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REGULATING CYBERSPACE

PERSPECTIVES FROM THE PRIVATE SECTOR IN ASIA

Edited by
NISHA HOLLA AND VIKAS KATHURIA

ORF
KONRAD ADENAUER STIFTUNG

Observer Research Foundation
20 Rouse Avenue, Institutional Area
New Delhi, India 110002
contactus@orfonline.org
www.orfonline.org

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Visiting Fellow, Observer Research Foundation

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VIKAS KATHURIA
Associate Professor, BML Munjal University

Today, most global citizens have digital avatars and are active in cyberspace. Especially in the wake of the pandemic, almost all aspects of interaction and subscription of services have moved online. Digital technologies have fast-tracked inclusion in multiple geographies in the last decade, including most Asian nations. Amongst other benefits, technology inclusion has proven to be most helpful in humanity's efforts to achieve the Sustainable Development Goals (SDGs).

At the same time, new-age technology is not entirely innocuous in terms of its effect on welfare. Digital markets are dynamic and characterised by a rapid pace of innovation, where big data is the most critical input in driving change. However, user data is not just a commodity but also contains sensitive personal information such as financial information, sexual orientation and political leanings. Thus, protecting the privacy of users is critical to ensuring efficient digital markets. Additionally, data-driven markets are often 'tippy' and prone to concentration. Antirust agencies need to be extra vigilant in such markets and, perhaps, require 'new tools' to ensure that markets serve consumers.[1] Online platforms may also threaten the democratic and social order if, as intermediaries, they fail to regulate harmful content. The digitalisation of our economy and social lives, further catalysed by the ongoing pandemic, may come to a standstill if cybersecurity, data protection and cyber sovereignty are not adequately addressed.

Regulating cyberspace—the global, interconnected, virtual world—is unlike any regulation humanity has had to undertake in its history. While past learnings lend some direction here, because of cyberspace's global and unbounded nature, the world must come to a consensus on optimal regulation—enforceable within national borders but protective in spirit for all global citizens.

The world, therefore, needs optimal regulation that places social welfare at the core of new technology. While critically important, innovation, the key driver of human development, needs to be balanced against fundamental human values such as privacy, dignity, and security. However, there are no ready templates of optimal regulation. In a conversation at Raisina 2021, Executive Vice President of the European

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Commission for A Europe Fit for the Digital Age, Margrethe Vestager, highlighted *trust* (including data and user privacy), *contestability* (including open competition and drive for innovation), and *absence of manipulation* as the core principles of regulation in the digital economy.[2] These could serve as practical guiding principles to design optimal regulation frameworks for digital markets in all democracies.

What is also noteworthy is that, hitherto, the global south has been missing in the debates to craft regulation for the digital world. Given the rising economic might, population sizes and shared democratic values, it is essential for Asian economies to design regulatory frameworks that strike a balance between innovation and social welfare. While governments are utilising new-age tools to effect socio-economic change, the private sector is at the cutting-edge of technology development and an influential stakeholder in this debate. Naturally, therefore, designing an optimal regulatory framework requires greater engagement with industry views.

To conceptualise the optimal regulatory framework, the Observer Research Foundation (ORF), in association with Konrad-Adenauer Stiftung (KAS), engaged with private sector voices in South Asia. This Journal features these voices and endeavours to support policymakers in their quest to design regulation for the new age of technology. The thought-provoking contributors have brought in their hands-on experience developing technology, building innovation-led businesses, and investing the capital that drives both.

On capital, which is the fundamental enabler of the development of technology platforms—the critical interrelationship between (technology) entrepreneurship, capital investment and policy regulation is nonlinear and "deterministically chaotic", describes Siddarth Pai in his essay, comparing it with the famous three-body problem in physics. Regulation, Pai cautions, must play a careful role. While it must protect the general populace from the ill-effects of new technology-driven businesses, going overboard with restrictive control mechanisms might result in the flight of both entrepreneurship and capital from the country; made particularly easy in this digitalised world where geography is (nearly) irrelevant. *Contestability* must not be sacrificed in the process of championing *trust* and the *absence of manipulation*.

Regulatory policy must also consider that there are two main components to innovative technology development—codified technology available in the form of frameworks and literature, and tacit expert knowledge that is only acquired by hands-on learning and execution.[3] Kailash Nadh explicates this by demonstrating that regulators' well-meaning instincts to protect citizens' data and privacy must be augmented by tacit knowledge and "hands-on" subject matter expertise to sufficiently achieve the lofty goals of user privacy, data protection, and cyber sovereignty. Regulators endeavouring to formulate data- and algorithm-related regulation must integrate an intimate understanding of the complex nature of modern technology, which Nadh refers to as "an infinite series of nested blackboxes".

Frontier technologies like artificial intelligence (AI), blockchain, and quantum computing can offer unique healthcare, agriculture, energy, and governance solutions. The rapidly evolving nature of these technologies is heralding an "era of hyperinnovation", writes Umakant Soni. Exploring the case of AI, Soni enunciates the massive challenge societies will face reacting to the unprecedented pace of change and obsolescence unless governments can formulate a well-governed system that promotes responsible AI without stifling innovation. This delicate balancing act between regulation and innovation brings us back to the principles of *contestability* and *trust*.

Shinjini Kumar argues that technological platforms are fundamentally reshaping the *trust* structures in society and that any "decent shot at achieving the SDGs" must involve a meeting of the minds of all stakeholders. In her lucid essay, Kumar illustrates how regulators and technology developers can create new *trust* structures with an *absence of manipulation* to usher in a fresh era of sustainability.

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Digital technologies and platforms are key to achieving several SDGs.[4] Several Asian economies have accelerated financial inclusion in the past decade, a key enabler in eight of the 17 SDGs.[5] Morshed Mannan and Saif Kamal delve into Bangladesh's efforts to utilise emerging technologies to drive financial inclusion. Highlighting both the benefits and the risks of adopting cybertechnologies, Mannan and Kamal make critical suggestions for regulating the same—including the *trust*-building exercise of Regulatory Sandboxes. On the other side of the Bangladesh-India border, Deena Jacob speaks from the experience of navigating her company through the Regulatory Sandbox environment and endorses it as a reliable and interactive method for a country to test and implement "digitally native regulation".

Mobility is another leading edge in the sustainability debate and prominently features in SDG11, which envisions to "make cities and human settlements inclusive, safe, resilient and sustainable".[6] Yash Narain and Aishwarya Raman write on the multi-stakeholder exercise of re-engineering India's mobility frameworks, examining it from the four lenses of SDG11. In their broad-ranging essay, Narain and Raman buttress Soni's viewpoint that the AI wave simultaneously perpetuates technological innovation and business model innovation, creating an explosion of end-use mobility models.

