



Digitization and Implications for (International) Business

Bharat Vagadia

1 Introduction

The digital revolution that we see evolve in front of our eyes has applications and systems that are collecting, distributing, and making available massive amounts of data to almost any situation, which can be reproduced infinitely at virtually zero cost and used for significant productivity gains. The impact this digital revolution will have on society and economies is likely to be as dramatic, if not bigger, than the previous industrial revolutions.

The World Economic Forum estimates point to more than US\$10 trillion of value from digitization in five key global industries over the next decade.¹ In 2018, McKinsey Global Institute estimated that an additional \$13 trillion could be added to global GDP by 2030 through digitization, automation, and Artificial Intelligence (AI).²

1.1 Digitalization: What Does It Mean?

Digitization of businesses is not new, although it is taking on a new dimension as we see the convergence of emerging technologies and innovative business and operating models emerge. The Internet (a key enabler) has already diffused into virtually all

¹World Economic Forum (2017). Digital transformation initiative telecommunications industry. The five key global industries are: E-commerce (US\$3.1 trillion), Automotive (US\$2.6 trillion), Logistics (US\$2.1 trillion), Electricity (US\$1.5 trillion), and Media and Entertainment (US\$0.7 trillion).

²Assessing the economic impact of artificial intelligence. ITU Trends. Issue Paper No. 1. September 2018.

B. Vagadia (✉)
Global Telecommunications and Digital Executive, London, UK
e-mail: BV@DigitalDisruption.xyz

aspects of our lives and all industry sectors. It is already reshaping how we socially interact with each other, how we consume entertainment, and how we buy and pay for goods and services. The digital economy is benefiting consumers by either creating entirely new categories of products and services or new means for their consumption, through entirely new business models and players.

For businesses, digitalization is creating opportunities as well as threats. When digitally capable firms collide with traditional businesses, they do not simply replace them with something cheaper, or more differentiated for higher quality. They do not just create a new value proposition to serve customers—they can potentially enable the emergence of a new and increasingly powerful breed of firms—ones that leverage a different kind of operating model and which compete in different ways. The use of digital technologies also presents new opportunities for SMEs to expand and succeed in foreign markets and for start-ups to enter and disrupt existing markets (so-called digital natives). Digitalization is also enabling some multinationals to reduce their cost base and monetize the massive data they have to hand.

Some of these new business models take the form of what are sometimes called “platform businesses.” Many of the products and services delivered through these platforms are of high quality, with low prices, and in many cases a monetary price of zero (e.g., Facebook). Seven out of the ten most valuable public companies in the world by market capitalization were digital platforms, as of April 2020; these were Apple, Microsoft, Amazon, Alphabet, Facebook, Tencent Holdings, and Alibaba Group.³

These new forms of business themselves have only been possible through the substantially lower cost of starting a business and ability to scale, through things like cloud computing, their access to global markets through the Internet, and a consumer base that is now always digitally connected, with the ability to securely transact.

So why are digitally enabled businesses growing so rapidly and being valued at such rates? Traditional corporate leaders typically face a set of challenges to grow and expand usually as a result of constraints placed by their operating model. Digital businesses dissolve these intrinsic limits of scalability and scope. Their operating models are designed to scale at rates that traditional firms just cannot fathom.

Digital Masters, as the authors have labeled them in their book “Leading Digital,” are 26% more profitable than their industry competitors and generate 9% more revenues. These firms use technology as an enabler to reconfigure their organizational structures, processes, and potentially their entire business model.⁴ Reinventing the business model does not have to be about changing the rules of an industry, replacing products or services, or creating new digital business, but about reconfiguring the value created and captured using new digital technologies.

Nevertheless, you simply cannot start from the perspective of what technology to adopt—but from a mindset of how you can deliver greater value to customers and

³<https://www.statista.com/statistics/263264/top-companies-in-the-world-by-market-capitalization/>

⁴Westerman, G., Bonnet, D., and McAfee, A. (2014). *Leading Digital*. Harvard Business Review Press. October 2014.

how that can be delivered operationally and better enabled through digital technologies.

1.2 Impact on Policymaking

While the adoption of digital technologies has the potential to have profound changes to the competitor landscape and on consumers, it equally has the potential for a profound impact on societies and economies, some of which we may not necessarily desire.

To turn these disruptive technologies into a force for good may require us to tear up existing government policies and regulatory approaches that have served us reasonably well to date. However, the very nature of these digital technologies means that jurisdictional national boundaries are dissolving, their reach is global, their adoption pervasive, and the way they work is not always transparent or predictable.

Digitalization holds the promise of improving productivity performance through innovation and by reductions in the costs of a range of business processes. But at the same time, many economies have experienced a slowdown in productivity growth that has sparked a lively debate about whether and how digital technologies boost productivity. While digital technologies can replicate valuable ideas, insights, and innovations at a very low cost, potentially creating bounty for society and wealth for innovators, it can diminish the demand for previously important types of labor, having a correspondingly adverse impact on people's wages.

Not all countries will follow the same trajectory, however. Over time, the impact of automation is likely to be felt more heavily on developing countries than in developed countries. If you take most of the costs of labor out of the equation by installing robots and other types of automation, then the competitive advantage of low wages largely disappears. The distribution of wealth created by digital technologies will be skewed to those individuals, those companies, those communities, and those countries that are digitally savvy. On the other hand, by enhancing connectivity, financial inclusion, and access to trade and public services, technology has the potential to be a great equalizer.⁵

Each country's policymakers and regulators will need to orchestrate an ecosystem and regulatory environment that magnifies the positive externalities associated with such disruptive technologies while minimizing potential negative externalities. To date, there is no overall regulatory authority covering the entire digital sphere. Regulation is fragmented with overlaps and gaps. This will need to change.

