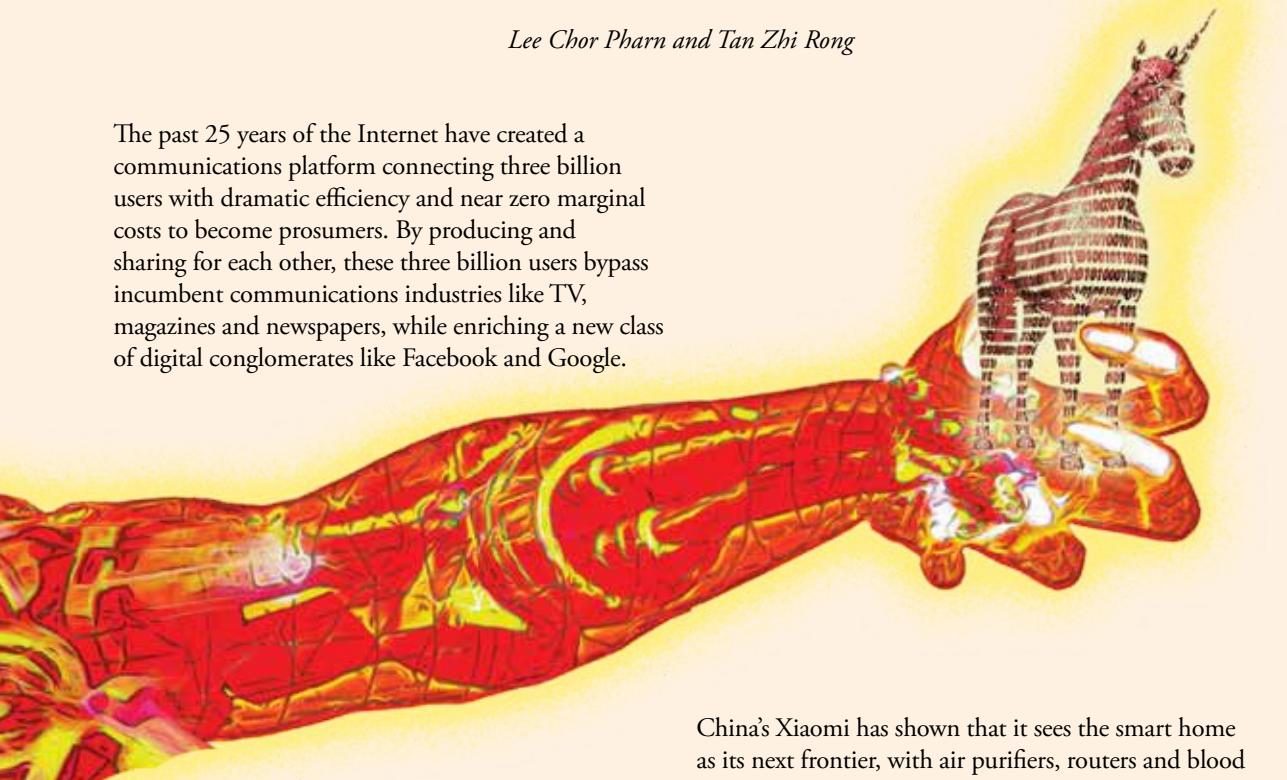


SOFTWARE IS EATING THE WORLD... AND IT'S STILL HUNGRY

Lee Chor Pharn and Tan Zhi Rong

The past 25 years of the Internet have created a communications platform connecting three billion users with dramatic efficiency and near zero marginal costs to become prosumers. By producing and sharing for each other, these three billion users bypass incumbent communications industries like TV, magazines and newspapers, while enriching a new class of digital conglomerates like Facebook and Google.



"DECACORNS" WAITING IN THE WINGS

2014 saw privately-owned tech startups raise billions of dollars in unprecedentedly large rounds of funding. Calling these startups "unicorns" will soon stop making sense, however, as the number of startups worth US\$1 billion grows. But some of the "unicorns" are in a league of their own. Out of the eighty or so startups on Fortune's list of "unicorns," nine are worth more than US\$10 billion. It is not hard to see why, as these firms are major disruptors in their respective sectors. We already see signs of a few "decacorns" positioning themselves to become the next digital conglomerates.

Source: Griffith and Primack, "The age of unicorns," *Fortune*, 15 May 2015.

