that we can access using the internet. A company may use cloud servers from a cloud service provider if it does not want to maintain its own servers for storing files, using email, and running programmes.

Data

Data refers to qualitative or quantitative information that we can tie to people, things, or phenomena. Big data is simply large amounts of data collected through digital means. The phrase has become popular because we now have the

technological and social means to collect very large datasets very frequently, allowing us to make correlations, predict changes, and affect behaviour. For example, how you like pictures or scroll on Instagram contains clues about the content or products you like, helping advertisers understand whether they should spend money on advertising to you or not.

Enterprise Software or Enterprise Solutions

Enterprise software is software for (usually large) organisations. This software helps organisations manage business processes, plan for resources, organise content, manage customer relationships and supply chains, and streamline administrative functions. Common examples of enterprise software are Salesforce and Google Analytics.

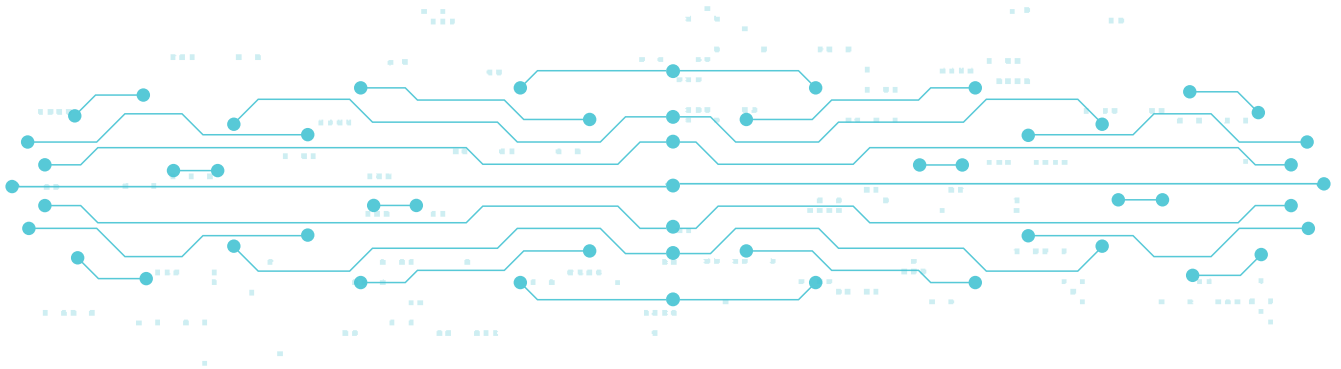
Platform

A platform facilitates interactions among two or more groups of actors, such as buyers, sellers, users, software developers, researchers, and financiers. For example, Amazon is a platform that facilitates interaction among buyers, sellers, logistics providers, and financiers (e.g., for purchases made using monthly instalment payments). Platforms are often referred to as multi-sided markets – the sides being the different actors. As we shall see in this paper, the nature of platforms is often infrastructural.

Venture Capital

Private equity refers to the financing of a company in exchange for an equity stake in it. This is done outside the ambit of public stock markets, thus these are private finance markets. Venture capital is a type of private equity finance that typically seeks investment in early-stage start-ups with the aim that, even with high risk, over the long term at least some of these start-ups will end up growing very fast.

The goal for a venture capitalist is often to earn money by eventually getting the start-up acquired or publicly listed, so that they can sell their shares at a much higher price than the purchase price.



SECTION 1: DIGITAL TECHNOLOGY COMPANIES ARE THE NEW CORPORATE GIANTS

For any activist or researcher interested in understanding the control of large corporations over the world, a recent change will be quite apparent. Rapid technological advancement has meant that digital technology companies are the new corporate giants controlling global value chains.

We should note that digital technology companies do not necessarily derive their value from proprietary technology, unlike the giant corporations that depended on intellectual property previously. The technology is often open for anyone to access. Digital technology companies derive their value from the data that they collect. For example, Amazon is able to market its own products on its platform by analysing the sales data of all other products on its platform.

Through the explanation of artificial intelligence (AI) in the Glossary, you will be able to see that more data means better accuracy in targeting, predicting, and planning. Uber, for example, collects data about the trips we take and uses this data to determine pricing and routes. Uber can increase prices on routes with high demand; it can even track if your phone battery is low and theoretically charge you a higher price for your desperation. It shares this data with the government or the public only when it wishes to, and only at the level of detail it wishes to. In effect, it encloses this data and builds powerful algorithms with it. This data gives it a bird's eye view of traffic flows, rider and driver motivations, and, in fact, of a city's economy through its transport patterns.

At the same time, it is not the case that the technology itself is unimportant to these companies. Digital technology companies can easily attract talent to develop new technology through higher pay. For instance, universities

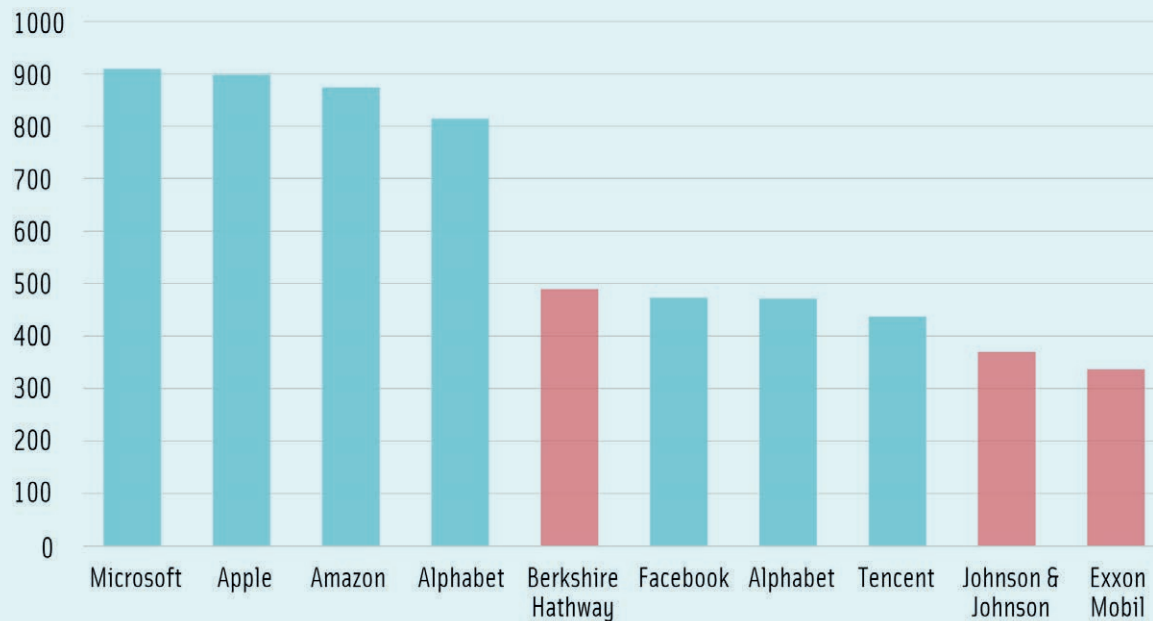
find themselves unable to retain experts in AI as Big Tech recruits them at very high salaries.¹ Big Tech also acquires start-ups to gain access to technology and talent. Their rapid acquisition of AI start-ups has left researchers and entrepreneurs concerned about the consolidation of power.² In fact, most technology start-ups backed by venture capital now aim to get acquired by an existing firm rather than to be publicly listed.³

Big Tech companies also derive value from network effects. Network effects refers to the idea that the more the users of a service, the better it becomes. For example, if most of your family and friends use Facebook instead of any other social network, you are more likely to join Facebook instead of the other network. Similarly, if most people use Facebook, advertisers will prefer to advertise on Facebook for its larger audience and better targeting data than any other platform is likely to have.

It is no wonder then that seven of the top 10 companies by market capitalisation are now digital companies, as can be seen in the chart (*on page 4*).

This ranking fluctuates often and has changed since the public listing in late 2019 of Saudi Aramco, which now stands as the most valuable company in the world. Nevertheless, the list is illustrative of the digital takeover of large global corporations.

FIGURE 1: The world's top 10 companies by market capitalisation (in USD billion) as of March 31, 2019. Source: PwC⁴



The following section will provide brief company profiles for all seven digital companies in the top 10 as a quick overview of what is now called Big Tech. The first five are US-based, and the last two are Chinese companies.

1. Microsoft

Microsoft has three business segments. The revenue contribution of all three is nearly equal⁵:

- **Productivity and business processes:** Microsoft Office, LinkedIn, and enterprise solutions.
- **More personal computing:** Windows, devices, gaming, and search products.
- **Intelligent cloud:** Server products and cloud services; related enterprise services.

Over a billion devices use Microsoft Windows 10.⁶ In comparison, Apple's macOS runs on 110 million devices.⁷ Microsoft employs about 151,000 people full-time worldwide, 59% of whom are in the US and 41% in engineering functions.⁸

In 2018, Microsoft acquired GitHub, a platform that many developers use to host the code that runs their programmes. GitHub has begun a major expansion in India by offering paid subscriptions to companies. As The Ken reports: "GitHub allows Microsoft to catch India's coders young, get them used to its ecosystem, and make itself indispensable."⁹ This is the same model used by

Adobe, for example, to get designers used to its products in universities. The same article also points out that Microsoft could integrate GitHub with its cloud platform Azure in the future, locking software developers and companies into using Microsoft software for various functions. Microsoft's financial filings say: "The acquisition is expected to empower developers to achieve more at every stage of the development lifecycle, accelerate enterprise use of GitHub, and bring Microsoft's developer tools and services to new audiences."¹⁰ They also say that, in the future, they want to focus on workplace offerings, cloud, artificial intelligence, and gaming.