⁵The Impact of Digital Technologies, UN. See: <https://www.un.org/en/un75/impact-digital-technologies>

2 The Digital Revolution

Digitizing the firm can drive significant productivity improvements through mechanisms that are many and varied.⁶ Some of these include: speed and strength by being faster, stronger, more precise, and consistent than workers; productivity enhancements by combining sensors, actuators, big data analytics, and cloud computing; and predictability enhancements enabled by new sensors, artificial intelligence, and machine to machine (M2M) communications, which can reduce disruptions to production.

Digital technologies also allow connectivity and communication across nations. Its nature means that businesses can scale quickly and with relative ease. All dimensions of digital are global: digital activities can take place internationally, and digital business models can globally span sectors and countries to offer digital goods and services.

Whether we like it or not, digital technologies are transforming business and society.

For businesses, it has already started reshaping how they market to and interact with their customers, as well as how they deliver customer service. The first wave of the Internet-enabled innovations that started in the early century with the emergence of Web 2.0 technologies was followed by advances in ubiquitous connectivity, smartphones, and cloud infrastructure. Thanks to these new technologies, today's consumers are no longer constrained to buying from stores in their immediate community, city, or even in their own country.

The COVID-19 pandemic has only accelerated the adoption of digital technologies by both consumers as well as businesses. Amazon, the digital retail giant, saw unprecedented growth in its retail sales; consumers, young and old, become accustomed to buying their goods and services online. Almost all businesses explored how they can reach customers through online channels—many even developing their own mobile apps. Different sectors and countries fared differently of course, depending on how digitally savvy they were in the first place and the effort, resources, and speed required for them to digitize.

This digital revolution has also profoundly transformed international trade, in terms of what we trade, how we trade, and who is trading. The rapid expansion of access to trusted digital payments has made it possible for consumers to conveniently make purchases for goods and services from merchants around the world.

While there has been much change and in a short period of time, this is only the beginning. This so-called fourth machine age is just emerging with further advances in digital technologies/computing and, more importantly, their convergence, driven by the Internet of Things (IOT), Artificial Intelligence (AI), and high-speed ubiquitous connectivity (5G). It would be wrong to assume that this new revolution is only driven by data. While data is a fundamental enabler for this fourth revolution, it is

⁶OECD. (2016). Enabling the next production revolution: the future of manufacturing and services. Interim Report. Meeting of the OECD Council at Ministerial Level, 1–2 June 2016.

disruption through engineering and physics such as miniaturization, nanotechnologies, energy storage, etc., which cannot be overlooked. The most significant advancements are happening where these two disruptive forces intersect.

Many of these new digital technologies can be classified as general-purpose technologies, where their impact has the potential to deliver significant boosts to output due to large productivity gains. These digital technologies not only create new markets, new forms of trade, and new products, but they also lower trade costs and change trade patterns—making it possible for firms in remote areas to sell digital products around the whole world or by making it profitable for firms in high-income countries to re-shore certain activities.

The service sector is leading the charge in terms of the adoption of digital technologies—roughly 50% of traded services are digitally enabled compared with 15% of traded goods.⁷ While traditional Internet-enabled disruption mainly focused on the service sector, new advances in IOT, AI, digital twins, and 3D printing will now have an equally dramatic impact on the manufacturing sector. However, it may take another 30 years for full, worldwide diffusion of emerging smart automation and AI technologies.⁸

2.1 Characteristics of Being Digital

We have discussed the impact digitalization and digital technologies have already had on businesses, but what does being digital actually mean?

There are probably five fundamental characteristics of the digital-enabled firm that are useful to look at; these are: a) the role of data to the firm; b) the significant returns to scale that are enabled by the use of digital; c) the network externalities enjoyed; d) the inability for customers to switch easily or for new entrants to come into the space; and e) the global nature of the firm. These characteristics help explain why you simply cannot ignore digitalization:⁹

1. The role of data is a critical ingredient for gathering insight and driving algorithms. The ability to use data to develop new, innovative services and products is a competitive driver for data-enabled firms.
2. The cost of production of digital services is much less proportional to the number of customers served, driving significant returns to scale through economies of scale and scope. While this aspect is not novel as such (bigger factories or retailers are often more efficient than smaller ones), the digital world pushes it to the

⁷Digital Globalization: The New Era of Global Flows. (2016). McKinsey Global Institute. February 2016.

⁸Twenty-five years of digitization: Ten insights into how to play it right. (2019). McKinsey Global Institute. May 2019.

⁹See also: Competition Policy for the digital era. (2019). EU Report.

extreme and this can result in a significant competitive advantage for the digitally enabled firm.

3. Network externalities are strengthened by firms exploiting two and multisided markets that characterize platform ecosystems. Initial work on two-sided markets by Jean Tirole, Nobel laureate in economics, goes back to the pre-digital platform era where he discussed cross-subsidies in the credit card companies such as Visa. In many ways, subsidizing one business activity with another one is nothing new. Many businesses do it to build complementarities, which can be monetized (take the examples of printers or razors). However, the platform ecosystem strengthens this logic further as the ecosystem operates on modularity, where different complementary goods can be combined for the benefit of the platform operator.
4. The lack of data mobility and interoperability means it is difficult for competitors to enter easily or for consumers to switch to alternative competitors. The inability to multi-home means customers are effectively tied to the digital-enabled firm.
5. Digital goods and services can be delivered globally cutting across national jurisdictions and regulations. Most of the digital businesses that sell globally do not have a physical presence, company registration, or licenses to operate within the countries they serve—meaning they can access global customers without the bureaucracy or costs of setting up operations in these countries.

While each of these is important, the most important characteristic of being digital that has been exploited by high-growth digital firms is the network externality effect. Digital natives talk about creating ecosystems rather than simply replicating existing products or services. This ecosystem approach allows these firms to exploit the network effects, to expand their business reach through bringing onboard more partners through modularity, and building an ecosystem that becomes costly for consumers and suppliers to leave.

