WATCH OUT FOR THE DISRUPTORS

The next wave of technology is here and a large number of industries are at direct risk

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Are we on the cusp of one of the biggest and most disruptive technology transitions of all time? A plethora of emerging technologies that have the potential to radically transform our lives, businesses and global economies seem to be converging at the same time. The pervasiveness of these technologies and the accelerated pace of change being brought about by them make the chances of future disruption of several industries a certainty. Not surprising, then, that John Chambers, executive chairman, Cisco, has warned that as many as 40% of enterprise companies across India, Europe and the US would cease to exist in the next four to 10 years.

It is increasingly imperative, therefore, for investors to be armed with an understanding of the principles of technology adoption and business disruption. First, it is important to recognise that technology adoption is rarely linear; in fact, new technologies usually hit an exponential rate of growth (also known as the technology s-curve) as they move from a phase of early adoption to mass adoption. Electricity, automobiles, radios, refrigerators, colour TVs, mobile phones and the internet have all followed this s-curve pattern of adoption. More recently, so have Uber, Facebook, Airbnb or Netflix, who, thanks to the network effect in technology, also dominate their respective categories.

Secondly, disruptive technology innovations (a term popularised by Clayton Christensen of Harvard Business School in his book *The Innovator's Dilemma*) are usually commercialised by newer entrants — armed as they are with new business models — rather than existing players. WhatsApp, for instance, was created by a start-up team of 50 people instead of being harnessed in a large telecom company. The innovator's dilemma then refers to the difficult choice an established company faces when it has to choose between serving and protecting its existing entrenched and profitable market

SHUTTERSTOCK

versus trying to capture an emerging, less profitable, nascent market by employing a new business model. Usually, the incumbent, even when well run and well managed, fails to successfully manage this transition (a popular example is Kodak, which was unable to succeed in the digital photography world).

Across technologies and markets, this Silicon Valley culture of innovation and risk-taking (on the scale of customers/revenue first, profits later) is being encouraged by investors experiencing success with proven models of massive wealth creation at an unprecedented velocity. A global environment of low cost of capital is also helping. Fortunately, investors do not have to become technology forecasters to stay ahead. Historically, markets do not de-rate valuations of a company until the disruption to its prospects becomes obvious (usually around the technology hitting the s-curve). However, as investors reflect on their investment checklists while assessing individual businesses, they will need to incorporate the potential impact of these emerging technologies on their investments. A few sectoral examples of the changes afoot are discussed below.

SUN IS SHINING

The most recent bid in the solar space in India has also been at the lowest rate ever (₹4.3 per KW hour compared with ₹18 per KW hour in 2010, an over 75% drop). The cost curve for solar energy globally is witnessing a sharp and continuous decline, thanks to economies of scale as well as constant manufacturing improvements. According to Tony Seba, a Stanford University professor and author of *Clean Disruption of Energy and Transportation*, solar photovoltaic (PV) panel costs have dropped from \$100 per Watt in 1970 to \$0.65 per Watt in 2013. He expects this to drop further to just \$0.20 by 2020, making solar energy the cheapest source of power.

In fact, Sun Edison estimates a power tariff of lower than ₹3.5 per KW hour for India over the next few years, which competes effectively with resource-based alternatives like thermal energy, which have an infla-

BREAKING IN THE NEW

● **ELECTRIC VEHICLES:** Driven by sharp and continuous declines in cost curves, solar, energy storage and electric vehicles (EVs) together are all set to disrupt the over $10 trillion oil and gas, power generation and transportation industries globally. This inevitable change could also radically alter the geopolitical future of nations that are supported by fossil fuels. Within the next decade, EVs will reach a tipping point in terms of costs versus the traditional internal combustion engine, triggering mass adoption of the former and making obsolete the latter. Global luxury car manufacturers without an EV strategy could be the first to be impacted. This technological shift will also have profound implications for the moats of auto parts manufacturers of fuel injectors, diesel auto engines and the like.

● **CAR-AS-A-SERVICE:** With sharing of self-driving vehicles set to become a commercial reality within the next 15 years, this service could displace personal ownership of cars, potentially shrinking new car demand by as much as 80%. Digitisation of enterprise and consumers, driven by faster and cheaper computing power and ubiquitous connectedness, is weakening traditional barriers to entry in several businesses such as retail, media and entertainment, banking and hospitality. For instance, Netflix, a $50-billion market cap company, is reinventing television and within a short span has reached 540 million households worldwide.

● **INTERNET OF THINGS (IoT):** A phrase reflective of the expanding capabilities of smart, connected products, IoT promises to stretch the industry boundaries of every manufactured product by expanding their functionality. It is estimated that 50 billion devices will be connected by 2020 and 100 billion by 2030 (basically, everything and everyone on the planet will be connected). The marriage of machine data and advanced analytics could sharpen functionality and lead to large savings. It is estimated that automation of knowledge work will have a $5 trillion-$7 trillion impact on white-collar jobs, while advances in 3D printing, which creates just-in-time inventory, will threaten the jobs of millions of manufacturing workers across the globe.

tionary bias to their costs. Ensuring adequate transmission capacities, though, is a near-term hurdle. Solar is at an early adoption stage. A lower cost than thermal could possibly trigger the technology s-curve effect for solar. Governments are likely to encourage a clean source of energy that also ensures energy security. The rise of this technology could have significant implications for prospects of companies in power generation, oil and gas, coal and back-up diesel generation set manufacturers.