In Asia-Pacific, Microsoft is headquartered in Singapore. Some policy decisions regarding Microsoft highlight US-China tensions in the technology sector. For example, in December 2019, the Chinese government ordered all public offices to remove foreign software and hardware, but Microsoft has said that this does not impact its revenues significantly as it mainly serves Chinese businesses trying to expand globally.¹¹ Overall, Microsoft's dominance is built on business software, personal computing, gaming, and a growing cloud segment.

2. Apple

Apple sells both products and services. Its product line includes the iPhone, Mac, iPad, Wearables,

Home, and Accessories (AirPods, Apple TV, Apple Watch, Beats headphones, etc.). Its services include digital content and streaming (e.g., iTunes), licencing, Maps, and other services that are bundled for free.

Recently, Apple's revenues from services have been increasing, and it is looking to diversify further out of products. It is attempting to focus on revenues from iCloud, Apple Music, Apple Pay, and the App Store.¹² This mirrors an overall trend in technology companies that indicates that the greatest value can be extracted through streaming and platform services rather than through product sales. For example, in 2018 streaming accounted for 75% of music industry revenues in the US.¹³ Google, Amazon, Microsoft and Apple are all investing in streaming games from remote servers instead of selling game downloads.

To meet the goal of diversification, Apple acquired Shazam (the app that identifies songs). Now, when someone uses Shazam to identify a song, they can add it directly to their Apple Music playlists. Apple is also focusing on integration by acquiring Intel's smartphone modems business to decrease its reliance on Qualcomm.¹⁴ It aggressively acquires start-ups for their technology, at a rate of one every few weeks.¹⁵

Apple is seeing declining revenues for Asia-Pacific as a percentage of total revenues. This is driven by a decline in Chinese revenues, mainly due to lower iPhone sales.¹⁶ The chart below shows that APAC revenues for Apple have fallen from 37% of total revenues in 2016 to 32% of total revenues in 2019.

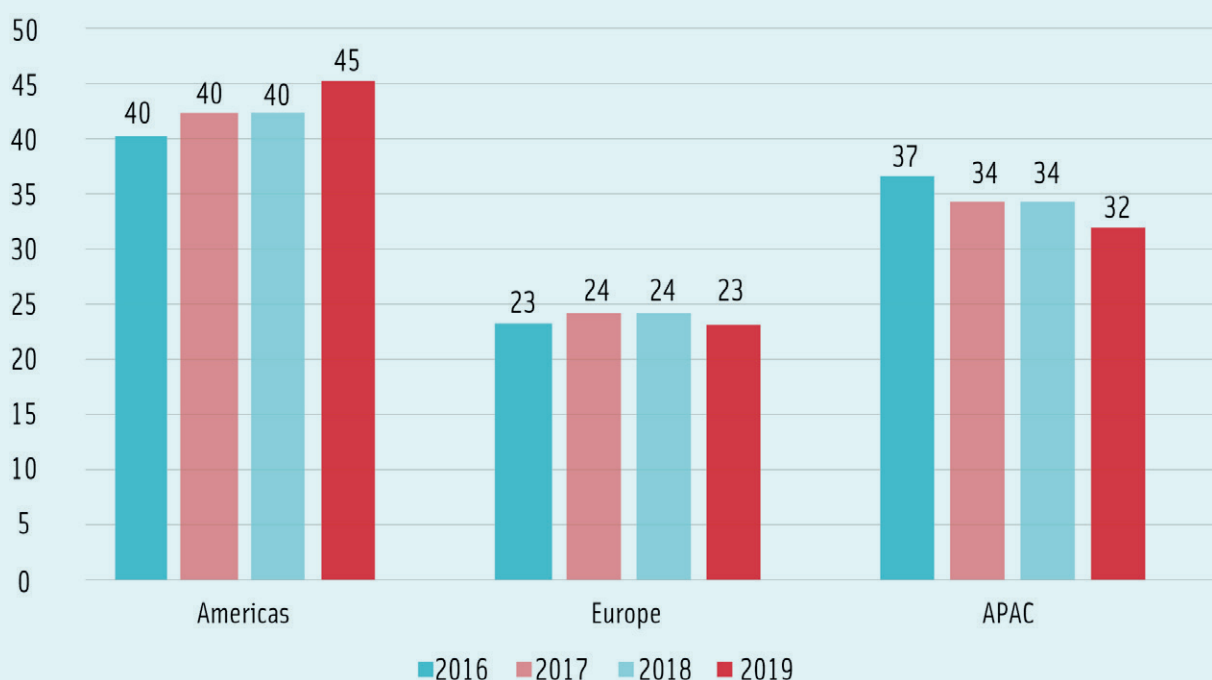
3. Amazon

Amazon's business is formally segmented into two geographies (North America and International) and its cloud offering (Amazon Web Services). However, a list of its products and services is more illustrative of the range of its activities:

- **E-commerce:** This includes manufacturing retail goods, marketplaces, logistics, warehousing, delivery (including that of groceries), and customer service. Amazon also has brick and mortar retail stores.
- **Media:** Amazon Prime, Amazon Publishing, Amazon Music, the Kindle Store, and Amazon Studios.
- **Other:** This includes manufacturing consumer electronics like Kindle, Echo, and Fire Stick; Amazon Web Services (AWS); and Amazon Payments.

Only the North America and AWS segments report a positive operating income, with the

FIGURE 2: Apple revenues by geography (% of total revenues). Source: Apple Earnings Statements



International segment reporting losses, although these losses are narrowing as it gains market share. Amazon pumps in large amounts of money into markets by offering discounts, sustaining losses while growing its customer base. It does this so it can gain market share and earn greater profits in the future. We can see proof of this in Amazon's financial statements: its net income for e-commerce in North America used to be negative for several years until it started earning profits. AWS contributes 10% of net sales, growing faster than other segments; 27% of net sales are from the International segment.¹⁷

Marketplaces are Amazon's standalone websites, such as Amazon.com, Amazon.in, and Amazon.fr, through which it sells products. Although Amazon has just 16 marketplaces, it ships to about 100 countries. Its marketplaces in Asia-Pacific include the ones in Australia, India, China, Singapore, and Japan.¹⁸ Amazon has announced that it is shutting down its Chinese marketplace while keeping cross-border selling to Chinese customers operational.¹⁹ Amazon's exit from China is thought to be due to competition from local rivals, as it had a negligible market share.²⁰ In India, Amazon has about 31.2% market share in e-commerce, behind Walmart's Flipkart and its sister sites at 38.3%.²¹ In Japan, it is the market leader with more than 20% market share, while in Australia it stands in fourth place with 3% market share.²² In 2018, AWS had 11% of the market share in

Asia-Pacific, including a 6% share in China's market. Amazon is in talks to acquire a stake in Gojek, a Southeast Asian platform for ride-hailing, delivery, e-commerce, digital payments, and other services.²³

4. Alphabet

Alphabet is Google's holding company. Its business segments include Google and Other Bets.

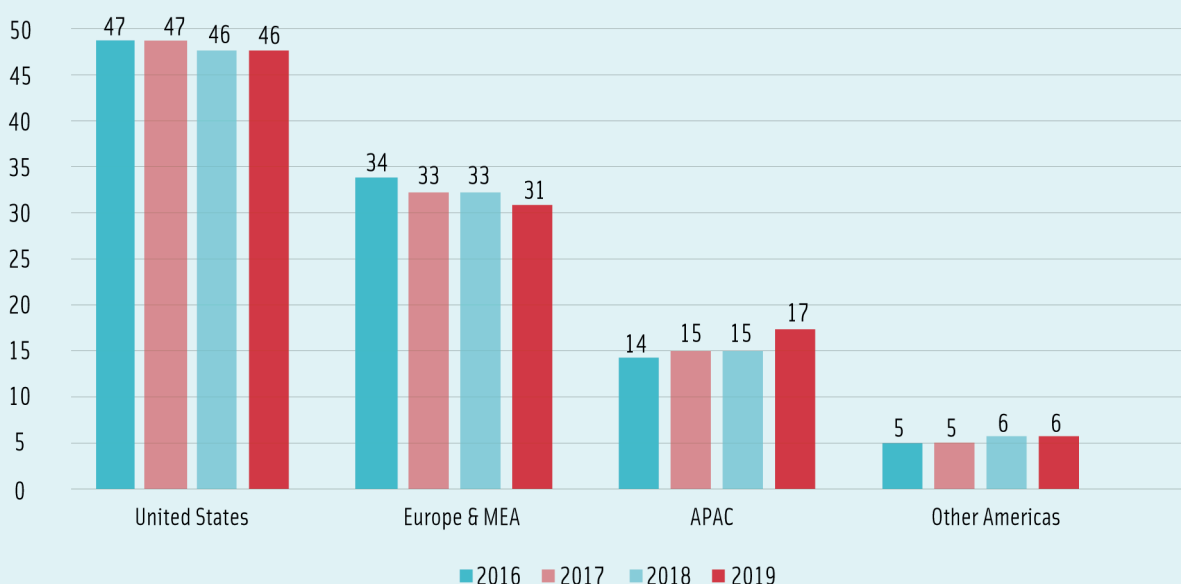
Google is further segmented into:

- **Advertising:** Google Search, YouTube Ads, and other ads.
- **Cloud.**
- **Other:** YouTube non-advertising revenues.

About 83% of Google's revenues come from advertising, although the revenue share of Google Cloud is increasing. Advertising works by tracking people's browsing activity. Ads are placed to target specific users, and companies pay per click. The fees paid by advertisers are shared by Google and the websites where the ads are placed.