The digitalization of an ecosystem also allows for use of long-tail market strategies where it is easy for digital firms to expand into different market niches which would normally be cost-prohibitive. This approach allows companies to tap into previously unserved markets and realize significant profits by selling low volumes of hard-to-find items to many customers. A business model based on the long tail works for a company based on digital distribution, where the cost of stocking extra inventory is near zero.

3 Digital Technologies and Their Implications for Businesses

3.1 Current Technologies

There are a number of digital technologies that many firms already use. Many of these are used to address a particular problem, whether it is to improve marketing reach to potential customers, to align sales with production orders, or just to keep a record of customer interactions. While it is not the intent to explain these technologies here—it is worth mentioning some of the more important ones.

Firms use these digital technologies but are not digital firms. The technologies they deploy do not have a transformative impact on the firm.

3.1.1 ERM and CRM

The working horse of almost every large firm is the Enterprise Resource Planning (ERM) software, used to standardize, streamline, and integrate most of the business processes across finance, human resources, procurement, warehouse storage, and distribution. Their focus is inward. Customer Relationship Management (CRM) software, likewise a stable technology in almost all large firms, is designed to record and store every piece of information regarding customer interactions. In both of these cases, the technology is not used to rethink how to increase customer value or how the firm can capture such value, only how to incrementally improve the existing operating model.

3.1.2 RPA

Another technology that has gained momentum is Robotic Process Automation (RPA), typically used to replace humans performing menial and repetitive tasks on the assembly line, in the warehouse, or in financial management. Again, firms use the technology to drive down costs (of the order of about 20–25% of FTE savings).¹⁰ The same comments as apply to ERM and CRM also apply to RPA—in that it is not a transformative technology.

3.1.3 Big Data/Business Intelligence and Cloud Computing

Two more interesting technologies that are starting to make firms think more broadly about how they can transform their operating models through the use of technology are big data/business intelligence and cloud computing. If used and integrated appropriately, they can help transform the operating model of the firm. Big data captures, stores, and makes sense of the huge amounts of data that may be gathered by the firm. Given the data sets can increase exponentially as day-to-day operational data is captured and stored, most firms need to utilize cloud computing to implement big data technologies.

The fundamental *raison d'être* for utilizing cloud computing (a bridge between the old and new digital technologies) is that they are elastic, that is they dynamically determine the amount of resources an application requires and then automatically provision and de-provision the computing infrastructure to support the application. Effectively, cloud computing gives firms the right, but not the obligation, to scale up if and when demand increases. The mass emergence of digital-native companies today would not be possible without easy, immediate, and affordable access to the scalable computing resources available through the elastic cloud infrastructure.

¹⁰Digital Directions: A perspective on the impact of digital technologies (2020). EY Report. April 2020. The report notes that up to 40% of RPA projects fail however.

3.1.4 E-commerce and Digital Payments

One final technology that I want to mention, which is not new, but where there have been incremental improvements, is digital payments and broader E-commerce. These technologies and the underlying infrastructure is allowing firms to scale globally and access geographic markets that would have been impossible a decade ago. These have served to help build consumer trust and enable seamless, secure transactions. Whether it is sending a text to pay for a bus ticket in Prague, using a QR code to pay for groceries in China, or tapping a sales terminal with a mobile phone in the Doha, even before COVID-19, these ways of paying for goods and services were evidence of a steady shift to digital payments.¹¹

Unfortunately, the change in the business-to-business (B2B) payments area has been slower. A vast amount of B2B payments are still heavily reliant on paper checks and invoices.¹² This is an area ripe for transformation. It would be hard to find a single digital business to make use of this antiquated process. It would seem strange to aspire to be an agile fast-moving business when you rely on payment mechanisms that take days to clear and require significant paper-based processes. International business operations and a non-digital payment platform would appear to be an oxymoron.

3.2 Emerging Technologies

There are a number of, what some label, emerging technologies. These technologies are being used by some leading-edge firms and are proving to have a disruptive effect on their business and operating models. While each of these emerging technologies is being developed independently and used for different purposes, the fundamental question is how these technologies are interconnected and what disruptive impact they can have on business and operating models. Figure 1 shows the interconnectedness of some of these key emerging technologies.

To make sense of this order of complexity, we need a simple framework to understand how these technologies relate to each other and what impact they might have not only individually but also collectively. Such a framework needs to start from a perspective of how data moves along the value chain from data capture to the applications that make use of data. In the end, digital is after all about the use of data to create value. Figure 2 illustrates a framework I have developed for looking at the data ecosystem and the key technologies that sit at each layer of this ecosystem.

¹¹ Payments 2025 & beyond: Navigating the payments matrix - Charting a course amid evolution and revolution. See: <https://www.pwc.com/gx/en/industries/financial-services/publications/financial-services-in-2025/payments-in-2025.html>

¹² <https://www.statista.com/statistics/291321/share-of-businesses-using-checks-in-the-united-kingdom-uk-by-purpose/>. 49% of UK businesses used checks to pay a supplier in 2019.