The International Monetary Fund's Muhleisen explains that the answer to normalising the adoption of frontier technologies lies in formulating forward-looking policies that "maximise the advantages of the new technology while minimising the inevitable short-term disruptions".[7] Kshitij Batra concurs in examining the effect of technology disruptions on socio-economic development and employment. Batra explores the role of regulatory institutions in propagating Schumpeterian "creative destruction", indicating it as an "essential churning process". Batra joins Kumar, Mannan and Kamal in voicing the private sector's precise needs from regulators to accelerate the development of disruptive technologies that ultimately serve the attainment of the UN's 2030 Agenda for Sustainable Development. Jacob underscores this sentiment with a first-hand narrative on how India's fintech ecosystem, which has driven the financial inclusion and integration of more than one billion people, has greatly benefitted from the "forward-thinking regulatory approach to how new utilities are jointly built with industry".

No debate on the platform economy today is complete without discussing social media. Aprameya Radhakrishna explores multiple intersections in his piece—global vs indigenous social media platforms, regulator vs technology provider, and domestic vs extra state players. Radhakrishna uses the case study of Indian microblogging site Koo to explore how private players can react to the various needs for regulation—customisation for the country's culture and languages, controlling fake news, anti-trust measures, promoting cyber sovereignty, and protecting national interests. Mohan Chathuranga, in his piece, while sharing his thoughts on the data protection legislation in Sri Lanka, reminds us how data protection, privacy and cyber sovereignty, and free and fair speech on online platforms are critical to the democratic order. *Trust* and *absence of manipulation* are sacrosanct in this new digital era.

The contributions in this timely volume on *Regulating Cyberspace: Perspectives from the Private Sector in Asia* bring a wealth of detailed ideas and an extensive range of perspectives across South Asia to bear on the exploration of this important, and perhaps, the most defining, debate of our digitalised era. Indeed, the debate will no doubt take time to resolve. By way of this Journal, however, we hope we are one step closer today to comprehending the intricacies of this multidimensional quandary.

—Nisha Holla & Vikas Kathuria

ABOUT THE EDITORS

NISHA HOLLA

Nisha Holla is Visiting Fellow at the Observer Research Foundation where she tracks the impact of technology on democratising access to socio-economic development, the importance of building strategic technology moats, and policy frameworks required to drive indigenous technology development in India. Nisha is also Technology Fellow at the Centre for Cellular and Molecular Platforms and Member of the WG16 at the International Union of Pure and Applied Physics. Her writings have appeared in The Financial Express, The Indian Express, The Sunday Guardian, and YourStory. Nisha holds a Master's of Science degree in Chemical Engineering from Carnegie Mellon University, and has extensive experience in hardware product development, both in India and the US.

VIKAS KATHURIA

Vikas Kathuria is an Associate Professor at School of Law, BML Munjal University and an Affiliated Researcher at the Max Planck Institute for Innovation and Competition (MPI), Munich. Vikas researches and writes on competition law, data governance, and law and technology. Vikas received his PhD at the Tilburg Law & Economics Center (TILEC), the Netherlands. His post-doc work at the MPI explored the role of competition law and regulation in data-driven markets. Vikas has previously worked with Observer Research Foundation (ORF) and the Competition Commission of India (CCI) and has held academic positions at Jindal Global Law School and Bennett University. His research papers have featured in international peer-reviewed journals including the Journal of Antitrust Enforcement, European Competition Journal, World Competition, Computer Law & Security Review, and Law and Development Review.

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PERSPECTIVES FROM THE PRIVATE SECTOR

This Journal features private sector voices and endeavours to support policymakers in their quest to design regulation for the new age of technology. The thought-provoking contributors have brought in their hands-on experience developing technology, building innovation-led businesses, and investing the capital that drives both.

SIDDARTH PAI

Founding Partner and ESG Officer

3ONE4 CAPITAL, INDIA

The Three Body Problem of Entrepreneurship, Capital and Policy

The only analogue to the interplay of entrepreneurship, capital and policy would be the famous three-body problem in physics, wherein one can't predict the movements of three bodies due to how they influence each other. A two body system is solvable as one can describe their influences mathematically with respect to each other, allowing the creation of a general solution. Adding just another body into the system creates chaos by exploding the number of unknowns beyond the number of equations that can define the system. This leads to a deterministic system that is inherently chaotic. Deterministic chaos is the ideal phrase to describe the interplay of entrepreneurship, capital and policy.

If one were to decouple these elements into binary pairs, the answers become more apparent. Entrepreneurship and capital are symbiotic, feeding off each other to grow and compound over time; capital and regulations display *commensalism*—where one benefits from the relationship and the other is not significantly harmed, with roles often varying between them; entrepreneurship and regulations reflect *amensalism* where in the long run, one remains unaffected while the other is harmed. But the three together lead to the classic three-body problem, where the only outcome of the system is chaos. It is chaos, indeed, that has punctuated the relationship between these three variables the world over—and in Asia in particular—given the multitude of ethnicities, cultures, socio-political systems, external influences and inter-regional dynamics influenced by a shared history and common geography.

Two fundamental principles underscore the interactions between these atoms of civilisation:

1. Innovation always outstrips policy and regulations
2. Capital is cowardly

Unpacking these principles can help provide a practical heuristic for the constant chaos between entrepreneurship, capital and policy.

Innovation always outstrips policy and regulations

Entrepreneurship and innovation are best exemplified by the above quotation, with the frenetic pace of technology causing access and dissemination of ideas to profligate in an unprecedented manner. Business cycles have been crunched in recent times, with ideation moving to execution, execution (or even the promise of it) leading to capital, capital leading to growth and growth leading to habit-forming actions for the general populace. The growth of ride-sharing, an idea that every person has toyed with at some point in time in their lives—of hailing a ride through technology to create defined outcomes in terms of price, quality and timelines, and sans uncertainty epitomises this cycle. It took the founders of Uber to execute it at a small scale, leading to capital pouring in from all corners of the world (US, Japan, China, the Middle East), leading to a highly accelerated worldwide landgrab and tussles with regulations and to becoming an essential mobility service that will shape consumer interaction and protection, labour rights and regulations for years to come.[1]

Each region has its own Uber—Ola in India, Didi in China, Careem in the Middle East, Grab in South East Asia. The same cycle, as above, has played out in all these regions, often with the same investors and same results.