Google controls 90% of the global internet search market.²⁴ It has faced anti-trust action for abusing its dominant position, such as by the Competition Commission of India, which in 2018 ruled that Google was disadvantaging other travel platforms by showing search users its own flight results.²⁵ Russia ruled against Google for showing

FIGURE 3: Alphabet revenues by geography (% of total revenues). Source: Alphabet Earnings Statements



its own search engine as the default on Android phones (Android is owned by Google).²⁶ The European Commission has also fined Google for related abuses in search and advertising.²⁷

“Other Bets” includes projects such as Loon, which uses helium balloons to provide network connectivity in remote areas; Wing, for drone delivery services; Verily, for wearable devices that can track health indicators; DeepMind AI; Access, for the provision of access to the internet; SideWalk Labs, for sensor-based traffic management; Waymo, for self-driving cars, and so on.²⁸ Google has strengthened its dominant position by making acquisitions such as Android, YouTube, DeepMind AI, and Motorola Mobility.

Asia-Pacific is Alphabet’s fastest-growing market, as the chart below illustrates.

Google Cloud in Asia still has a much smaller market share compared with Amazon and Microsoft. The notable exception to Google’s dominance, of course, is China, which blocked most Google services in 2010 and 2014. Baidu has 70% of the search market share in China.²⁹

5. Facebook

Facebook reports its revenue in two parts:

- **Advertising revenue:** This includes revenue from Facebook, Instagram, Messenger, and

other websites where Facebook facilitates ads. In 2019, advertising was 98.5% of Facebook’s total revenue. This is what we mean when we say that Facebook makes money from user data – it provides advertising services that are targeted based on user data.

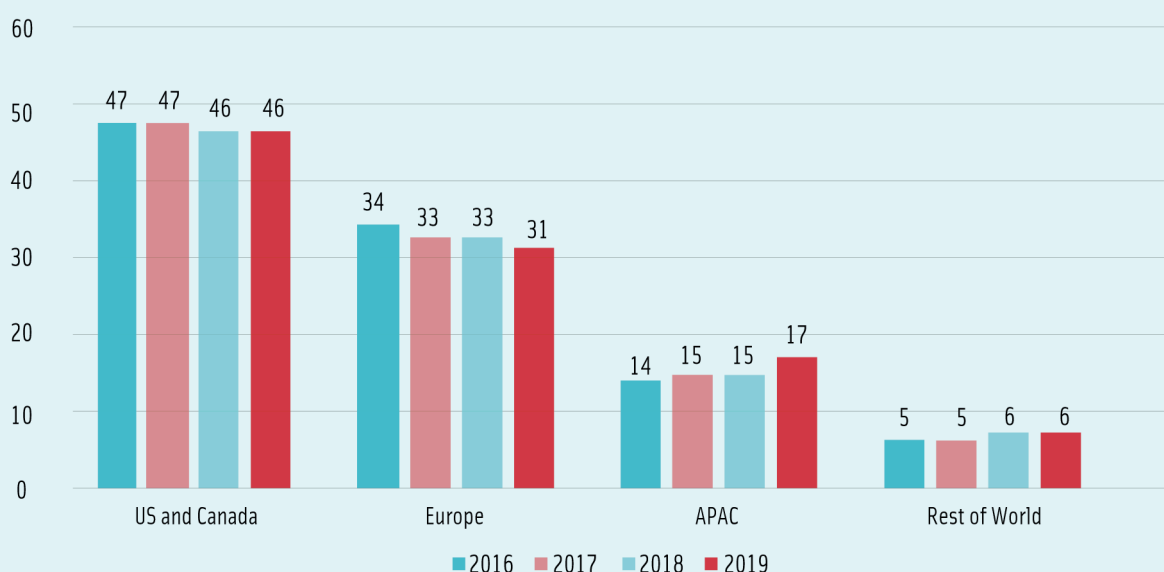
- **Other revenue:** This includes revenue from hardware sales, payments, etc., including from Oculus virtual reality products.³⁰

More than 8 million businesses advertise with Facebook. It controls 66% of the global social media market.³¹ This has led to other media outlets like newspapers seeing drastically reduced revenues as Facebook locks in users and advertisers.

From the graph below, we can see that Asia-Pacific is Facebook’s fastest growing market, although the average revenue per user for Asia-Pacific in Quarter 4 of 2019 was USD 3.57 as compared with USD 41.41 for US and Canada. The Asia-Pacific growth is led by growth in India, Indonesia, and the Philippines.

Facebook’s future plans include more advertising in Messenger, especially for small and medium enterprises in Asia-Pacific. It also plans to venture further into payments and virtual reality, and to integrate its family of apps (Facebook, WhatsApp, Instagram, etc.) more closely such that it can have better data and better customer retention.

FIGURE 4: Facebook revenues by geography (% of total revenues). Source: Facebook Earnings Statements



6. Alibaba

Alibaba's business is divided into the following segments:

- **Core commerce:** This includes both retail and wholesale commerce, its logistics service Cainiao, local consumer services (including revenues from food delivery), etc. As of 2019, this segment generated 84% of Alibaba's total revenue. Alibaba's Taobao is the world's biggest e-commerce website. 92% of its retail commerce revenue is generated from Chinese markets. International retail includes AliExpress and Lazada, among others.
- **Cloud computing:** This contributes 8% to Alibaba's total revenue.
- **Digital media and entertainment:** This includes UC Browser, video streaming, Alibaba Music, Alibaba Pictures, etc.
- **Innovation initiatives and others:** This includes products like smart speakers and mapping services.³²

Only the core commerce segment reports a profit, with its digital media segment trailing behind Tencent and Baidu.³³ Alibaba Group also owns Ant Financial, a fintech company offering payments and credit. Ant Financial's Alipay held 53.8 percent of the market share in China's mobile payments market.³⁴

Alibaba Cloud is the market leader in Asia-Pacific, with 19.6% market share.³⁵ Lazada, an e-commerce company acquired by Alibaba in 2016, has 20% market share in Southeast Asia.³⁶

7. Tencent

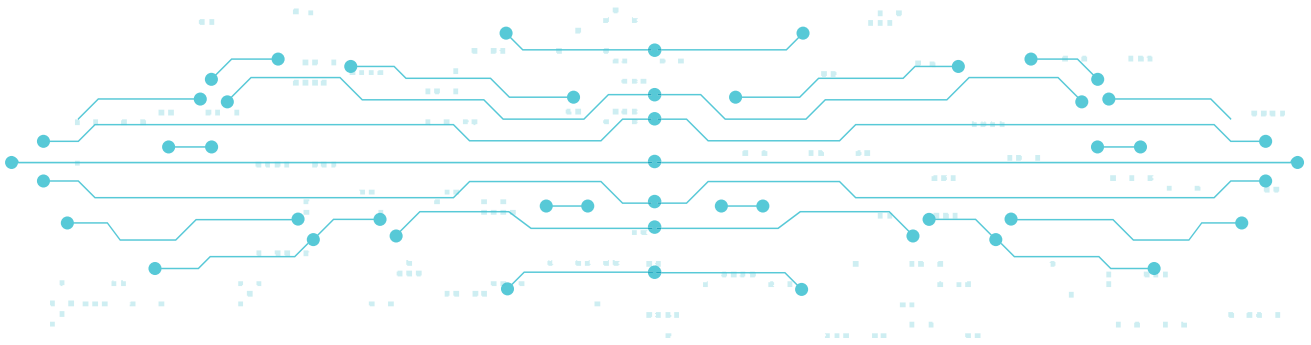
Tencent's business segments are as follows:

- **Value added services:** This includes online gaming, social media and video streaming among others. This segment contributes 54% to total revenues.
- **Fintech and business services:** This includes payments (Tenpay, WeChat Pay, and QQ Wallet), cloud offerings, etc.³⁷
- **Online advertising:** This includes targeted advertising on its offerings such as WeChat, Tencent Video and QQ (a social network). Revenues from this segment constitute 18% of total revenue and have been growing rapidly.
- **Others:** This includes trademark licensing, software sales, software development services, etc.

Tencent is the largest gaming company in the world, operating the three most popular games in China.³⁸ Its messaging and social network apps serve as distribution channels for its games. Its dominance is supported by its wide investments – Tencent Holdings has stakes in over 600 companies worldwide.³⁹

Tencent's major investments in Asia-Pacific include twelve Indian investments and six Southeast Asian investments.⁴⁰ Tencent is planning to increase advertising, expand globally, diversify away from value-added services, and expand into cloud gaming.⁴¹





SECTION 2: THE RISE OF DIGITAL TECHNOLOGY HAS IMPLICATIONS FOR THE GLOBAL DISTRIBUTION OF VALUE

Having acquainted ourselves with some of the world's largest technology firms, we may turn our attention to what their dominance means for the world economy. Where is value created, and where is it captured?