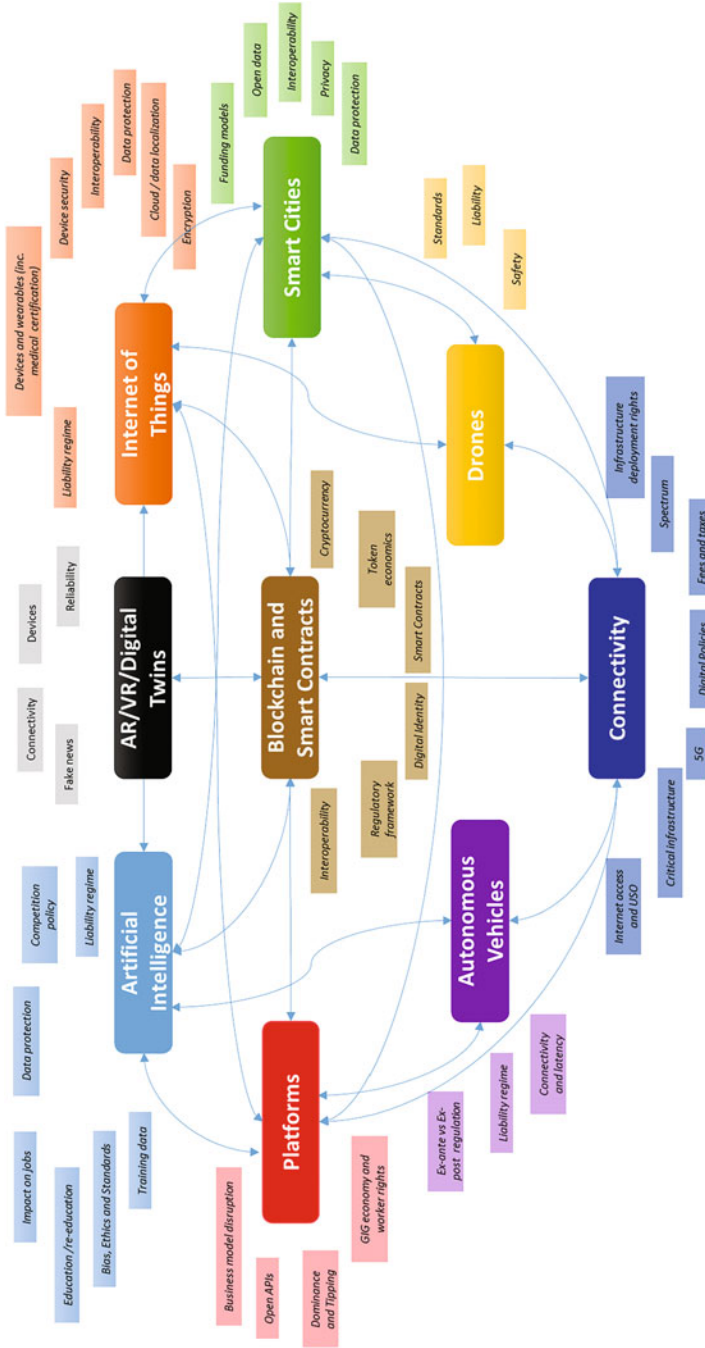


Fig. 1 Interconnectedness of emerging technologies. Figure compiled by author

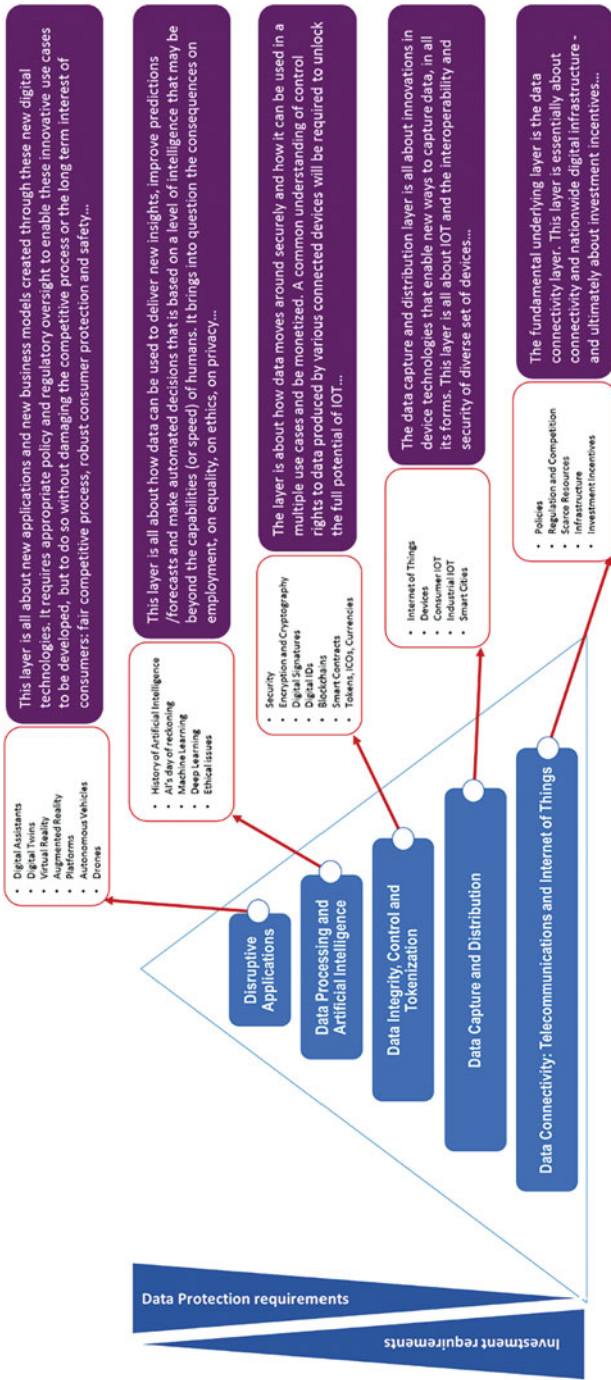


Fig. 2 The data ecosystem. Figure compiled by author

It would be impossible to look at all of these layers and technologies in detail within this chapter—something I have done so in my book *Digital Disruption*.¹³ Nevertheless, it is worth examining some of the more transformative technologies here.

3.2.1 IoT

Internet of Things (IOT) is an umbrella term for technologies that allow objects to communicate. It includes a range of technologies, such as passive radio-frequency identification (RFID) and near-field communication (NFC); and technologies that cover large distances such as machine-to-machine (M2M) communication. While IOT enabling automation is per se, not new, it is the amorphous, pervasive connected, ad-hoc, distributed, easy-to-design, easy-to-deploy, easy-to-“mash up,” and massively commoditized nature of the sensing, computing, and actuators enabled by IOT that makes it a new and explosive capability. IOT will enable, and in some cases force, new business models. Firms will move away from selling products to selling a service enabled through IOT. When businesses move toward an “as-as-service” model through the use of IOT, it will open up additional value creation opportunities for customers, which can also open up opportunities to extract value by digital firms.