"NO FORCE ON EARTH CAN STOP AN IDEA WHOSE TIME HAS COME"

—VICTOR HUGO

It was only during the rapid expansion of these companies did policymakers realise the lacunae their existing frameworks suffered; when they were faced with these rapid, technological changes. New York had regulations on medallion cabs[2], the ubiquitous yellow cars that darted through the concrete canyons of the city; India had radio taxi regulations and regulations for *autorickshaws*[3], a common curiosity on Indian roads. These regions had to immediately roll out new regulations or force-fit the ridesharing business model into their existing frameworks, leading to protests from consumers and these companies themselves. Labour rights activists balked at the assumption that the drivers of such services were "independent contractors" and not "employees" of these services, thus, depriving them of hard-fought labour rights accumulated over years of struggles.[4]

This same paradigm can be extrapolated across all the new, emerging business models: For homestays in the form of Airbnb; for food delivery startups like Doordash, Swiggy, and Meituan; social media startups like Twitter, Whatsapp, Koo and others; e-pharmacy startups like Pharmeasy; or even for the entire cryptocurrency space. It's the same song played in different tunes across different sectors and geographies.

It is with crypto that one can see the whole arsenal of tools available to policymakers to deal with such innovations, where the same protocol has been played across all the sectors mentioned and will be played across future sectors that arise, especially in areas that deal with consumers, finance or data. In true Asian fashion, the protocol has become a *mantra:* Ban, Control, Tax, Regulate, Repeat.

Step 1: is always the same: Ban it. In most contexts, a ban is usually the last resort, not the first response. But, in the context of government, a ban is often the first step as it's the most simple and effective tool to remind entrepreneurs about the established order: That the government is above all. A ban is also versatile—it can be permanent or temporary, with conditions or without, against non-local entities or even local ones; it buys time and serves its purpose of establishing order. But all bans are challenged in the courts of the land, but more importantly, in the courts of public opinion. In the words

of Chanakya, “In the happiness of the subjects lies the happiness of the king. What is dear to the king is not beneficial to him, but what is dear to the subjects is beneficial to him”. Thus, if large enough sections of society are against the ban, it’s often overturned after negotiations with the parties involved. Once the ban is resolved—either through resignation or resistance—we move onto the next bead of the *mantra*—Control.

Step 2: is Control. And control is crucial to tempering disruption, especially if disruption upends established social orders and norms. Control here differs from regulation, for the latter seeks to referee while the former restrains. Control is also where utmost care must be taken, for the policies which flow from control cannot be modified without either the passage of time or a force majeure event. Any drastic change once an act of control has been executed will paint the government as being of two minds, projecting instability and indecision—the anathema of good governance.

Generally, control does not happen in a vacuum. Governments acknowledge that they are not experts in emerging fields and realise that they require the presence of domain experts in order to understand how to tackle emerging segments. This is the most crucial step as those who are part of this process will often make inputs that serve their existing models, often at the expense of their competitors, and at the expense of disruption. It is here that many entrepreneurs make the fatal mistake of hubris—by waiting to be called to the high table instead of making efforts to take a seat there. They mistake the walls of social media platforms for the corridors of power and the mindless public chatter for official policy statements. Contrary to popular belief, public policy is not dictated by one’s musings on social media and the sooner that the ecosystem realises this, the quicker they can effect change. Once Control is established via policies we move onto the third step: Tax.

Step 3: As Benjamin Franklin famously said, nothing is certain except death and taxes; the policies intended to control always contain both death and taxes—death of business models and taxes on activity. Taxation is the most important source of revenue for governments, who, like entrepreneurs, are always on the lookout for new sources of revenue. The taxation of disruption is inevitable, but the classification of the disruption[5], which feeds into which tax bucket it falls into, plays a decisive role in the viability of the sector. Taxes are the cost of doing business, but the tax rates determine viability. High taxes will sound the death knell for any emerging sector while low taxes will help broaden acceptance of the same amongst consumers and allow for the model to thrive.

Step 4: is regulation. It’s a step that depicts the maturity of the disruption and where it becomes mainstream. It is where order is established, and the players that are already present and those that are yet to participate understand the rules of the game and the beads of the *mantra* above, allowing for *samsara* or the cycle of the *mantra* to replay again and again. Many models don’t survive the steps above, but those that do may sometimes meet a fate worse than death—of becoming the established order and becoming the very institutions that they wanted to upend. Many entrepreneurs accept this and spend more time in compliance than creation, but often, entrepreneurs leave to restart the cycle in another industry, becoming wiser about the ways of the world.

Ban, Control, Tax, Regulate. Any new field that has emerged over the past 30 years has followed these four steps, in whichever geography they’re a part of. An example of this is the e-pharmacy space in India. Indian regulations did not explicitly allow for e-pharmacy startups, with entrepreneurs exploiting the grey areas in the regulations to achieve accelerated scale. But in time, the existing power structures lobbied extensively to ban them or subject them to the same requirements as their

brick and mortar counterparts. Indeed, such a ban went live in December 2019[6], mere months before the COVID-19 pandemic. But once the pandemic began to raze throughout the country, the previously-banned business model came to the forefront in a time punctuated by the lockdowns, social distancing and the need for medicines instantaneously.[7] They emerged as heroes during the lockdown and the next steps in the chain—control, taxes and regulations—followed through swiftly to allow them to fully integrate into the fabric of daily life.

The friction inherent in the process is emboldened by capital, and capital has played an outsized role in accelerating the current state of affairs. Capital allows for breathing room to litigate, legislate and bide time as the natural order of things goes on. Capital thinks long-term but acts quickly, allowing businesses with capital to scale and get the public on their side before facing the *mantra* above. This bravado of capital seems to be in stark contrast to the heuristic that capital is cowardly, but it feeds directly into it.

Capital is cowardly

Capital is like Dutch Courage—it emboldens yet enervates simultaneously. Capital buys time, allows for mistakes and missteps, allows for pivots and changes and most importantly, for the chance to go big; capital gives one a long rope, but what one does with it is a reflection of oneself.

The early 2000s saw engineers extend the philosophy of "move fast and break things" to the real world, without understanding its real-world consequences. "Move fast and break things" works in controlled experiments, where the consequences are mitigated and the costs are low; but the moment it extends to the real world at scale, things don't break, they collapse.

"CAPITAL ALLOWS INNOVATION TO TAKE RISKS AND FAIL."