1. The United States dominates Big Tech, followed by China

As can be seen quite clearly from the list of the largest technology firms, the US and China dominate the Big Tech sector globally. The US is responsible for 68%, and China for 22%, of the market capitalisation of the world's top 70 digital platforms. The US is the market leader in business-to-business e-commerce, while China

leads in business-to-consumer e-commerce.⁴²

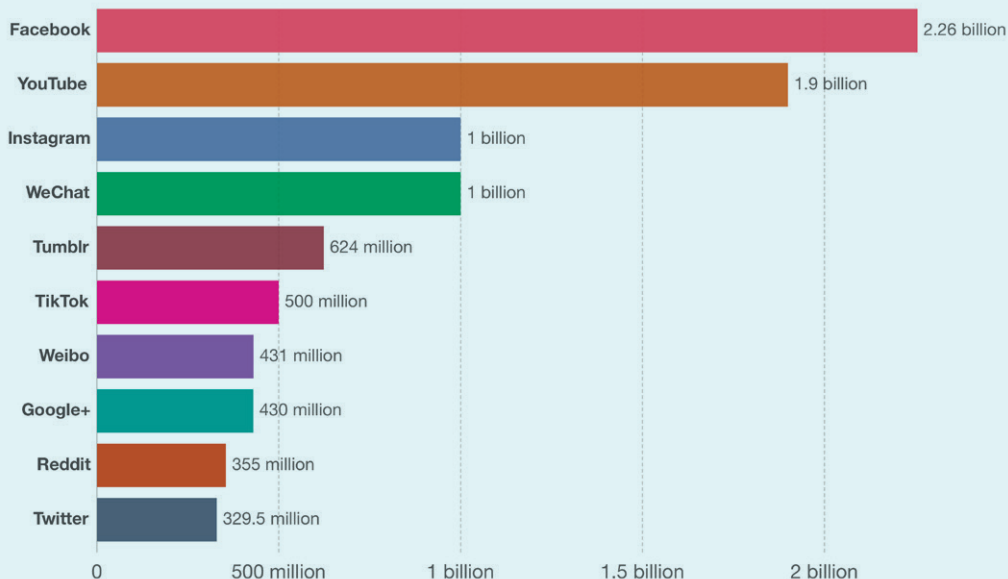
The rest of the world lags far behind these two countries. Another indicator is the list of the top social media platforms in the world as seen in the chart below.

Seven of these companies (Facebook, YouTube, Instagram, Tumblr, Google+, Reddit, and Twitter) are American-owned, while the rest are Chinese-owned.

FIGURE 5: Generated from Our World In Data

NUMBER OF PEOPLE USING SOCIAL MEDIA PLATFORMS, 2018

Estimates correspond to monthly active users (MAUs). Facebook, for example, measures MAUs as users that have logged in during the past 30 days. See source (Statista and TNW 2019) for more details.



The economic relationship in the technology sector between these two leading countries is fraught. The intensity of the US-China rivalry in technology can be gauged by the fact that it is called a “digital cold war” by many commentators.⁴³ China’s Great Firewall, a term for different methods used by the government to block some foreign websites, has played an important role in ensuring that China is a formidable rival to the US in digital technology. These methods include blocking IP addresses, filtering keywords and using DNS attacks. China considers the principle of cyber sovereignty central to its digital governance policies.⁴⁴ Cyber sovereignty, like any sovereignty, is a double-edged sword – but its non-existence means cyber colonialism or subservience to foreign technology providers. The Firewall, and the subsequent policies to promote Chinese technology companies, allowed this cyber sovereignty to exist.

A few years ago, as China was at the cusp of its digital transformation, it needed Google and its services. Today, it is commonly understood that the situation has reversed: Google needs China and its large market. In 2018, it was revealed that Google tried to re-enter Chinese markets

by acceding to content regulation conditions, but the plan was halted after an uproar and a directive from the US vice president.⁴⁵ This reaction typifies the US attitude toward Chinese technology companies alongside Chinese restrictions on US technology companies. The US has also instituted bans on doing business with Huawei over allegations of spying and has opened a case on TikTok owner ByteDance over the same concerns.⁴⁶

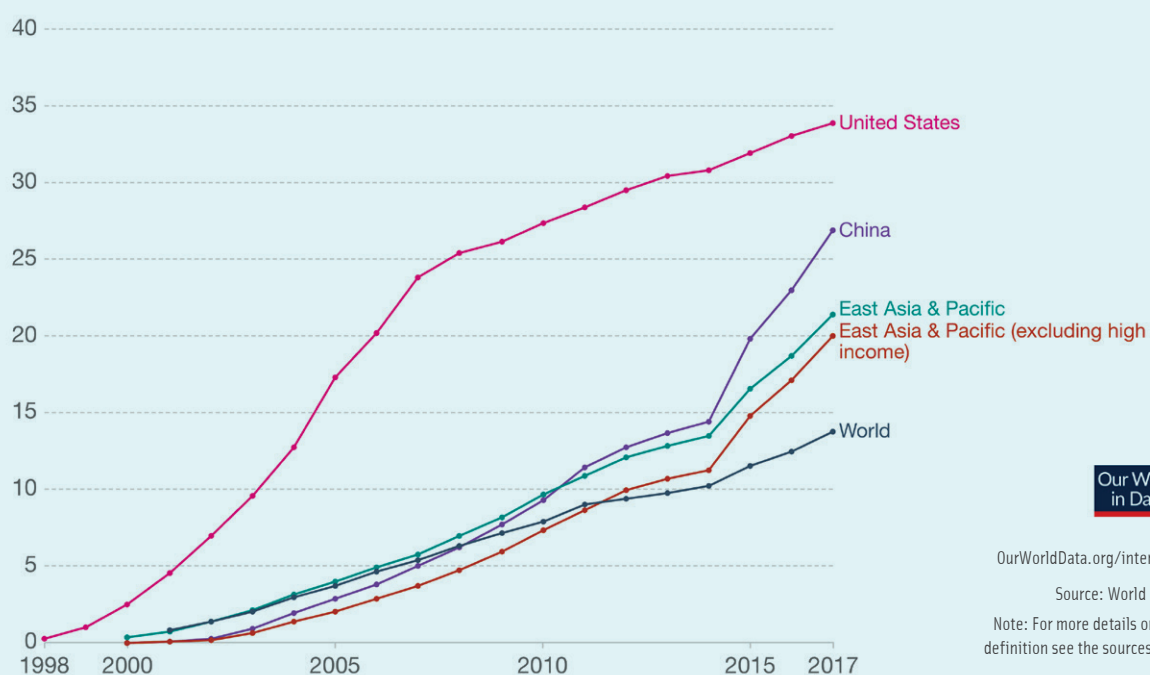
2. The Asia-Pacific region faces a digital divide

Where do the Asia-Pacific (APAC) countries stand in relation to the US-China rivalry? Let us start by examining the basics of digitalisation and connectivity in the region. The APAC region is rapidly increasing internet and telecom connectivity but still needs to catch up with the Western world in this regard. In addition, there are disparities in connectivity among APAC countries and within them.⁴⁷ The following graph explains the disparities in broadband internet penetration rates among APAC countries and also where they stand in relation to the world:

FIGURE 6: Generated from Our World In Data

BROADBAND SUBSCRIPTIONS PER 100 PEOPLE, 1998 TO 2017

Broadband subscriptions refer to fixed subscriptions to high-speed access to the public internet (a TCP/IP connection), at downstream speeds equal to, or greater than, 256 kbits/s.



Our World
in Data

OurWorldData.org/internet/

Source: World Bank

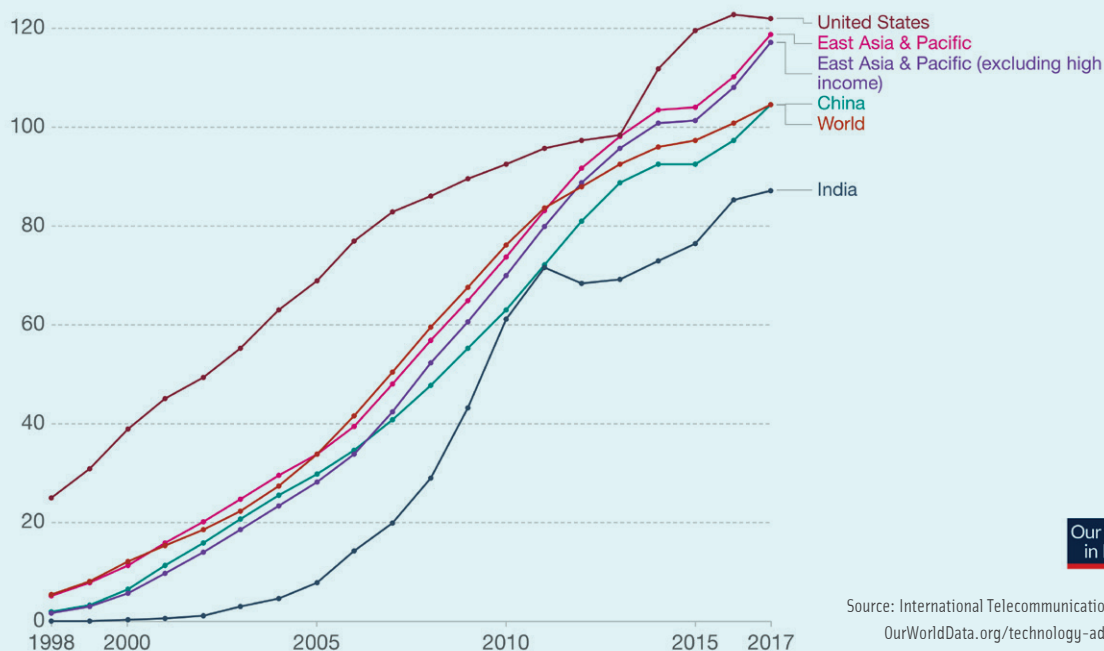
Note: For more details on the definition see the sources tab.