3.2.2 Blockchain and Smart Contracts

Blockchain at its core is a form of distributed ledger, which its advocates claim has the promise to reshape industries by enabling trust, providing transparency, and reducing friction across business ecosystems, potentially lowering costs, reducing transaction settlement times, and improving cash flow. The Blockchain database is not stored in any single location, meaning the records it keeps are truly public (well in some cases) and easily verifiable. The digital nature of the ledger enables the implementation of smart contracts. Users can set up algorithms and rules that automatically trigger transactions. A firm could signal via the Blockchain that a particular good has been received or the product could have GPS functionality embedded, which would automatically log a location update, which in turn triggers a payment, eliminating inefficiencies, unnecessary intermediary costs, and reduce the potential for fraud or errors—something that could be invaluable for facilitating international trade.

3.2.3 Artificial Intelligence

As the world stands at the cusp of this transformative technology, much is at stake. Deployed wisely, Artificial Intelligence (AI) holds the promise of addressing some of the world’s most intractable challenges, from climate change and poverty, to disease eradication. Used in bad faith, it can lead the world on a downward spiral of totalitarianism and war, endangering—according to Hawking—the very survival of

¹³Digital Disruption: Implications and opportunities for Economies, Society, Policy Makers and Business Leaders. (2020). Vagadia, B. See: <https://www.springer.com/gp/book/9783030544935>

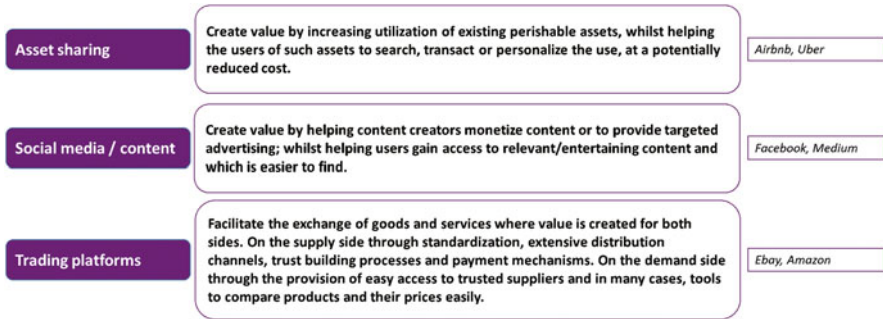


Fig. 3 Platform types. Figure compiled by author

humankind itself. In 2017, PwC forecast that GDP worldwide could be as much as 14% higher in 2030 because of AI technologies, which it valued as potentially contributing some US\$15.7 trillion to the global economy. The majority of the gains would, in its assessment, come from retail, financial services, and healthcare in terms of greater productivity, enhanced products, and higher demand.¹⁴

3.2.4 Platforms

Platforms are typically intermediaries; they connect two or more distinct groups, for instance, buyers and sellers, or content providers and individuals, where the platform owner may not actually own the assets or services being transacted. These platforms are enabled through a combination of web and mobile apps, cloud computing, big data, AI, digital payments, and increasingly virtual and augmented reality—all made possible through ubiquitous smartphone connectivity. Figure 3 illustrates the three types of platform models observed today.

The significance of platforms in the economy can be observed when we compare their valuations compared to traditional firms. In 1990, the top three automakers in the USA had among them nominal revenues of approximately US\$250 billion and a market capitalization of US\$36 billion, employing over one million employees. In 2014, the top three companies in Silicon Valley had nominal revenues of US\$247 billion, but a market capitalization of over US\$1 trillion and only 137,000 employees. Seven of the top 12 largest companies by market capitalization, Alibaba, Alphabet, Amazon, Apple, Facebook, Microsoft, and Tencent are all effectively platform or ecosystem players.

3.2.5 Virtual, Augmented, and Mixed Reality

Many firms, primarily in entertainment and gaming, are today utilizing Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), allowing brick

¹⁴PwC. (2017). Sizing the prize: what's the real value of AI for your business and how can you capitalise? See: <https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html>

and mortar retailers to take their showroom experiences to another level, creating unique experiences that blend digital and physical shopping—and extending the appeal of the showrooms globally. According to recent estimates by Goldman Sachs, VR and AR are expected to grow into a US\$95 billion market by 2025.¹⁵ The strongest demand for these technologies currently comes from industries in the creative economy; however, over time, many applications of VR and AR applications will find their way into a number of sectors, including the healthcare and education sectors.

3.2.6 3D Printing

Invented three decades ago, 3D printing has only recently become a viable technology. The industry was worth just over US\$4 billion in 2014 with some estimating an average growth rate of 25% per annum, and if that continues, it could be worth just over US\$50 billion by 2025.¹⁶ The real societal impact of 3D maybe even more profound over the long term. The very design of towns and cities and populations over time have been largely determined by the industrial revolution. If 3D printing really does become a substitute for mass manufacturing, large clusters of labor around large plants will no longer be necessary.

4 Digitally Driven Business and Operating Models

4.1 Business Model Redesign: Creating Value

The new breed of digital firms is all about innovation in the business model, experimenting, and recombining various aspects of value creation and value capture. Digital companies take traditional business models and stand them on their head. They start with a customer's pain point and mobilize resources to solve it. They use data and insight to understand customer needs, to connect with their supply chain partners, their employees, and ultimately to build a competitive advantage.