Capital and innovation are symbiotic—each can survive without the other, but they're mutually enriched by each other. They feed off one another and become stronger over time, attracting more of each constituent as time progresses. Capital allows innovation to take risks and fail, and innovation rewards capital that can take that initial risk by delivering outsized returns. But capital is cowardly; it understands the established order above, far better than entrepreneurs do. After all, each idea isn't the first rodeo for the venture capital or private equity firm. They study and assess the risks involved and the grey area that such innovations exist and then take an informed decision to fund them or not. But capital too was seduced by this "move fast and break things" *mantra.* Capital relied on the businesses scaling quickly in order to exploit the inherent inertia of governments to perform their *mantra*; capital needed the businesses to become public darlings, affect the lives of many, generate economic and social good and inveigle themselves into the social fabric so that any attempts to ban or control such businesses would be an attack on the public itself.

Indeed, this worked for the longest time, with the stories of Uber, Lime, Airbnb, amongst others, challenging the status quo and winning because of how integral they became to the way of life. But this model has also reached its limitations as the world saw the ferocity of the governments' actions against others who dared to walk down this path. The reprisals became swift and extended to not only the company but to the board and investors as well. Public action groups also began targeting the source of capital as well, bringing to light the role that capital played in bringing such models to life. The toxicity created by litigation began to put off larger investors, who didn't mind sacrificing gains for stability.

It was the fintech sector that heralded the new social compact between capital and innovation and policy. Financial services is a highly regulated sector and the financial regulators of all countries do not take kindly to those who wish to exploit the rules. Investors, being regulated by the same regulators as fintech companies, wouldn't dare challenge the regulators in the same fashion as they had in other sectors. Regulation is also seen as an edge in the fintech sector, with regulated financial services seeing greater acceptability amongst consumers as well. Unregulated financial services bring to mind Ponzi schemes, 419 scams and the like, where the house of cards comes crumbling down. But regulations baptise everybody involved and absolves them of the taint of doubt, at least from a regulatory standpoint. This same thinking is now percolating through to all other sectors as well.

COVID-19 has increased the people's faith in governments and the role that governments play in public safety. The untrammelled rise of tech giants is seeing the world view them with increased suspicion, with regulations becoming the sword that can slay the proverbial dragon and government the white knight who can wield it. Capital is also expected to have a transformative role as opposed to a purely commercial one and global compacts like the UNPRI and ESG investing force investors to add multiple dimensions to their investment matrix.

In an era awash with liquidity and where capital is more abundant than the innovation it can fund, capital is also becoming more selective about the type of risk it can take. Capital has been aware of the *mantra* for ages and that the four steps happen due to hidden variables and information arbitrage. Getting ahead of the curve rather than following it is key to ensuring continuity of operations and reducing friction.

Capital can take execution risk but is shirking away from regulatory risk. The industry joke is that funds are now being formed with a two-person investments team and a four-member compliance team, highlighting how serious the need for compliance has become. The appetite for regulatory risk is lower and regulatory uncertainty will cause capital to watch from the sidelines, rather than rush in and get burned. Capital is cowardly, but it is also patient. Capital can survive elections, governments can't.

Governments too have woken up to the inexorable march of progress and realised that in this highly mobile, digital world, geography is irrelevant and intellectual capital flight can hollow out a country. Innovation is attracted by frictionless environments and the internet has reduced distribution costs to almost zero, allowing for innovators and entrepreneurs to shift base the moment the regulations become hostile. No country wants to be a land of subsidiaries.

The solution to the three-body problem in physics is to try and force a "restricted three-body" situation, wherein, one of the elements exerts no significant influence on the other two, allowing one to solve it as a two-body system. Thus, in the trinity of entrepreneurship, capital and policy, so long as two out three of them don't ruffle the other, the chaos inherent in the system can be quelled. If not, there's always litigation, which to paraphrase the rotund philosopher Homer Simpson, "is the cause of and solution to all of life's problems".

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KAILASH NADH

Chief Technology Officer

ZERODHA, INDIA

Pragmatism, holism, and hands-on technical expertise: The only path to meaningful technology, data, and cyberspace regulations

Zerodha, India's largest stock brokerage firm today,[1] is one of the earliest online-only brokers. On any given trading day, up to 2 million investors and traders login to Zerodha's platforms to participate in the stock markets and place up to 12 million trades, where transactions vary from a few Rupees to crores of Rupees, amounting to almost 20 percent of the retail stock market activity in India.

With the huge surge in online financial activity over the last few years, the questions of data privacy and cyber security have taken centre stage. The apex capital markets regulator, Securities and Exchange Board of India (SEBI), has been proactive in not only attempting to survey the technological landscape, but in formulating regulations aimed at improving the overall cyber resilience. In 2018, SEBI came out with a comprehensive set of cyber security regulations[2] targeting all market participants including stock brokers, exchanges, and depositories. It is interesting to note that a stock brokerage is not just regulated by SEBI, but multiple quasi-regulators. Zerodha, for instance, is directly regulated by SEBI; three stock exchanges, NSE, BSE, MCX (National Stock Exchange, Bombay Stock Exchange and Multi Commodity Exchange of India); and two depositories, CDSL and NSDL (Central and National Depository Services Ltd.). With the direct oversight of six institutions, one can imagine the seriousness and heft of regulatory compliance. Similarly, institutions in the banking and payments industry are bound by regulations set by the Reserve Bank of India (RBI) and the National Payments Corporation of India (NPCI). And yet, in recent times, there have been multiple high-profile cyber attacks and data breaches in India that have hit large financial institutions[3] [4]. This has been happening all over the world. Why is that?

As a technologist who has not only been interacting with various institutions in the financial industry on regulatory and technical matters, but also been working on implementing them, it is my conviction that regulatory institutions and law makers need to take a pragmatic approach to technology regulation and start including actual technical expertise in planning and decision making. Often, cyber security and data protection are about nuances, technological and otherwise, that can only be understood by looking at all the elements involved, especially the human element, holistically, and that no amount of regulation or laws can actually magically eliminate software bugs or vulnerabilities. Pragmatism here is not a thinly veiled proxy for lax regulations, and technical expertise here refers to people with current, hands-on technical experience. In this article, I attempt to illustrate this with real life examples from our experiences at Zerodha.