The disparities in mobile cellular subscriptions are less stark, indicating the APAC region's connectivity story is largely mobile-led:

FIGURE 7: Generated from Our World In Data

MOBILE CELLULAR SUBSCRIPTIONS, 1998 TO 2017

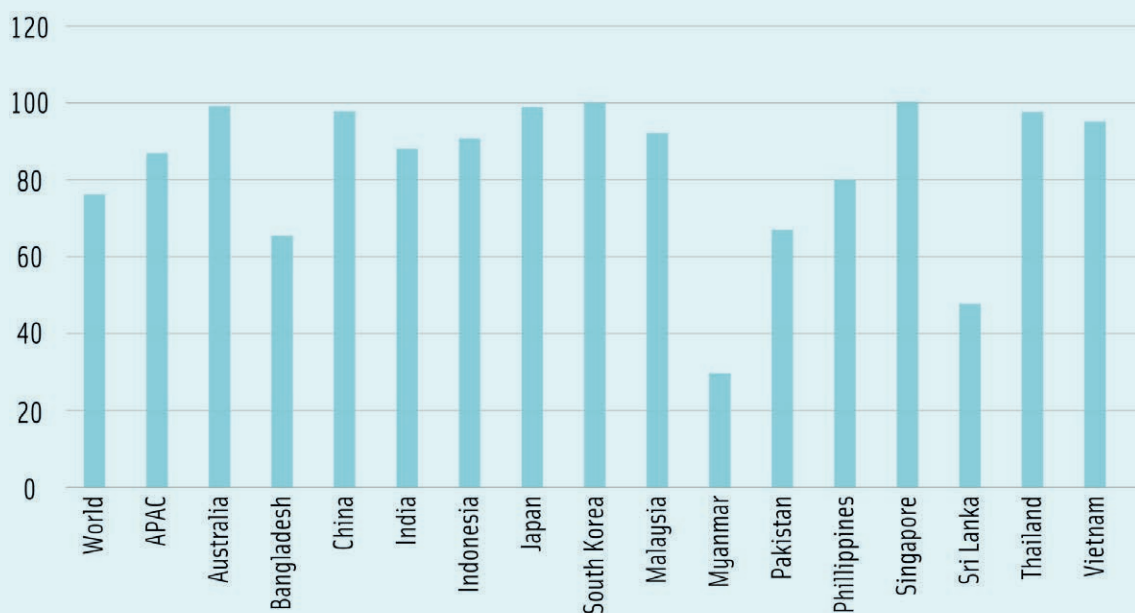
Mobile phone subscriptions, measured as the number per 100 people.



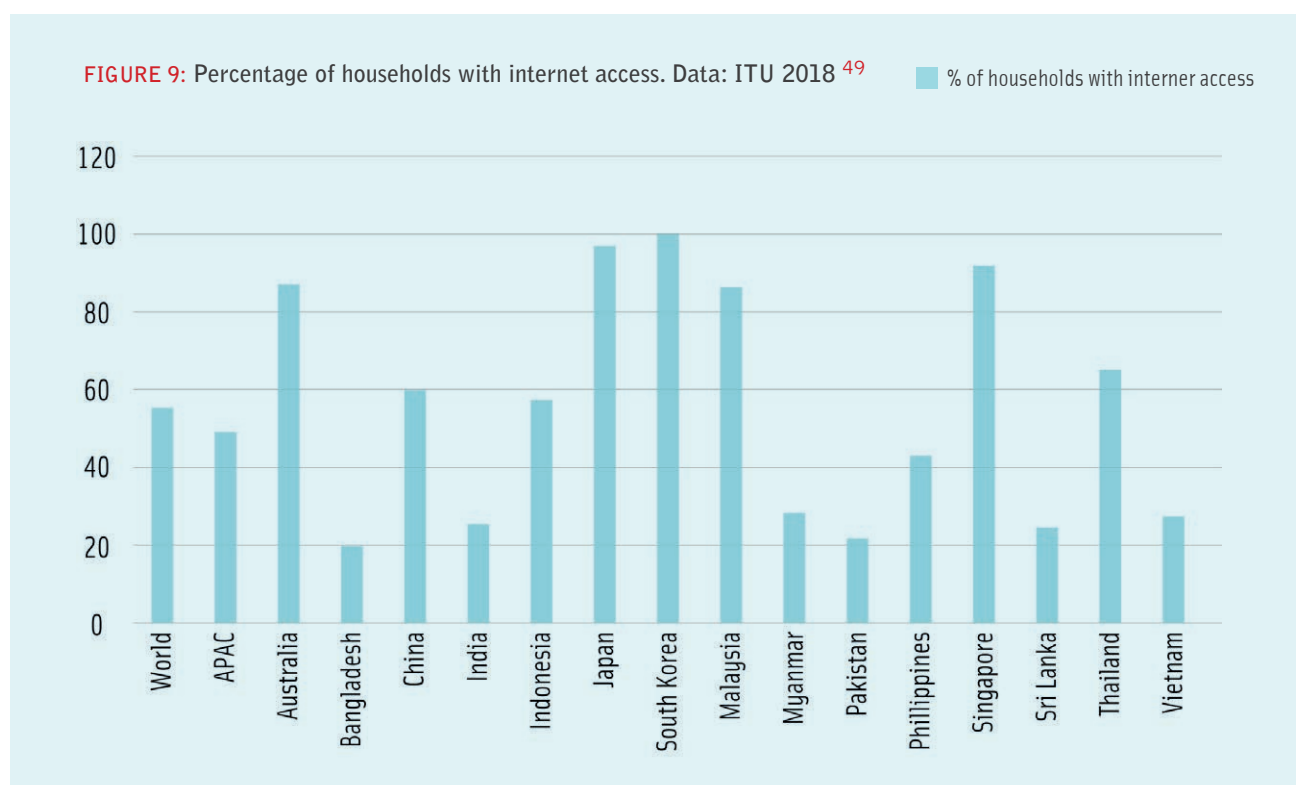
The following chart shows the percentage of population that lives within range of a high-speed mobile network (LTE) signal in APAC countries. It does not show the number of LTE subscriptions, but rather the extent of digital infrastructure present in these countries, revealing wide disparities:

FIGURE 8: LTE coverage in APAC countries. Data: ITU 2018 ⁴⁸

■ % of population with LTE/WIMAX coverage



The next chart shows that there are major differences in the percentage of APAC households that have internet access, with some countries far above the world average and others lagging far behind:



Besides, there is a digital divide between urban and rural areas, men and women, those who can and cannot speak English, etc. The digital divide tells us populations that are better connected and have more digital literacy will find it easier to adapt to a changing economy. They will be in a position to make the most of digital platforms.

3. What does this mean for the global distribution of value?

In a globalised economy, digital infrastructure and literacy by themselves cannot ensure that a country will derive the full economic benefits of digitalisation. We have seen how network effects ensure that a few digital companies end up becoming market leaders. UNCTAD has pointed out that these companies are now on the way to leading not just domestic markets but entire global value chains. Deloitte foresees a transformation from traditional supply chains to “digital supply networks”, where every process in the chain is digitalised. This includes the digitalisation of planning, fulfilment, manufacturing, and customer care. At the core – or top – of this chain is the entity providing digital technology, which is the set of Big Tech firms we are now familiar with.⁵⁰ This creates a difference between economies that contribute data and

economies that create value-added products out of this data. As companies at the higher ends of the value chain are either American or Chinese, the bipolarity in the global technology economy remains. European competitors are unable to capture markets as effectively, and developing countries, including India, seem to be stuck at the lower end of these value chains through work like data cleaning.⁵¹ There are notable exceptions such as South Korea’s Samsung, which is an electronics company that is nevertheless entering the market for enterprise solutions and big data analytics.⁵² India’s Reliance is also likely on its way to becoming a market leader in e-commerce through its partnership with Facebook.⁵³ Even this deal has spurred interest from Google and Microsoft to invest in Reliance and other telecom providers in India.⁵⁴

As every business, from the Fortune 500 company to the street hawker, necessarily digitalises, Big Tech reaps ever greater rewards. The following sections will explain how this dominance has been and will be built due to the nature of global digital value chains. It will help provide a framework to understand not only the rise of the current top digital companies but also the potential rise of others, whether from the US, China, or other countries.



SECTION 3: DIGITAL TECHNOLOGY COMPANIES WIELD DATA AND INFRASTRUCTURE POWER TO EXERT ECONOMIC CONTROL

Why are these digital technology companies valued so highly? What is the nature of their economic influence, and how do they maintain it? There are two interrelated levers that make these companies so valuable: data (and technologies built using data) and the platform or infrastructural nature of these businesses.

Data is important because of the uses to which it can be put. One kind of use for data is for targeting. Facebook, for example, derives its revenue from targeted advertising. It allows advertisers to reach the audiences they choose, and these audiences are categorised by their online activity. For instance, a manufacturer of men's shoes can choose to advertise only to men, based on the gender information that Facebook users provide. More sophisticatedly and worryingly, advertisers can also advertise to people based on their browsing activity, their political beliefs, and even their mood.⁵⁵ Google and Facebook together are recipients of 65% of digital advertising spending globally.⁵⁶ However, advertising is not the only kind of targeting that data enables. Data allows targeting in finance, for example, to predict loan repayment rates. Data can also be used to target public welfare measures, though such use has faced criticism of facilitating "rule by algorithm" in welfare states.⁵⁷

Another use for data is for planning. Data from ride-hailing, logistics, and mapping platforms can be used for traffic management and urban planning. It can even have unexpected uses in healthcare, such as Uber data potentially being used to work out the fastest way to a hospital at different times of day. Soil and weather data are already being used for precision agriculture. Data on sales and prices can also help in planning

agricultural marketing better. Data is being used to optimise manufacturing and supply chains and to customise products cheaply. A good hybrid example is the potential use of data from an app that uses image recognition to grade agricultural produce for quality. Such data can be used not only to automate parts of agricultural marketing but also to optimise warehouse operations by predicting the rate at which produce stored in warehouses will spoil.

The targeting and planning applications of data make it an extremely valuable resource, and in the digital economy, data begets data. The more data you have, the better your algorithms, as they are able to draw correlations with more accuracy, thereby improving targeting. These better algorithms lead to services that are targeted better, attracting more users, who then generate more data.