In traditional firms, value creation and capture is typically created and captured from the same source, that is, through sales of goods and services through the price mechanisms. In digital businesses, the sources and options for value creation and capture are broader because value creation and capture can be separated more easily and often come from different stakeholders. The Nest thermostat creates value by digitizing the entire home temperature control process, from fuel purchase to temperature setting to powering the heating, ventilation, and air-conditioning system and connecting it to Nest's cloud data services. The thermostat aggregates its data on

¹⁵Immersive Virtual Reality Supporting Content For Evaluating Interface Using Oculus Rift and Leap Motion. Kento Yasui, K., Kawai, R., and Arakawa, T. (2019). *International Journal of Innovative Computing, Information and Control*. Volume 15, Number 2, April 2019.

¹⁶UNCTAD. (2018). *Technology and Innovation Report 2018, Harnessing Frontier Technologies for Sustainable Development*.

real-time energy consumption and shares that data with utilities, which helps improve their energy consumption forecasts and thus achieve greater operating efficiency. Nest can push cost savings back to customers by reducing their energy bills. Nest captures value by charging two or three times the price of conventional thermostats and it makes money from electric utilities on the basis of outcomes. Thus Nest will not only play in the US\$3 billion global thermostat industry; it will help shape the US\$6 trillion energy sector. It can also jump into other sectors by opening up its digital cloud platform to devices and services from other providers. Another example of a change to business model and correspondingly its operating model is Philips. In 2015, Philips signed a deal to sell lighting to Amsterdam Schiphol Airport. Schiphol Group pays only for the light it uses, and Philips retains ownership of the bulbs and their maintenance. Instead of investing in all the equipment, the customer only pays for the light it actually uses. For Philips, this new business model requires it to reconfigure its operating model and make use of new emerging technologies such as IOT and AI. Instead of being incentivized to sell more bulbs, Philips is motivated to create bulbs that last longer and are more efficient, aligning with its wider sustainable development goals.¹⁷

Many firms are doing digital versus being digital, that is, they use technology to fix isolated problems rather than as part of an overall business strategy. Instead of starting with a piece of technology and figuring out ways to apply it to their business, digital leaders think of outcomes their customers most value and how to deliver them using digital technologies.

Simply investing in digital technologies to digitalize existing functions and processes is not enough. Firms need to start from a blank sheet and look at how they can deliver greater value to customers, examine what customers will demand in the near future, who their real competitors are, and how they can maintain their competitive advantage either by being smarter, cheaper, or faster, or indeed all three.

Digital firms think differently in another critical way. They realize that the concept of the vertically integrated enterprise going it alone is antiquated. The world is moving too fast. They need to build an ecosystem and digital foundations to create unique value that benefits all participants and this approach cannot be accomplished alone—they instead, attempt to create an ecosystem. In many ways, while most firms are not platforms, they need to start thinking like platform players—and move beyond looking at sectors and to the wider ecosystem.¹⁸ They need to examine how they can utilize digital technologies so they can replicate the operating models of platform businesses—that is, becoming agile at developing and scaling the business.

This is certainly not an easy task. Digitizing products or channels to market may well cannibalize existing revenues as customers may expect digitally available products to be cheaper than traditionally sourced goods. A careful approach is

¹⁷<https://www.lighting.philips.com/main/cases/cases/airports/schiphol-airport>

¹⁸Winning in digital ecosystems. (2018). Digital McKinsey, January 2018; and Competing in a world without borders. McKinsey Quarterly, July 2017.

required to balance the risks of cannibalization of some of the revenue stream in the short-term versus the longer-term risks of the business becoming wholly uncompetitive or irrelevant to customers.

4.2 Operating Model Redesign: Capturing Value

Operating models deliver the value promised to customers. Ultimately the goal of an operating model is to deliver value at scale, to achieve sufficient scope, and to respond to changes. In traditional firms, the intrinsic scalability and economies of scope that could be derived from technology are limited by the operating architecture of the firm that it was deployed in. But digitally enabled firms are designed and architected to release the full potential of digital networks, data algorithms, and AI. The more a firm is designed for scale and scope in its operating model, the more value it can create and capture.

A digitally enabled firm must go from siloes, un-connected IT into a true software/algorithm enabled data-driven operating architecture. This is done in order to remove human interaction from the critical path in the operating model. The marginal cost of serving an additional customer using digital agents transforms the process of increasing capacity and makes it easier to scale. The problem of increasing complexity is managed through software and analytics, rather than hiring more layers of managers.¹⁹

Alipay started life in 2004 as a simple payment solution for the goods transacted on Alibaba's marketplace.²⁰ It then expanded its payment solution to a wider audience outside of simple transactions on Alibaba. It has since rapidly expanded its business model built on a new kind of digital operating system. One of its expanded product ranges is providing loans to millions of customers in China. The loan approval and issuance processes rely solely on credit scores and are entirely digital and AI driven, where each loan application is run through 3000 risk control strategies. It can process loans at a cost of RMB 2 compared with RMB 2000 at a traditional bank. With the digital systems in place, it does not need physical bank locations or a large workforce; it can scale on mass.²¹

As digital business models advance, location, distance, and real estate become less relevant. Beyond removing human bottlenecks, digital technologies are intrinsically modular and can easily enable business connections usually through the use of APIs to external communities of partners or potential customers; just as Alipay did by extending its offering to a wider audience outside of its existing domain.

¹⁹Westerman, G., Bonnet, D., and McAfee, A. (2014). *Leading Digital*. Harvard Business Review Press. October 2014.

²⁰Alipay is a third-party mobile and online payment platform, established China in February 2004 by Alibaba Group.

²¹Competing in the age of AI: Iansiti, M and Lakhani, K. Harvard Business Review Press.

Successful firms do not just deliver a product or service but have a relentless focus on delivering a great customer experience. In traditional firms, this experience is delivered through your front office employees or your customer service staff. The problem is that as firms scale, the challenges of continually delivering a great customer experience become more difficult. You need to hire more staff, you need to train them, you need to start standardizing some of your processes, thereby losing that individual personalized experience and customers start to feel they are just another dollar sign rather than individuals.