AUTO-CALYPSE

The cost for lithium-ion batteries, which is a third of that for an electric vehicle (EV), has been continuously dropping at 15% per annum over the past 15 years. According to Seba, battery costs could drop to a level of $100 per kW hour from the existing $350 within the next decade, making EVs costing $15,000 (200-mile range) totally disruptive. Again, a technology s-curve could follow for the product. Better acceleration, a lack of noise, cargo space and traction control of a separate motor powering each wheel are advantages for an EV. But, equally importantly, an EV is 10x cheaper to charge or maintain (an EV has 18 moving parts compared with more than 2,000 for an internal combustion engine vehicle). EVs are often compared with consumer technology products due to their ability to update their operating system wirelessly and because of their shortened product development cycles.

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Not surprising, then, that deep-pocketed Silicon Valley technology companies such as Apple and Google are tempted to design one. The key challenges, however, are around battery costs, charging infrastructure and range. CLSA, in its recent report *Autocalypse*, says it expects the first brunt of EV success to be faced by luxury ICE car-makers without an EV strategy. This technological shift will also have profound implications for moats of auto parts manufacturers of fuel injectors and diesel auto engines. More dire, however, are the projections for auto demand when self-driving cars become a reality (within the next 15 years); sharing of self-driving cars could result in a reduction in new auto demand by as much as 80%.

REIMAGINING BANKING

Infosys co-founder Nandan Nilekani calls it the 'WhatsApp moment' for Indian banking, implying the potential disruption from the evolving framework of one billion Aadhaar-allotted citizens (India's national identification number) supported by smartphone ownership. Even as the smartphone, along with the Aadhaar number, would enable the biometric authentication of the citizen, the interoperable mobile payment mechanism could create a secure ecosystem of payments and transfer of money, which could bypass the existing banking system. The early adopters of such technology will be the unbanked population of India. The introduction of new payment systems and small banks, armed with technology capabilities and innovations, could help accelerate this process.

Moving forward, the use of analytics and algorithms on the ongoing data explosion from mobile phone usage captured digitally could sharpen and customise the credit practices of these new players, weakening traditional banking's lending process advantage. The open architecture of the system, which is supported by standards backed by the government and its agencies, makes it a potential source of disruption of existing ways of banking. However, existing banks are familiar with the evolving landscape and are already participating in the ecosystem. Globally, too, (as in India) start-up financial technology companies (known as 'fintech' firms) are being set up to disrupt the payments, lending or even asset management functions of existing banks. Goldman Sachs has estimated that the emerging fintech industry could attack more than $4.7 trillion in revenue and $47 billion in profit from traditional bankers.

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REMODELING IT

Indian IT services companies have emerged as a disruptive force in the global IT services market since the late 1990s on the back of the offshoring wave. The then established IT vendors such as EDS and CSC suffered market share losses as they were unable to swiftly move to the new paradigm. Digital — which encompasses social, mobility, analytics and the cloud — is now emerging as the new wave in IT services.

Digital projects, focused more on how to change the business than run the business, are smaller sized and consulting oriented — the competition, therefore, is not only from larger IT companies, but also from mid-sized or even sharp tech-oriented start-ups. At the same time, some of the legacy businesses of Indian IT (such as application development and maintenance, business process outsourcing and testing) are witnessing increased automation, resulting in revenue deflation (as also requiring to redeploy/retrain the workforce released). The wave of migrating software applications to the cloud to leverage the benefits of software-as-a-service (SaaS) platforms could also have the impact of requiring lower IT service resources in future. Even as the legacy businesses witness a revenue deflation, the challenge for IT services companies is to ensure adequate wins in digital to deliver growth on a net basis (so far, overall IT budgets have not contracted since clients are redeploying savings from legacy spends on digital).

The digital practice, as the curve matures (estimated to increase to almost half of IT service spends, from 15% currently), therefore, could lead to different success rates for different companies, since it is more expertise based, unlike the earlier labour intensive and process oriented offshoring wave. To ensure continued success, IT services companies, then, may have to inculcate a culture of innovation, ensure agile processes to accommodate the current small-sized digital projects, demonstrate an enhanced ability to re-train resources, partner or acquire capabilities to ensure speed-to-market, hire a specialised sales force and employ flexible pricing models. The DNA of Indian IT services could experience a radical change.

To conclude, it is very likely that the impact of some of the technologies discussed above could surprise on the upside and some on the downside. As the inimitable Yogi Berra would put it, "It's tough making predictions, especially about the future." Having said that, investors would be wise to keep an eye on the evolving future, given how radical the implications of the changes are.