This brings us to the second lever that makes digital technology companies valuable – their platform nature. As we have seen, platforms are multi-sided markets with network effects. A platform's value is higher when it has more participants, increasing the probability that every participant finds what she is looking for. A participant in a large platform finds it difficult to switch to another platform because the other platform has fewer participants. Thus, the

likelihood that she will find what she is looking for (the right product, a cab nearby, pictures uploaded by her friends) falls. The likelihood can only be matched if all or most users switch, and if past data is shifted as well. This means that users are, in a way, locked into the platform through what are called high “switching costs”. The combination of switching costs and the usefulness of data at scale makes dominant digital technology companies incredibly valuable.

With the digitalisation of the entire economy, the value of these companies soars even more. They become leaders in global digital value chains, determining, through analysis of data, what and how much should be produced and where. They also provide the requisite infrastructure as every firm and government digitalises. Examples of such infrastructure provisions include:

1. Data management and office functionality in a digital world:

More and more companies are using data, but buying and maintaining servers to store and process this data is expensive and time-consuming. It is also inflexible because companies cannot increase and reduce server space quickly as their needs change. Cloud storage and computing help by storing and processing this data on remote servers hosted on the internet. Cloud service providers provide easy, flexible options for storage: one can choose to contract or expand storage space based on the growth of the company. The result is economy-wide efficiency, but it comes with the danger of concentration of ownership. Earlier, server space was owned by many companies themselves. Increasingly now, cloud service providers own server space and merely lease it out to companies with flexible contracts. The use of cloud services from Big Tech is not limited to private firms – Microsoft recently won a contract to provide cloud and platform services for the Pentagon.⁵⁸

There have been allegations that when organisations and individuals store their data on the cloud, the cloud service provider can access and use this data for its own benefit. Google and Amazon have both denied that they use data stored on their cloud services.⁵⁹ However, there are still ways in which cloud service providers can benefit from data being stored on their servers

without actually accessing that data. Reportedly, Amazon used the patterns of cloud usage among its start-up clients to understand how fast they were growing. For example, if a start-up needed more server space in only a few months, this could mean that it was growing fast and would be a good investment. Amazon reportedly used this information, which was not available to other investors, to make investments in start-ups.⁶⁰

Companies and governments that digitalise also require software and enterprise solutions. Microsoft is valuable partly because it services a large part of this segment: many companies use Windows and Microsoft Office, including through the cloud.

b. Retail in a digital world:

As more businesses start selling online, they find it easier to use existing e-commerce platforms not just for their marketplaces but also for their logistics services, such as packaging, warehousing, delivery, and tracking. Cainiao, a logistics company launched by Alibaba, is a good example of this. It has digitalised parcel tracking for logistics providers and is planning to digitalise the entire logistics chain, including warehouses and transport.⁶¹

Amazon recently announced a USD 1 billion investment to digitalise 10 million of India’s small and medium enterprises. This makes it easier for these SMEs to join Amazon, directly expanding the latter’s market share. What is more, it also includes an initiative called “I Have Space”, through which small neighbourhood shops can turn into delivery centres for Amazon products – a stark illustration of the future role such small actors in the economy will play as mere appendages of digital giants. A similar strategy, where customers can place orders online on Tmall and collect them from physical stores, is used by Alibaba in China.⁶² Calling such strategies “new retail” or “online-offline integration” hides the increasingly subordinate role played by small offline players in such arrangements.

c. Digital infrastructure for automation:

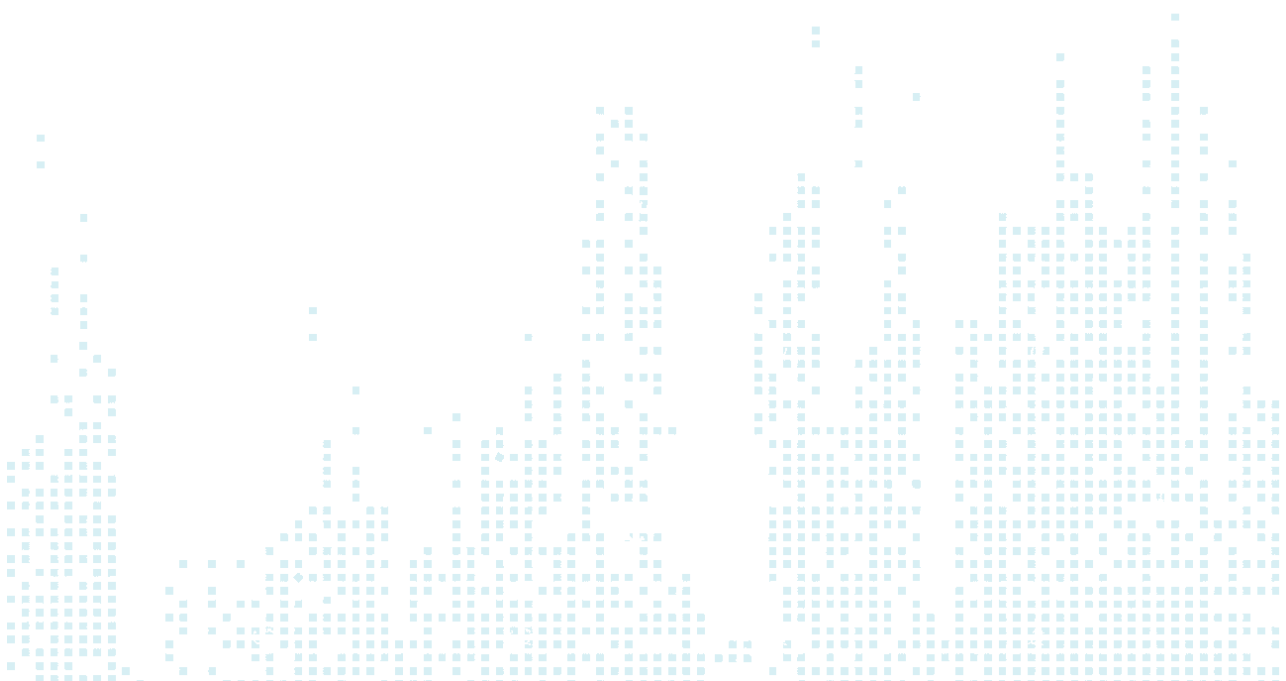
The automation of industries and functions also provides technology companies inroads into providing infrastructural services. For example, Alphabet’s Waymo is projected to lead the

car market as the number of self-driving cars grows. It is predicted to achieve this not by manufacturing cars but by providing self-driving software and hardware to existing cars. This can turn car manufacturers into mere suppliers as Waymo collects data and improves its algorithms at a rate unparalleled by the car manufacturers themselves.⁶³ We can see that this case mirrors the fate of small neighbourhood shops in a retail market dominated by Amazon and its data collection. A less insidious case, where a company's automation depends on a digital giant, is that of Uber. Uber uses data from Google Maps through Application Programming Interfaces (in this case, tools that pull or push data in real-time) for navigation and tracking. It has accepted that this is the most efficient and cost-effective way for it to access digital maps. Alibaba and other companies are providing the technology for the digitalisation of agriculture, including through sensors to monitor animals and to spray fertiliser.⁶⁴ Similar examples abound in education, health, urban development, tourism and so on.

Because of the twin effects of data enclosure and network effects, we can no longer view a large digital technology company as just another business. More often than not, it is a platform for other businesses, or a platform for commercial and other interactions. Digital technology companies are thus described through different

terms. Some scholars call them infrastructure providers or utilities, similar to electricity or water utilities in many ways.⁶⁵ Some see them as gatekeepers to other companies.⁶⁶ Others even call them ecosystems,⁶⁷ meaning that they encompass a whole family of services.

It is by now evident that the concentration of data in a few hands means that information is not freely available in the market. This unfair advantage leads to a situation where markets cannot function optimally and become concentrated themselves. In other words, it becomes more and more difficult for a new company to compete with a technology giant because it is unlikely to have the same amount or quality of data, and for this reason is also unlikely to attract users who generate data.⁶⁸ It has also become fairly clear that a few corporations with a lot of potential to impact social behaviour are under-regulated: Facebook's Mark Zuckerberg has himself called for more regulation of Big Tech.⁶⁹ The changes in economic relations wrought by Big Tech – whether between small actors and large technology companies or between different countries – are as yet understudied. But there are clues – particularly, that global supply chains are increasingly being led by these companies and technologies, and that the ownership of these companies is far from geographically scattered.





SECTION 4: DIGITAL TECHNOLOGY COMPANIES AND SPECULATIVE FINANCE ENABLE EACH OTHER

Speculative finance, that is, private equity including venture capital, is not a new phenomenon. Apple, Microsoft, and others attracted venture capital in the 1980s; the subsequent decade saw a rise in venture capital funding of technology start-ups, including Amazon and Google.