Digitally savvy firms attempt to utilize digital technologies and data to be able to scale without the need for more staff or losing that individual personalized customer experience. When you login into your Netflix page, what you see is individualized to you, based on historic data on what you like, what you do not like; even changing the icons of the movies that are displayed to your taste. The same goes with Amazon; while they serve millions of customers with the same technology platform, as customers, we get to see a personalized experience. These digitally savvy firms also extend this relentless focus on great customer service to their ecosystem partners—suppliers and partners.

4.3 Digital Transformation Strategies

A key challenge in driving digital transformation is that the whole organization is optimized for the current business model. Fundamentally, the organization itself prohibits breakout from the old model. To transform the organization requires a break out from the old model, old people, old metrics, and old investment profiles.

The operating model is one of the biggest challenges of digital transformation. Successful operating models in the digital era enable speed of both action and decision-making and collaboration across internal functions and with external partners with an appropriate level of risk-taking. Put another way, successful operating models bring about a step-change in the firm's agility. Information Technology (IT) systems have helped improve the performance of many traditional firms, but these IT systems generally mirror the firm's silos and specialized architecture. Although improving efficiency and internal responsiveness—they drive only incremental improvements to economies of scale and scope across operating units. Traditional technologies do not change the structure of the firm per se.

Digital transformation is not just about bringing cross-functional teams and IT systems together, but also about bringing cross-functional data together. In traditional firms, software applications and data are still embedded in individual, largely autonomous, and siloed organizational units. IT and data are most often gathered in a distributed and inconsistent fashion, separated and isolated by existing organizational subdivisions and by generations of highly specialized and often incompatible legacy technology. Large firms often have thousands of enterprise applications and IT systems, working with a variety of scattered databases and supporting diverse data models and structures.

The seven 'A's of high performing organizations	Broad elements
Accountability	Boards, teams and individuals in terms of control, risk and performance
Awareness	Listening to signals which suggest the need to adjust
Agility	Strategy, implementation plans, workforce, delegation
Adaptability	Pliable structures, including command and control and planning
Alignment	To vision and strategy and across departments, across functions and stakeholders
Action	Concrete visible action and tracking
Achievement	Collecting the right dots and connecting them – objective and benefit realization

Fig. 4 The seven As of high-performance organizations. Table compiled by author

A more strategic and integrated approach to organizational design is needed to transform the firm, one that integrates the vision and mission with strategic objectives, with policies, processes, controls, decisions, issues, and risks, and these ultimately to actions and tasks that are carried out by stakeholders across the enterprise. Well-developed structures and systems can lead to better decision-making and better and faster decisions. The importance of these structures and systems becomes even more important as firm’s attempt to “invert” and seek value from outside of the organization and develop an array of partnerships. Figure 4 details the seven As of high-performance organizations.²²

Delivering on the seven 7As starts and ends with having the right people in the organization. Nothing will be more important than recruiting, training, and retaining the right workers to operate and lead the digital enterprise. Employees with new perspectives and capabilities are needed to execute digital strategies. This new wave of workers think fast on their feet, are continually learning, play well in teams, and can expect to be in a new job, maybe a new career, every few years. These employees need to be provided the ground rules of how they are expected to behave. They need a digital culture. The culture and organizational design must support, reward, and encourage the appropriate behaviors behind the strategy. Trying to transform an old bureaucratic firm by instilling digital technologies without changing the organizational design from a hierarchy to a flatter firm, from centralized to decentralized decision-making, from a meticulously planned to an agile structure, and from a culture supportive of a risk-averse—job for life—to a learning and adapting culture—is bound to fail.

²² Adopted from by earlier book: Enterprise Governance - Driving Enterprise Performance Through Strategic Alignment. (2014). Vagadia, B. see: <https://www.springer.com/gp/book/9783642385889>

5 The Data Ecosystem and Impact on Society and Policymakers

The rapid scale of change that is enabled by digitization is already impacting large swathes of society. The way people interact with their friends and colleagues, the way people get their news, or the way society buys goods and services has profoundly changed in the last decade. As a society we are giving access to our personal data—what we like, who we like, where we go, and what we watch online—some without us even noticing. The very fabric of trade is changing—we are sometimes transacting not with fiat money but through the intrinsic value of our personal data. The nature of competition is changing primarily through greater automation and new ecosystems. This is already starting to impact employment patterns and the wages people earn.

These are just some of the societal impacts of digitization. This is however just the start—the impact of digitization is going to be much wider and deeper. It will require major policy responses—some of which may need us to have a wholesale rethink about what we value as a society—some of which will need to be coordinated globally.

5.1 Consumer Implications

5.1.1 Privacy and Freedom

In a world where data is becoming the new oil, the incentives to steal, pilfer, illegally sell, or otherwise abuse data increase dramatically. It, therefore, becomes natural for individuals to guard against access to their personal data. On the other hand, significant economic and social value can be accrued when data is being used more intelligently and combined. It is therefore vital that a happy balance is found between these two extremes. Many countries, recognizing this, have sought to introduce data protection laws. The most stringent of these was the introduction of the General Data Protection Regulation (GDPR) within the EU which enhanced upon the previous data protection directive. The GDPR was designed with the data economy in mind and was primarily a response to the power of large data processors such as Google having access to and processing the personal details of European residents while potentially being outside the jurisdiction of the EU. Many other countries, including the USA and China, have taken a less aggressive approach to data protection. While Europe's practice of data minimization and high data privacy standards can be seen as economically disadvantageous against the likes of China, where personal data flows more freely, in the long run, digital "prosperity" will inevitably have to go hand in hand with citizens' well-being.