China's Xiaomi has shown that it sees the smart home as its next frontier, with air purifiers, routers and blood pressure measurement kits joining its growing range of products.

Sources: Russell, "Xiaomi expands beyond smartphones once again with new \$150 air purifier," *TechCrunch*, 9 Dec 2014 and Russell, "Xiaomi furthers its smart home ambition with \$200m investment in appliance maker Midea," *TechCrunch*, 14 Dec 2014.

Throughout 2014, Uber's interest in becoming a global logistics service was clearly visible through a range of targeted pilots in various cities – a bike courier service in New York City (Uber Rush), food delivery in California (Uber Fresh), grocery delivery in Washington D.C. (Uber Essentials) and moving services in Hong Kong (Uber Cargo).

Even as it battles failure to develop a viable space vehicle that can be reused, Elon Musk's SpaceX is moving into low-cost internet via micro-satellite swarms.

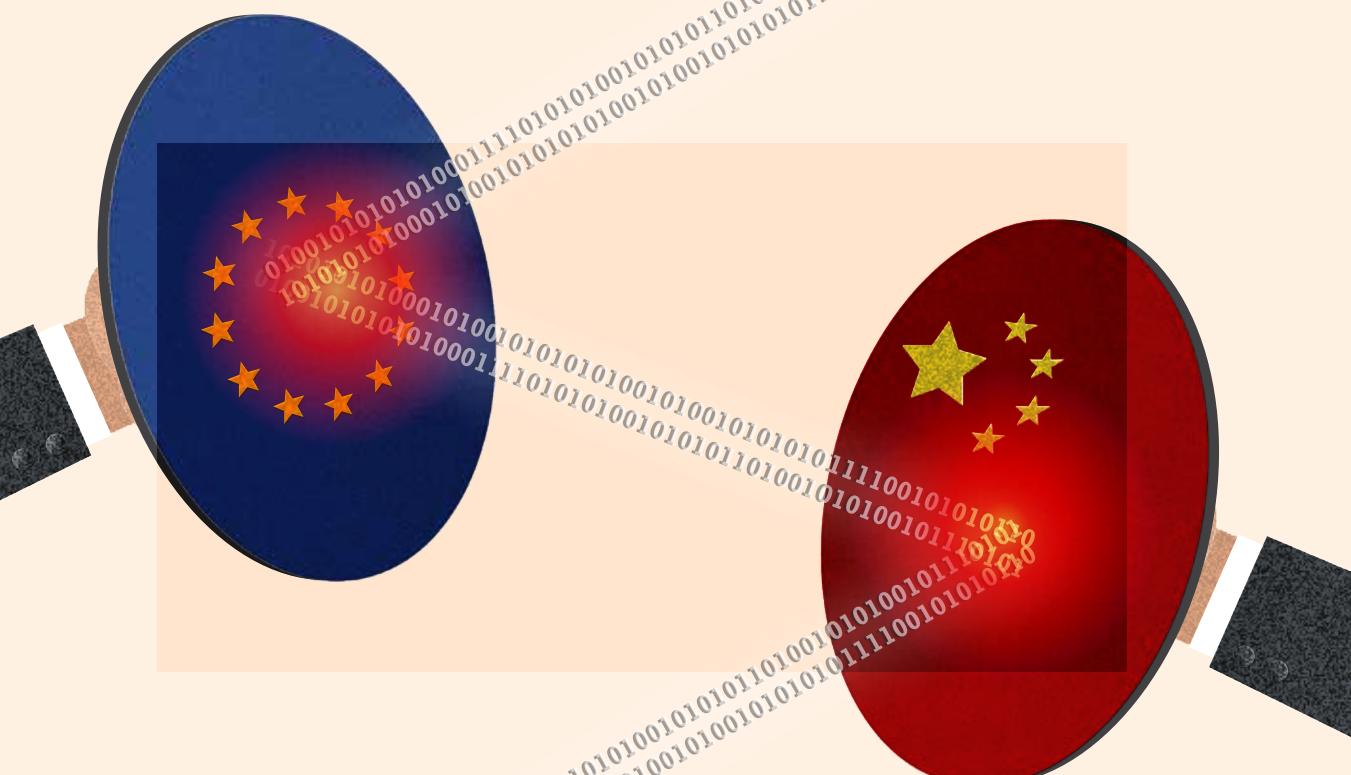
Source: Knapp, "SpaceX is entering the micro-satellites game," *Forbes*, 12 Nov 2014.