Recently, venture capital has gained notoriety for facilitating deep discounting by their portfolio companies. Deep discounting is the practice of providing unusually high discounts, often selling at a price much lower than cost. Such discounting is aimed at gaining market share at the expense of other players. The expectation is that prices will be raised later, and also that venture capital investors will make capital gains due to the increase in the company's value after gaining market share. Amazon and Flipkart are facing an investigation by the Competition Commission of India for deep discounting practices, and Indian entrepreneurs have in the past complained about the dominance of large, foreign speculative finance that makes it impossible for them to compete with foreign technology companies.⁷⁰

This crop of entrepreneurs has now benefited from the same speculative finance, and those complaints have consequently ebbed. Similarly, restaurant associations have accused food aggregators of deep discounting.⁷¹

In the last few years, Big Tech has also decisively entered the world of finance. Many of the world's largest technology companies have their own venture capital funds. Microsoft's venture capital arm M12 has made investments in logistics, AI, and 3D printing companies. Facebook has recently invested in Reliance Jio, a move that raises concerns of vertical integration of platforms and telecom. Google's GV, the Amazon Alexa Fund,

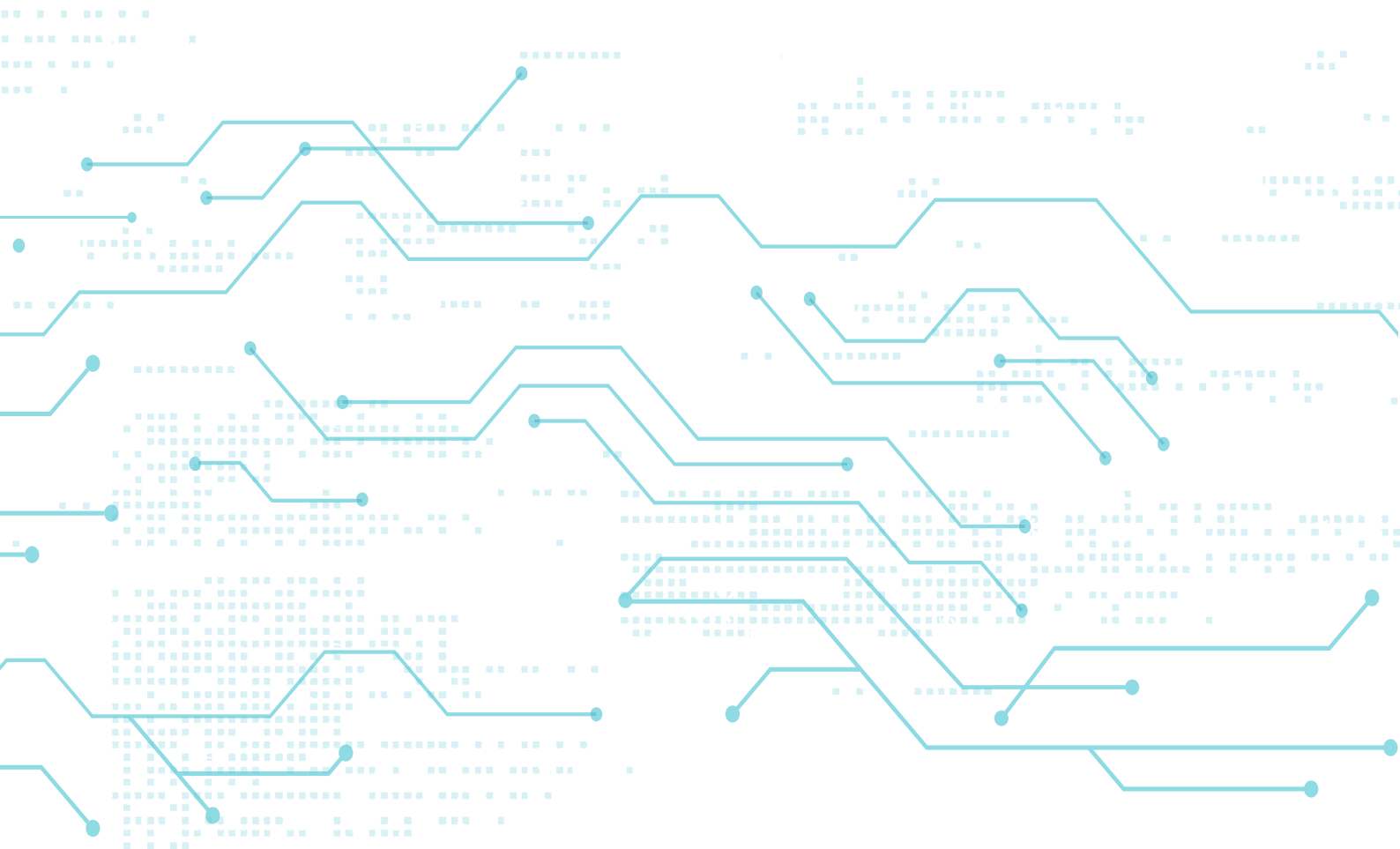
Alibaba Capital Partners, and others have all made investments in new technologies. Alibaba and Tencent invest mostly in China and the rest of Asia.⁷² When a technology giant invests in a start-up, a few questions arise: One, are start-ups being bought or controlled by Big Tech before they can pose a threat as competition? Two, do Big Tech companies use the data they control, which is not available to other investors, to make beneficial investments through privileged information? Three, do Big Tech companies provide preferential treatment on their own infrastructure-like platforms to start-ups they invest in, thereby causing a disadvantage to start-ups they do not invest in? These questions provide directions for further investigation.

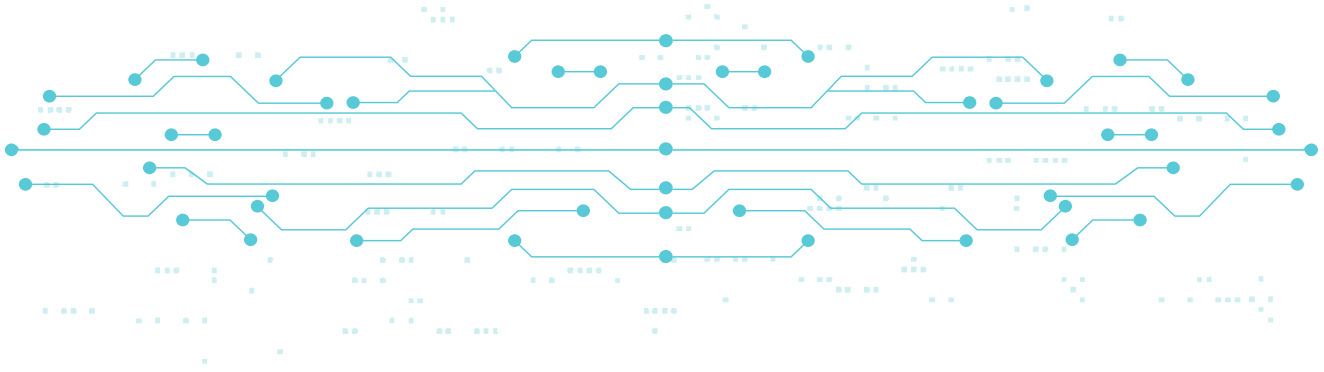
Beside equity investments, Big Tech companies also provide other financial services such as payments, lending, and insurance. Alibaba, Tencent, Apple, Google, Amazon, and Facebook (through WhatsApp) all have very popular payments services. Apple has launched an Apple-branded credit card with Goldman Sachs.⁷³ Amazon and Alibaba both lend to sellers on their platforms, particularly SMEs.⁷⁴ Tencent, Ola, and Grab all provide credit to customers through post-paid services with credit limits. The concern with these forays into finance, of course, is again the ability of Big Tech to leverage data. There were reports that Tencent and Alibaba refused to share loan data with the People's Bank of China

and that Google had bought Mastercard data to correlate offline purchases with online ads to improve targeting.⁷⁵ Facebook's bet with Libra as a private currency seems to have misfired for now, alerting regulators to the dangers of Big Tech's ambitions in finance. The Financial Stability Board has stated that the resilience of financial institutions was at risk from Big Tech because "the financial services offerings of Big Tech firms could grow quickly given their significant resources and widespread access to customer data, which could be self-reinforcing via network effects. An overarching consideration is that a small number of Big Tech firms may in

the future come to dominate rather than diversify the provision of certain financial services in some jurisdictions."⁷⁶

Big Tech was funded early on by speculative finance, as we saw through the examples of Amazon, Microsoft, Google, and Apple at the beginning of this section. Big Tech now has the potential to entrench its dominance through financial activity. Financial regulators, competition regulators, and privacy regulators should conduct deeper investigations into Big Tech's financial activities.





SECTION 5: WHAT CAN BE DONE ABOUT BIG TECH?

The governance agenda of Big Tech itself has been presented through principles called the Digital 2 Dozen. These principles were drafted for the US Trade Representative through a revolving door of Big Tech executives.⁷⁷ These principles include: making it illegal for governments to restrict cross-border data flows, making it illegal for governments to demand source code disclosures, making it illegal for governments to demand the use of local computing facilities, and privatising standard-setting functions, among others. Such measures restrict the ability of people in different countries to determine their own digital future according to their own priorities and economic standing. They also place Big Tech outside the scope of national law by disallowing source code disclosures.

But these are exactly the measures that Big Tech and the US government have been pushing at international fora such as the World Trade Organization and through regional trade agreements such as the Regional Comprehensive Economic Partnership (RCEP). More recently, the stance of Big Tech has been changing as the geopolitical priorities of the US are changing. To assure the US government of its bonafides while making a bid for purchasing TikTok's US assets, Microsoft promised that it would not engage in cross-border transfer of Americans' data.⁷⁸ Big Tech has thus disproved its own sacred understanding that free cross-border data flows are absolutely essential for the development of technology.

Many different approaches and regulatory actions have been tried or proposed across the world to rein in the power of Big Tech. By far the most controversial one has been China's approach, which was to block certain websites in the country and allow local companies to grow. The state's ability to enforce this approach, and the large domestic market, have together meant that this approach has worked, at least to keep at bay the excesses of foreign technology companies. How the excesses of domestic technology companies

are contained depends on different policies of the Chinese government. Strategic protectionism, investment in research, and information exchange in the Chinese technological sector have meant that China is now the only significant counterweight to US technological companies.⁷⁹ Some Asian countries and entrepreneurs seem to want to follow parts of this model, with the relevant market being regional rather than national.⁸⁰

In the Western world, the regulatory and political response to Big Tech has focused on three main approaches. The first is the well-known approach of privacy regulation, through laws such as the EU's General Data Protection Regulation (GDPR). The GDPR has some provisions that could potentially be used to limit the economic power of Big Tech, such as data portability: the requirement that a user's data generated on one platform must be portable to other platforms at the user's request. Such a provision, if used at scale, could be useful to break data-based monopolies. Open Banking regulations in the UK are a step in a similar direction, where a customer of a large bank can ask for her banking data to be transferred to a smaller competitor such as a fintech company, which could build financial solutions based on that data.⁸¹ The GDPR has also set

the global standard for privacy regulation, which could be considered an economic benefit to the EU. Overall, however, while privacy regulation is important to secure certain individual rights, it does not solve most of the economic and social issues caused by the dominance of Big Tech.