5.1.2 Loss of Employment

There is no doubt the widespread usage of digital technologies will have a profound impact on employment. The changes to employment are already evident. Jobs involving significant amounts of repetition have already been affected by technology

and remain at a high risk of automation. The Bank of England put potential job losses at around half the British workforce.²³ A study by PwC estimated that some 30% of British jobs are vulnerable to automation from AI and robotics by the early 2030s; the comparable estimates for the USA and Germany are 38% and 35%, respectively, while Japan is somewhat lower at 21%.²⁴ However, forecasts of mass unemployment arising from AI are open to criticism. Jobs are comprised of tasks, which themselves vary in the degree to which they can be automated.²⁵

5.1.3 Pressure on Wages

While not all jobs will be displaced, a more worrying development is that as some jobs do get automated, the competition for the remaining jobs will increase. Such supply increases will put downward pressure on wages for those remaining jobs. At the same time, when returns on capital are greater than the returns on labor, firms will invest in AI and machines to perform tasks rather than hire staff. The only way people can remain competitive will be to work for less.

5.1.4 Loss of Security

The platform economy (“gig,” “sharing,” or “on-demand” economies), though small today, is growing quickly across many sectors. The adoption of such a model lowers transaction costs of firms accessing a larger pool of potential workers and suppliers, with workers increasingly engaged as independent contract workers. This has benefits for some workers (greater flexibility, additional income, and access to work), but at the same time, these jobs rely mostly on non-standard work arrangements that may limit access to regular jobs, offer less promising employment careers, and reduce access to social protection as employees effectively become self-employed.

5.2 Economic and Societal Implications

5.2.1 Competition Policy

Digital transformation will have a significant impact on the way firms enter and compete in the market, particularly as processes become replicable at near-zero cost margin. This digital disruption creates new entrepreneurial activities and may lower the barrier to entry for some. However, it may also widen the gap between those firms who can gain market share and those who cannot. At the heart of this disparity

²³Haldane, A. (2015). Labour’s share: speech given at Trades Union Congress, Bank of England, London, 12 November 2015.

²⁴PwC. (2017). Up to 30% of existing UK jobs could be impacted by automation by early 2030s, but this should be offset by job gains elsewhere in economy. PwC Blog, 24 March 2017. See: https://pwc.blogs.com/press_room/2017/03/up-to-30-of-existing-uk-jobs-could-be-impacted-by-automation-by-early-2030s-but-this-should-be-offse.html

²⁵R. and Susskind, D. (2016). The future of the professions: how technology will transform the work of human experts. OUP Oxford; Reprint edition (22 October 2015).

will be who controls the data. In markets where network externalities and returns to scale are strong, and especially in the absence of multi-homing, protocol, and data interoperability, or strong differentiation, there may be room in the market for only a limited number of large competitors—who will push smaller competitors out of the market. Competition policy will need to be redesigned to be relevant for a digital era.

5.2.2 International Trade Policy

Digital transformation is fundamentally changing what and how we trade, including reductions in cost of delivery, trade facilitation, trade in data, and corresponding de Minimis rules. Digitalization is blurring traditional distinctions between goods and services and the borders these cross, making it more difficult to identify the specific rules that apply to specific transactions. Given that data underpins trade, whether directly or indirectly, measures that restrict its flow can have trade consequences. Many of the new trade agreements have specific clauses for cross-border data flows—however, concerns over sovereignty, state security, and consumer data protection remain.

5.2.3 Taxation and Social Security

Digitalization, the way in which it is changing business models and how digital firms set up their corporate entities in global low tax jurisdictions, is having a major impact on national taxation. Given the lack of international consensus on how to address these challenges and the tremendous political pressure in some countries to take action, some countries have already implemented or have proposed short-term unilateral tax measures. In recent years, several countries around the world have implemented a tax on many digital services, ranging from online advertising and digital platforms to search engines and the trading of data. The tax is commonly called Digital Services Tax (DST). Italy, Austria, Spain, France, and the UK all apply a tax rate varying between just a few percentages up to 5% on digital services. Others have proposed a similar tax or are still considering it. Either way, as digital businesses grow and transcend national boundaries, their impact on the tax take will demand action from policymakers.

5.2.4 Inequality

It is clear that digital disruption has not positively touched everyone to date and that may only get worse over time. The lack of reliable and affordable connectivity infrastructure remains a critical challenge. Globally, some 4 billion people do not have access to appropriate or affordable broadband. Even where people have access to broadband, many lack digital identities limiting their ability to access many online services. The longer those countries and their citizens remain excluded from the online world, the greater their missed development opportunities. Policymakers may need to invest in digital infrastructure to reduce such inequalities paid for by additional taxes.

5.2.5 Data Monoliths and Potential for Social Biases

AI has the potential to help us make better, more rational decisions based on data rather than instinct or gut feeling. However, AI can amplify existing biases, where these human biases are built into the data. These biases are often a function of imperfect training data used to train the AI. It is not that AI itself that is biased, but rather that AI makes visible the biases in society or derives the bias from the imperfect data used to train the AI.²⁶ The problem is that much of the valuable training data for AI is held by a few large data monoliths. In the absence of policy and regulation, a few large global firms will dominate the AI world and the applications that are enabled through AI.

5.2.6 Loss of Control and Manipulation

Online platforms such as Facebook have come to play a quasi-public role, essentially regulating what individuals read, see, hear, or say, while harvesting data to refine their understanding of people's behavior, preferences and potentially undermining the democratic process itself. Sophisticated AI systems might allow groups to target precisely the right message at precisely the right time to maximum persuasive potential. Such a technology is sinister when applied to voting intention, but pernicious when applied to recruitment for terrorist acts, for example. There is much discussion in the policy field around how these platforms should be regulated and held to account.



Dr. Bharat Vagadia is a global telecommunications and digital executive with deep experience in public policy, regulation, strategy, enterprise governance, strategic alliances, and data ecosystems. He is the author of four books: (1) *Digital Disruption*, (2) *Enterprise Governance*, (3) *Strategic Outsourcing*, and (4) *A Legal Handbook on Outsourcing*.

²⁶Take, for example, the recent case where an image classification algorithm on Google classified images of African-American individuals as gorillas. Google apologized for the incident - see: BBC News (1 July 2015).