DATA ISLANDS

Through foresight or chance, China's Great Firewall effectively makes its Internet a data island (or continent) where indigenous digital champions like Baidu, Alibaba and Tencent are forged amidst intense competition. Chinese Premier Li Keqiang's "Internet Plus" programme wants to use these dynamics to drive economic restructuring and "eat" state-dominated/inefficient sectors like financial services, agriculture and healthcare. As China's next phase of expansion – ("One Belt, One Road") – extends railways, highways, pipelines and industrial parks to link entire regions to inland markets, Chinese digital champions will follow hard on the heels of infrastructure and finance to connect and reorganise regional economies.

Source: "Full text: Report on China's economic, social development plan," *The National People's Congress of the People's Republic of China*, 19 Mar 2015.

Europe is taking a leaf out of China's playbook to nurture indigenous European digital champions in a truly EU digital market without barriers. This move is perhaps prompted by Snowden's revelations, the fall of once-mighty Nokia and its unceremonious windup by Microsoft. Aside from China and the EU, few regions have both the market clout and administrative capability to set up data islands. It might not stop some from trying, though, and we may see more instances of partial deglobalisation.



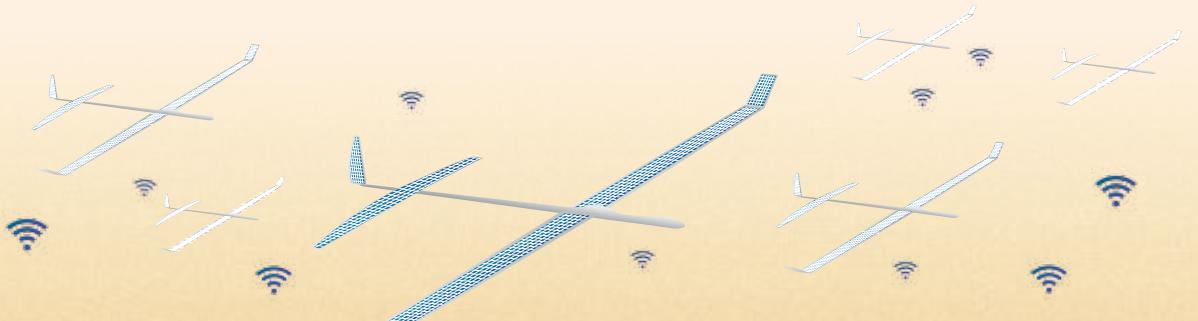
CONNECTING THE UNCONNECTED

By 2014, about 3 billion people were online, leaving 4.2 billion unconnected. The economic potential that can be unlocked by connecting the unconnected is immense, and several technology companies – most of them digital conglomerates – are stepping in to provide connectivity in creative ways where governments have been unable to. This may not altogether be altruistic. As they face bruising battles over market share in China and Europe, the future growth of digital conglomerates like Google and Facebook depends on finding even more potential consumers.

Source: "Mark Zuckerberg and Facebook's plan to wire the world," *Time*, Dec 2015

Google's Project Loon deploys high-altitude balloons to create a communications network that beams data to smartphone users over the LTE spectrum. Google intends to extend this network worldwide and augment it with a fleet of solar-powered drones and low-cost satellites with similar data-transfer capabilities. This network has direct benefits to existing ventures like Google Maps and autonomous vehicles, and puts Google in direct competition with telecom incumbents in emerging markets.

Source: Hardy and Dougherty, "Google and Fidelity put \$1 billion into SpaceX," *New York Times*, 20 Jan 2015.



Facebook is collaborating with phone manufacturers like Samsung and telecom carriers in emerging markets in a coalition known as “Internet.org” to allow users free access to specially-designed apps. Facebook identifies a particular geographical region that lacks internet access, creates content that might be compelling enough to get its inhabitants online in the region’s dominant language, and packages the content into customised apps. Users gain access to a curated, walled sliver of the Internet for free, while telecom carriers enjoy an increase in registered mobile data service users who decide to pay for access to the wider Internet. For instance, in Rwanda, Facebook is working with the government and edX, the open online learning platform co-founded by Harvard and MIT, to develop an app with which Rwandan students can participate in free lessons over data connections.