Technology: An infinite series of nested blackboxes

The staggering pace at which the internet and software have eaten the world also marks a significant epoch in human history. In just a decade, not only have consumer markets moved online, but so have essential public services—identity, income, health, social services and more. While end users interact with technology over user interfaces; generally underneath websites or mobile applications, there is a complex maze of networks and interconnected systems powering a simple user interface. To cite an example, when a user registers on Zerodha's website to start investing in the markets, their data passes through a complex maze of integrations and networks behind the scenes. Income tax systems for PAN verification; Meity's DigiLocker service for address verification; KYC/KRA/CKYC repositories; digital signature provider, UIDAI; UPI and bank integrations for payments and account verification; telco and service providers for SMS verification; three stock exchanges and a depository; and more. Many of the entities described here have their own nested integrations and complexities.

That is, the "simple" act of registering on a stock broker's website involves the integration and interaction of numerous complex critical systems, whose dynamics and combined complexity are practically impossible to quantify. Any narrow technology or data related regulation pertaining to user registration on a stock broker's website, thus, needs an understanding of these systems. However, often, when specific technology or data regulations are crafted, they fail to take into account technical nuances and inadvertently and unknowingly end up creating even more complexities, and, sometimes, even dangerously weaken cyber resilience. The human impact and nuances though, are often even more complex than technical ones. The Nth order effects of seemingly simple changes to complex systems and the butterfly effect, are easily missed.

The SEBI Cyber Security and Resilience Circular of 2018:

An example of a holistic regulatory exercise

In December 2018, SEBI published a comprehensive set of regulations that touch upon everything ranging from human resource policies for enhancing cyber security within organisations to specific technical recommendations on how to encrypt and protect customer data. What is interesting about this particular circular is that it was co-authored by SEBI, industry participants, and technologists, including Zerodha.

SEBI circulated the original draft of the circular in late 2017 to multiple stock brokerage associations that represent pretty much the entire stock brokerage industry, seeking feedback. When we first came across the draft in early 2018, I was dismayed and appalled for multiple reasons. Firstly, there were a number of technically impossible and obsolete technology regulations that could be disastrous, and, of course, impossible to implement. Secondly, the draft had been in circulation for months with SEBI waiting for feedback, of which there was none.

Personally, as a technologist, I found it hard to comprehend that such technically infeasible regulations could be written in the first place, and that despite it circulating amongst the very brokers that it would affect, nobody had actually read it or sent any feedback—a first hand insight into how technical regulations, which can have wide implications, can sometimes slip through the cracks because there happened to be no technical experts involved.

We immediately sent a letter to SEBI highlighting multiple critical issues in the draft. SEBI's quick response appreciating the feedback and their intention of a working group involving SEBI, select brokerage firms, and technologists to rework the draft came not only as big a relief, but turned out to be an excellent example of a highly sensible, forward thinking, and pragmatic regulatory exercise. SEBI had no hesitation in stating that where they did not have the requisite technical expertise, they would be happy to collaborate with experts from the industry.

Barring the occasional impedance of industry participants with certain vested interests, which were always immediately quelled, the working group evaluated every point in the draft circular and discussed multiple possible implementations with a pragmatic and holistic approach. The following is a real example of how one particular point in the circular was framed and formulated:

- **Clearly define the particular piece of regulation**

  Reduce the cyberattack surface on user logins of brokerage clients getting stolen by cyber criminals for executing fraudulent transactions.

- **Is it a big enough problem that requires attention?**

  - Yes. Credential hacking is a common cyberattack and can cause financial losses.
  - This is a key insight that requires first-hand knowledge and data on widely used hacking methodologies and their impact on clients.

- **Does this problem require technical solutions?**

  Yes.

- **Propose solutions: How effective is each one in solving the problem at hand?**

  - a) Two-factor authentication (cryptographic tokens, biometric etc.) = highly effective.
    b) The standard practice of forcing users to add special characters to their passwords, specifying arbitrary password lengths, and forcing users to regularly change their password (as prescribed in older circulars) = highly i neffective as evidenced by numerous studies.
  - These are key insights that require expertise in various authentication methods, security, and end user behaviour.

- **Is the proposed implementation technically feasible and practical to implement?**

  - Yes. All brokers have to alter their trading platforms and systems to support two-factor authentication, but it is absolutely necessary and the trade-off is worth it.
  - A significant percentage of stock brokerages use the same handful of IT vendors to offer their trading platforms. So, the vendors implementing this once can cover wide swathes of the industry.
  - Mobile operating systems, Android and iOS, have first-class APIs for biometric authentication, and much of the trading activity originates from

mobile applications, so biometric two-factor authentication is practical and impactful.

- These are key insights on industry-wide implementation complexity and impact that requires in-depth knowledge of trading platforms, stock brokerage systems and the technology landscape.

- **What is the impact on the proposed implementation on end users that the regulation is trying to protect, that is, the human impact?**

  - There are multiple ways to offer two-factor authentication. Some seamless (biometric on mobile), some mildly annoying (cryptographic TOTP). No major impediment and, if anything, a minor inconvenience for a manifold gain in security improvements.

  - This is a key insight that requires technical expertise on authentication methods and first hand understanding of end user behaviour and expectations.

This line of thinking and approach was applied to more than 50 points in the circular. In the end, when the regulations finally came out, they were more comprehensive, were rid of technical errors and were technically stronger; took a pragmatic and holistic view of every element in the ecosystem—institutions, technology and platforms, the psychology of end users that the regulations were protecting and the psychology of cyber criminals and common means of attacks that end users were being protected from; and finally, with no compromise on SEBI's original regulatory intentions whatsoever. In fact, if anything, it was stricter on brokers.

More recently, SEBI has undertaken a mammoth technology project to standardise industry-wide data exchange and implement machine readability. The working groups constituted to formulate and implement the project have participants from a range of industries with real hands-on expertise in matters of finance, business, data, and technology. SEBI's practical, pragmatic, and holistic approach here with each action item that considers not just technology but all connected elements is not only refreshing, but is exciting.

Cyber security and data protection do not have silver-bullet solutions

Technology changes by the day, and so does the sophistication of cyber attacks. The human element, user behaviour, can also change significantly in quick time. For example, in 2018, close to 30 percent of the trades on Zerodha's platforms came via its mobile applications and the rest from desktop platforms, but by 2020, the trend had reversed with 80 percent of the trades coming from mobile applications. Zerodha's internal cyber security measures and risk assessments, thus, were continuously readjusted along with usage trends.