Another approach is that of trying to ensure adequately competitive markets, both domestically and internationally. This includes India's e-commerce regulations that prohibit online marketplaces and sellers being owned by the same company. It also includes competition probes in various countries, including from the European Competition Commission, the Russian Federal Antimonopoly Service, the US Federal Trade Commission, and the Competition Commission of India.⁸² The solutions to anticompetitive practices have ranged from fines to mandatory software changes, especially requiring the unbundling of services to provide consumers choice. In an as yet unusual move, the Australian Competition and Consumer Commission has mandated that Facebook and Google must share advertising revenue with media companies.⁸³ This regulation recognises that advertising revenue has increasingly been redirected to Big Tech, leaving media companies and content creators in the lurch. There have also been proposals to "break up Big Tech", including by undoing anti-competitive mergers.⁸⁴ Another proposal has been to disallow advertising based on personal data and permit it only based on the sharing of general demographic information of the users of a specific website.⁸⁵ This would make online advertising less prone to privacy and monopoly risks and more like traditional media advertising.

The third focus of governments has been on ensuring that tax avoidance by digital technology giants is minimised. There are ongoing digital tax negotiations at OECD through its Base Erosion and Profit Shifting (BEPS) programme.⁸⁶ The major questions for digital taxation can be summed up as follows: Which countries should have the right to tax cross-border digital transactions? What proportion of profits should each country be able to tax? How can taxes on cross-border digital services be reconciled with existing laws and arrangements? What should the basis of taxing a digital economy be – data, profits, revenue, or another parameter?

Taxation negotiations are complex because they involve tussles among countries about where value is created in a digital economy. Some countries hold that value is created where data is generated because, after all, it is this data that improves targeting, even in other countries. Some hold that countries should be able to tax in proportion to the revenues generated on their territories. Many countries do not agree that the country where profits are reported should be the one to tax because of several instances of technology companies reporting profits in low-tax jurisdictions, whereas most of their business exists outside these jurisdictions.⁸⁷ A global agreement on taxation is important because digital companies carry out a large amount of cross-border transactions. This means that there is a twin danger in the absence of a global agreement: that these companies are undertaxed due to evasion, or that these companies are doubly taxed for the same activity because countries could not come to an agreement.

There are certain regulatory actions in the digital economy that are under-explored. These include regulatory actions concerning data. Under the Open Banking regulations discussed previously, large banks were required to form an organisation that would govern the data they were mandated to share with fintech players. This organisation decides the technical protocols and administrative rules of sharing. Similar arrangements for data sharing or pooling can be designed for other sectors. Entities that facilitate such safe sharing and pooling of data on behalf of the data generator are called "data intermediaries". Such intermediation efforts will be crucial because of the central role that data enclosures play in preserving the dominance of Big Tech firms. The important considerations in such arrangements will be maintaining the neutrality and accountability of the data intermediary, ensuring privacy, and preventing the recapture of people's data. Some preliminary actions in this direction include Barcelona's DECODE project for digital participative governance⁸⁸, the Account Aggregator system of data fiduciaries created by financial regulators in India⁸⁹, a mandatory data sharing law for the automotive sector in Australia⁹⁰, and so on. More such arrangements need to be iterated so that context-specific, accountable, participative common data sharing structures can be built. Further, to be able to

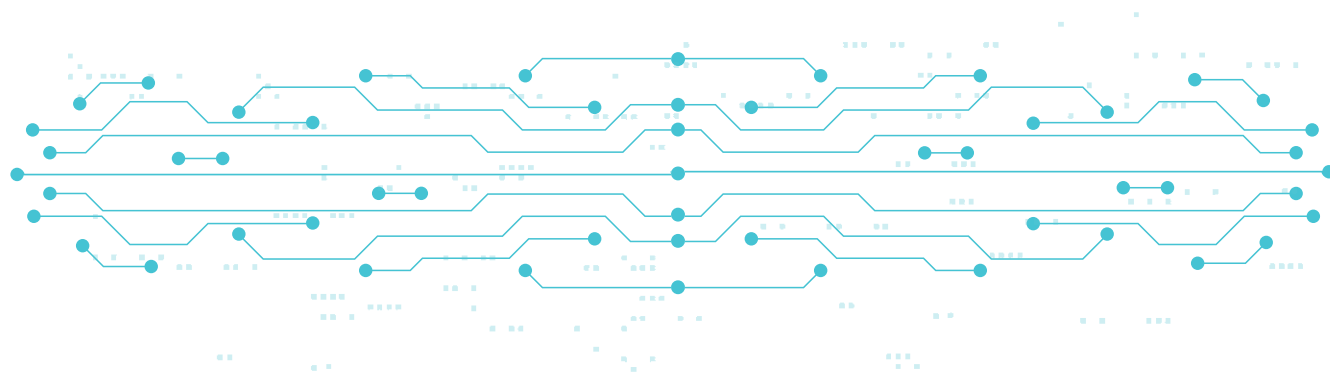
enact regulations like these, it would be unwise for governments to agree to free cross-border data flow provisions such as through the World Trade Organization's e-commerce negotiation proposals. These proposals make it illegal for a government to require that data generated within its borders be stored within its borders. The regulations discussed above cannot be effectively implemented if the government does not have the right to mandate that the data, or a copy of it, should be stored within a country's sovereign borders. The alternative is that all countries come to a data sharing agreement that respects every country's right to make its own regulations.

Another under-explored solution is the public ownership of digital infrastructure. There have been various proposals for creating a digital commonwealth for establishing digital infrastructure that is neutral to all suppliers and the people.⁹¹ The Labour Party in the UK also campaigned on the plank of publicly owned full-fibre broadband.⁹² The state of Kerala in India has perhaps gone the farthest apart from South Korea in terms of implementing such a policy. The state government will lay out the fibre optic network for the state, using whichever internet service providers can supply their services,

precluding the provision of such infrastructure by Big Tech.⁹³ These examples show that the public sector can be strengthened by carrying out one of its traditional functions, i.e., the provision of infrastructure, even in a digital world.

Digital technology companies are also being challenged by collective action by platform workers. Amazon workers in the US have organised strikes and demonstrations over working conditions and the uses its technology was being put to, and Facebook employees have petitioned against its hands-off policies on misleading content posted by politicians.⁹⁴ Google workers have demonstrated against discrimination and sexual harassment.⁹⁵ Drivers for ride-hailing companies and food delivery companies have protested and carried out strikes in various parts of the world, demanding employee status, insurance coverage, decent and overtime pay, sick leave, and safety provisions. Attempts are being made to consolidate these efforts and expand traditional labour organising to the gig economy. Organised and engaged platform workers will also make it easier to demand that workers, who also create data, get a say in managing the digital firm and in implementing worker-controlled digital company models in the future.⁹⁶



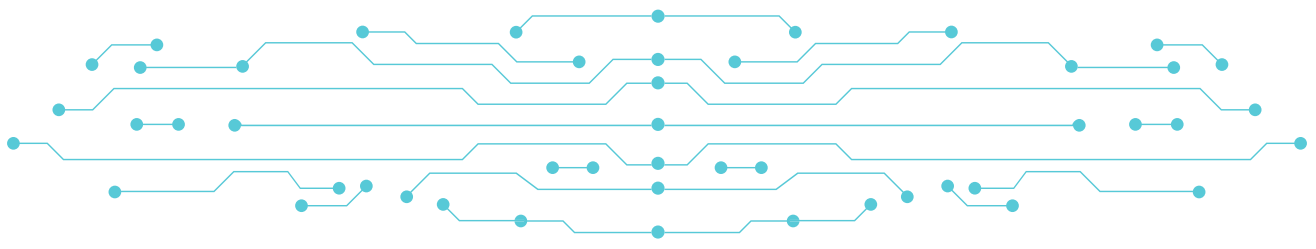


CONCLUSION

The rise of Big Tech indicates new challenges born out of new forms of economic organisation. Data and networks are the building blocks of these forms of economic organisation, and historical particularities along with policy choices have resulted in the US and China leading the digital sector. As the entire economy digitalises, progressive actors need to design broad-based responses that are ideal for their own countries and constituencies. To that end, it is crucial to understand the approaches that have been tried before and other potential regulatory and organisational choices. These include more

public decision-making and therefore more public ownership of resources that underpin the digital economy. Data sharing, public platforms, platform co-operatives, and public digital infrastructure are all examples of such policies. Countries, particularly in the global South, need to design digital policies that do not relegate their own economies to exclusively low-value parts of the global digital value chain. To make this possible, cooperation among these countries, especially to keep at bay the global free-for-all for Big Tech, is necessary.





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Global economic development has been going through a process of rising polarisation. Countries in the global South are far from being able to catch up with the global North, where digital technology companies are the new corporate giants.

**How does the digitalisation of the economy contribute to the development gap?
What do we mean when we refer to Big Tech, and why has it come to dominate the global economy? How are global value chains being transformed by digitalisation?
What does all of this mean for the Asia-Pacific region?**

This report is a primer on how large digital companies have attained and maintain their position at the top of the global economic hierarchy; how disparities between and within countries are exacerbated within this digitalised economy; how Big Tech and speculative finance reinforce each other; and how countries and progressive actors in Asia-Pacific can promote policies that mitigate the harms of new technologies while ensuring they are used for the public good.