Source: Rothberg, "EdX partners with Facebook to provide open online education to Rwanda." *The Harvard Crimson*, 26 Feb 2014.



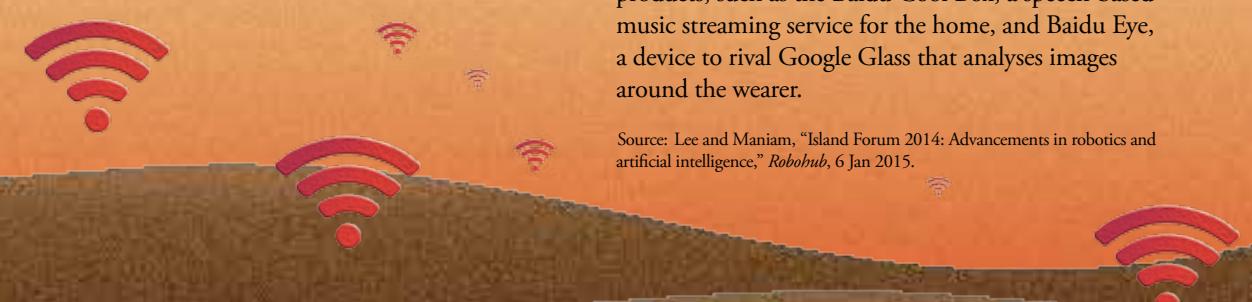
CONNECTING ANOTHER BILLION

Digital conglomerates have another card up their sleeves in artificial intelligence, which allows for other ways to access the Internet other than conventional text, e.g. speech, images. AI unlocks new groups of users such as fringe language speakers and more significantly, the functionally illiterate, which number 897 million worldwide according to UNESCO.



"AI could provide intuitive interfaces that will be attractive to computing beginners. Those newcomers to the Internet—like all of us, really—will not want to learn new modes of interaction. They will prefer to speak naturally to their devices to get the information or translation they want." - *Dr Andrew Ng, Chief Scientist, Baidu*

Google, Baidu, Facebook and others have made heavy investments in AI research, particularly deep learning.



Google, for instance, relies heavily on deep learning algorithms to drive its Voice Search and Search by Image functions. Dr Andrew Ng, founder of the Google Brain project and now Chief Scientist at Baidu, highlighted that 10% of Baidu's search queries today are via speech. Deep learning may one day enable speech/ image "killer apps" that allow users to interact with technology they are unfamiliar with. Some examples include Baidu's deep learning products, such as the Baidu Cool Box, a speech-based music streaming service for the home, and Baidu Eye, a device to rival Google Glass that analyses images around the wearer.

Source: Lee and Maniam, "Island Forum 2014: Advancements in robotics and artificial intelligence," *Robohub*, 6 Jan 2015.

Open Garden / Firechat: Open Garden creates wireless hotspots, and its FireChat app allows users to chat anonymously with each other using mesh networking. In a mesh network, a group of smartphones can create their own network with only one smartphone connected to the web. The app's use of untraceable peer-to-peer connections has made it popular in places where accessing the Internet is restricted or dangerous. For instance, during the 2014 Taipei Sunflower Movement, student activists downloaded FireChat to communicate among themselves in case the government shut down web access.

Source: Olson, "Could this app create a free, secret web?" *Forbes*, 5 Jun 2014.

GROWING YOUR OWN INTERNET?

Peer-to-peer distributed networks are transforming the Internet. By focusing on simple services or transactions that are fast and lightweight, these distributed networks are able to maintain a communications network quicker, more efficiently, and without the costs of a centrally controlled system.

storJ: Described as a secure, private and fast network using P2P technology and encryption, StorJ is a Dropbox-style file service that is paid with bitcoin. Data storage is provided by peers with excess space without central storage.

source: Wilkinson, "StorJ: A peer-to-peer cloud storage network," 15 Dec 2014.

OpenBazaar: Allows users to anonymously buy and sell goods from anywhere in the world. Each user hosts their anonymous storefront and the process of locating goods and services, checking seller ratings and making transactions is entirely distributed.

source: Infante, "What 'distributed autonomous corporations' mean for markets of the future," *Coin Report*, 26 Jul 2014.