The Hearbleed[5] (2014) vulnerability that affected significant parts of the internet; SPECTRE[6] and MELTDOWN[7] (2018) vulnerabilities that affected billions of computers running Intel processors around the world; the technical sophistication of Stuxnet[8] (2012) that sabotaged the Iranian nuclear power program; and Pegasus[9] (2016) that enabled mass surveillance on private mobile devices were deafening wake up calls to the world on the complex, multidimensional nature of cyber security as a concept. When a computer processor that is considered sacrosanct, on top of which everything is built, turns out to have security vulnerabilities, it fundamentally shakes and rewrites perceptions.

Cyber attacks stopped being limited to criminal enterprises seeking profit a long time ago with extra-state actors conducting large scale cyber attacks that have significant national security implications. Given the infinitely complex nature of interconnected systems and the countless nuances and facets as illustrated in the previous systems, the realisation that these technology problems do not have single silver-bullet technological solutions, or often, any technology solutions at all, is paramount. One incorrect technology regulation, well-spirited but lacking technical depth and understanding of nuances could have disastrous consequences far worse than what the regulation attempts to solve in the first place. For instance, any sort of weakening or "backdooring" of encryption which underpins the internet.

Given such complexity and the extremely high stakes, matters that can affect national security and sovereignty, the number of technology regulations that come out regularly across the spectrum, from various financial regulators, law makers, and industry bodies, one shudders to think about that one poorly thought out bullet point that slipped through the cracks, which could have wide ranging negative implications. Of course, technical expertise does not magically solve all cyber security implications just like with any human endeavour, but it can reduce the scope of errors by orders of magnitude. After all, one seeks medical advice from expert doctors who give advice based on hands-on and current medical knowledge and experience. Why would technology be any different?

On technical expertise

I have observed that, often, committees that are constituted for formulating technical laws and regulations involving technical experts from various domains and industries, have a very liberal interpretation of "expertise". Technology changes so rapidly that what was an industry standard just two years ago could be at the verge of obsolescence today. Unless one is immersed in the thick of it with hands-on involvement and experience, one can easily miss critical nuances. Technologists from the yesteryear who are no longer actively involved with current technology and administrators with technical education from eons ago may not be equipped to take objective technical decisions on cutting-edge encryption algorithms or security features that are pertinent today. The technological knowledge gap widens exponentially and quickly.

I suspect it may be inherent in the nature and legacy of institutions, both of which stand in contrast to the break-neck pace of technological changes, a relatively recent phenomenon, that their framework for technical expertise often does not incorporate hands-on and current expertise. At the peril of having used the term hands-on too many times, I would stress that it is absolutely vital to any sort of technological decision making. Academic qualifications or experience from the yesteryear often have little bearing on current technical implementations.

Ironically, and often, the solutions to technical problems are often non-technical. In the chaos of the technology landscape, it is often easy to miss sight of the most critical aspect, the human element. Be it protecting a user from cyber attacks or ensuring their privacy or protecting an entire nation's critical infrastructure that is vital to its citizens, at the end of the day, the weakest link in the most sophisticated technological setup is a human. After all, humans create technology in their image to solve human problems. Technology and data regulations, thus, need a holistic and pragmatic approach in tandem with deep technical expertise, forget meaningful, to be viable and effective at all.

The Indian technology sector that has exploded in its depth and innovation over the last decade, is rich with real technical expertise and talent. As a technologist, as an end user, as someone who works with technology regulations, as a citizen, I would urge regulators and lawmakers to take cognizance of the necessity of developing a holistic and pragmatic approach when it comes to technology, cyber security, and data regulations, and involve real technical expertise alongside expertise on the human element of technology, in the process. The stakes are way too high to even comprehend.

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UMAKANT SONI

Co-founder & CEO

ARTPARK (AI & ROBOTICS TECHNOLOGY PARK), INDIA

AI Wave and Ethical Dilemmas for the Decision-makers for Inclusive AI

AI Wave and Growth Possibilities

The Artificial Intelligence (AI) wave is going to be exponentially larger than the Information Techonology (IT) wave with Data as the new gold and is expected to create an additional economic value of US $15.7 trillion by 2035.[1] This has massive implications for technology change, societal innovation, and business innovation; and we are being poised to leapfrog from a knowledge economy to an intelligent intangible experiences driven, so-called experience economy.

AI is often talked about as the ability of machines to perform tasks like thinking, perceiving, learning, problem-solving, and decision making. This transformational capacity of the AI technology revolution has been compared to that of electricity, leading to the “Fourth Industrial Revolution” (4IR).[2]

Initially propagated as a technology that could mimic human intelligence, AI has evolved in ways that far exceeds its original idea with multiple application areas. With massive advances made in data collection, processing, tagging and computation power that stretches to the application edge, AI systems can now be deployed to take over multiple tasks with or without humans in the loop, enable connectivity, and enhance productivity. AI’s capabilities have dramatically expanded over the years in multiple waves and so has its utility in a growing number of fields.

The AI wave is different in the ways in which rapid technology innovation (combination of AI, Robotics, 5G & Quantum technologies) is going to occur together with business model innovation (digital-intangibles-driven experience economy). The derivative effects of these exponentially growing technologies with business model innovations are eventually going to create an ecosystem of consumers who are hungry for a digital experience-driven economy. A case in point is Amazon’s Alexa, which creates the digital experience of owning an intelligent assistant that will provide a personalised

experience in anything we do, be it shopping, travel, eating out, movie watching, and so on.

Global stock markets are seeing this shift very clearly, which is accelerating very rapidly post-COVID with 90 percent of the perceived value being in intelligent intangibles.[3] It is important to see this impact in its entirety and with clarity. Wall Street Journal ran a story[4] on how the Big Tech firms became bigger post-COVID amassing almost US $8tn in market value, while the non-digital struggled to cope with the pandemic (see the fig. below).

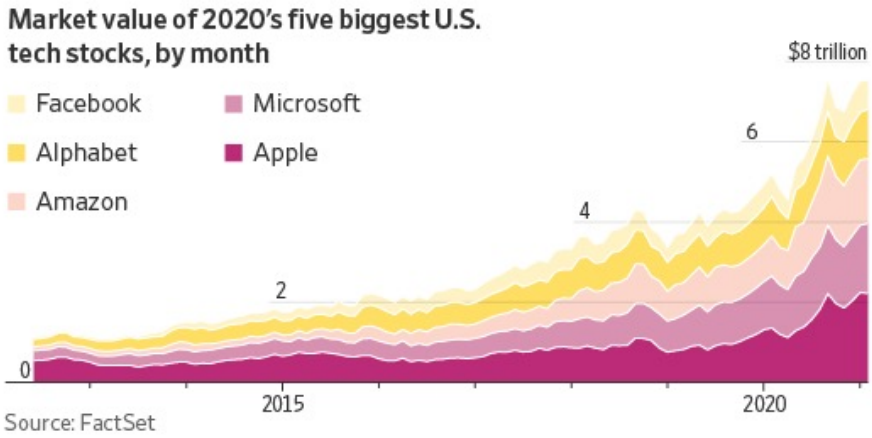

Fig 1: Market value of 2020's five biggest U.S. tech stocks, by month[5]

In the foreseeable future, courtesy AI, digital economies will start reaping rich benefits because of resulting massive cost advantages in labour and time. AI will penetrate more broadly and deeply because of the AI and Machine Learning (ML) processes, wherein machines increasingly learn and improve their performance with time, in turn flowing more investment in capital and talent towards AI. This rapidly iterating loop will create massive growth for companies and countries that can master the AI wave, and because of the cumulative impact nature of AI, it can give rise to massive monopolies unless we are able to create inclusive innovation ecosystems with strong AI governance and accountability at global scale.

Important new trends and challenges

While the AI wave is gathering capital and talent, policymakers would be hard pressed to explore and pursue equitable and inclusive growth for not just developed regions, but also for developing regions like India. There are three major trends encompassing technology and business model innovation that are critical to ponder on and for policymakers to notice and act upon.

Era of "HyperInnovation", implication of rapid change

Unlike the previous two waves of internet and mobile, where technology change was followed by business model change, the AI wave is resulting in technology innovation and business model innovation happening simultaneously. If you look at the technology

innovation of the internet, it was followed by the rise of e-commerce by almost a decade. Mobile usage followed the same pattern, with business model innovations of the share economy based on location following after a while. However, for the AI age, it is different. Technology changes are rapid and are co-evolving with business model innovations. For example, innovation in driverless cars together with ride hailing business models could signal a big shift in mobility. This is going to result in an era of "hyperinnovation", where multiple verticals will get disrupted quickly with a much faster rate of innovation and adoption. "Resources as a service"[6] (RaaS) business model, where the consumer is changed based on the usage of an AI feature or system or bots—an evolved version of Software as a service (Saas) model—would not only change the way we pay for healthcare, or financial services or mobility, but also drive a very different adoption pattern in different parts of the world. For example, you might be paying for a knee surgery by a robot surgeon, based on how many miles you might be walking in the near future. While it might make healthcare more accessible and affordable even in the remotest of places, it will have a deep impact on the provider-led health care systems that most countries have. It will force most nations to adopt a patient-centric model. Our governance system, from regulation to policy, also must reflect these dynamics driven by the rapid pace of AI innovations. We all suffer from human biases, however, technology like AI has the ability to scale these biases at exponential levels and much more quickly with these iterative technology and business loops. This presents a challenge for us as a society to adapt to a much faster rate of change and obsolescence, unless we are able to create a system of well-governed, responsible AI along with the innovation ecosystem. Further, the hyperinnovation loop has the potential to create a wider rift of 'AI haves' and 'AI have nots' in a very short period of time, unless we are able to create a model that spreads the fruits of AI innovations more evenly.

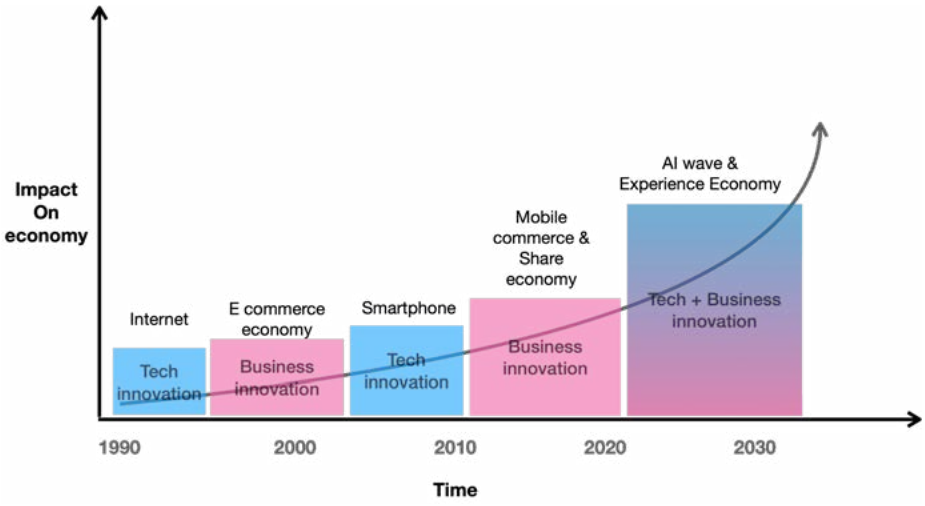

Fig 2: AI Wave and experience economy[7]

Rise of Transformers

Innovations in AI (Compute, Data, Storage) combined with the Internet of Things (IoT) (for autonomous actions) & 5G (for always-on, low latency communication) are leading to a completely new kind of technology core with AIoT (Artificial Intelligence of Things) first architectures, where core business models are built around a set of new technology innovations. By observing the action or behaviour of, patterns among, and relationships between key entities—for example, words in a story or cats in a video—the system bootstraps an overall understanding of its context by itself, referred to as unsupervised learning.[8] Unsupervised learning can scale AI quickly and lead to adoption across multiple verticals.

Unsupervised learning is already finding a transformative impact in natural language processing (NLP), where it is getting adopted at a fast clip, courtesy of a new unsupervised learning architecture known as the 'Transformer'. Presently, the technological breakthrough is the release of the Transformer, Generative Pre-trained Transformer 3, called GPT-3[9] from OpenAI, which enthralled the technology and business world together. It can now write decent poetry, generate functioning code, compose useful business memos, write articles about itself, and so much more, by leveraging massive data, with around 175 billion trainable parameters. While early use cases are frothy, they point towards an interesting future. Wu Dao 2.0, the largest language model to date, with 1.75 trillion parameters, has been another success of this approach. It has surpassed OpenAI's GPT-3 and Google's Switch Transformer in size. Chinese government-supported Beijing Academy of Artificial Intelligence (BAAI) backed Wu Dao 2.0 and aims to enable 'machines' to think like 'humans' and achieve cognitive abilities beyond the Turing test.

Such transformers might completely break new grounds in AI and create horizontal utilities, which can be leveraged by nimble startups to build on top of their customer use cases with differentiation and added value. This approach might eventually spill over to the other major areas that AI is exploring. However, this approach might be too data and compute-intensive and could be counterproductive in the longer term from an energy perspective.

Privacy-aware computing and fight for learning data

One of the overarching challenges of the AI-driven experience economy is building AI while ensuring data privacy. Because data is the lifestream of modern artificial intelligence, data privacy issues play a significant, and often limiting role, in AI's growth trajectory. Harsh data protection regulation robs AI of the most transforming impact brought about by deep personalisation. However, for ethical reasons, personal data has to be protected and provided only with consent. Current architectures have an "either or" approach to data collaboration, limiting the amount of data from which AI systems can learn, without infringing upon privacy. The fight for open learning data is going to become a major challenge for the AI-driven age. The current model of a few companies amassing massive amounts of data and computing capabilities to drive deep learning AI, coupled with the diminishing role played by the universities struggling with flight of AI talent[10], can be counterproductive for future growth of inclusive innovations. Rise of privacy-aware AI with confidential computing is worth noting in this regard.

A framework for sharing of privacy sensitive data like a citizen's financial or health data has been proposed by Government of India's Niti Aayog and is called the Data Empowerment and Privacy Architecture (DEPA)[11]. It incorporates privacy and active consent by design. Profiting from data is important from a developing nation's perspective as people are becoming data rich before they are asset rich. The key aspect of this architecture is the concept of a consent manager, whose role is to acquire consent from data owners, with this consent being captured in a standardised format based on an XML schema. This approach is promising and combined with technology advances in using secure trusted hardware enclaves, it could be a game changer. Although encrypted storage and network sessions typically protect data under most circumstances, the use of shared infrastructure and services like cloud instances and containers potentially opens applications and data to attack while they are executing. Furthermore, since the data must be unencrypted during code execution, it doesn't matter how securely it was treated during storage or transport. Instead, the only way to guarantee data security during application execution is by exploiting hardware features now included with modern processors called trusted execution environments. This would ensure that secure data collaboration would be more widely and, more importantly, securely accessible. This, in turn, will create more trust among data owners for collaboration, allowing for far richer data to be available more widely. This would lead to more inclusive development and advancement of AI with alternate data models.

Approach for creating an inclusive, robust and fair innovation ecosystem in AI

The big question in the eyes of policymakers and regulators is how to make sure that we have an inclusive and equitable AI growth ecosystem, while promoting the development and adoption of ethical AI. While the problem is deep and current technology challenges ensure that the AI future is currently held in hands of a few, there are few key possible enablers for an inclusive and fair future.

AI ethics and standards: Very similar to the three laws of robotics propagated by Asimov, nations need to adopt a common minimum standard and a uniform approach to ethics. While each nation might have different policy and regulation framework, common minimum standards will ensure that ethical essentials are not ignored.
Open and verified Data Banks: Open data banks contributed by the government and corporate partners in a privacy-preserving model, which incentivises the data owner and data fiduciary as well to create a win-win for all the stakeholders. These data banks should be rated with respect to the inherent biases they carry, so that system builders have acute awareness and understanding of them, while creating innovations.
Open Talent: Open Talent via encouraging academia to train/reskill talent, supported by government support or subsidy and providing R&D subsidies to open or join startups via venture studio model. This would ensure that young talent would flow towards innovation ecosystems.

Domain: Open Innovation is driven by domain advisors from all across the globe, facilitated by consortiums, government and academics with a perspective to drive AI standards in domains.

Research: Enable open and networked research models funded by large cooperatives, foundations, or large companies as part of corporate social responsibility and made open for co-innovation by all the stakeholders. This would ensure that innovation will spread more evenly with much better quality of research output.

Capital: AI innovation venture funds and debt funds partially funded by government and supported by industry with reduced tax structure to attract capital participants will create more even capital availability.

The road to the AI age is tricky and treacherous. How we, as a society, will wake up on the other side of it depends upon both innovators and policymakers. A too harshly regulated environment could kill innovation, while an unchecked and unmodulated ecosystem could create changes that are too radical and too fast for us to adapt to as a society.

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SHINJINI KUMAR

Co-founder
SALT (MYSALTAPP), INDIA

Technology, Sustainability, Policy—It Takes Three to Tango

In many ways, all technology is about aiding human effort. The wounded lioness has no help to hunt and must die of hunger. The weak human species, on the other hand, can not only protect themselves, but can hunt the stronger beast down, conquer severity of weather, and move faster than the fastest animal with the help of wheels, engines, or space technology. In brief, technology has helped humans to own the planet and its resources, to overcome hardships of nature and make their lives comfortable.

Unfortunately, this march of technology has also created its own set of problems. A large number of people still face hunger, and fear unnecessary violence, calamities, and pandemics. The future looks bleak for many as disruptive technologies lead to "the rise of the useless class"[1] as Yuval Noah Harari famously calls them. On the flip side, it is now almost incontrovertibly accepted that the planet is on the brink. There is an urgency to make decisions and choices to slow or halt this fast escalating descent into chaos. To that end, the Sustainable Development Goals (SDGs)[2], drafted by the United Nations in 2015, with the goal to achieve them by 2030, are the critical 'blueprint to achieve a better and more sustainable future for all'.[3] In this article, we will discuss the role that tech companies can play in getting us closer to the SDGs. We will also talk about the role of capital providers and policymakers in facilitating and actively creating the success metric for this much needed and worthwhile objective.

The Context: How Did We Get Here?

"But this tractor does two things—it turns the land and it turns us off the land." The Grapes of Wrath, John Steinbeck, 1939

To turn the land to feed more people is what the tractor was supposed to do. That was technology. But it is also true that it caused misery to small farmers by turning them off the land. In this world view, the few, who can use and own new technology, become

the winners, whereas losers (who could be large in numbers) become the responsibility of the state, which deals with it with varying degrees of effectiveness, rarely perfectly. Eventually, if this causes strife, misery and poor political outcomes, it becomes a "zero-sum game"[4] for all.

However, the utopian view of technology, or techno-utopianism, has prevailed for a good reason. The naysayers get left behind because the very technology they dislike or refuse, excludes them. History is written by the victors who are celebrated, while those pointing out gaps and deficits come across as cross and negative. But with digital technology, this is changing. Like never before, humans have the ability to bypass the constraints of physical space and can form communities and interest groups to articulate needs, demands, protests and hold governments, leaders and industry accountable in a much more direct way.[5]

Trust structures in society are changing fundamentally as more power (computing, social networks) is in the hands of users and creators. With distributed ledger and blockchain, this disruption goes much deeper, wherein, it becomes possible for people to build and run their own currency or ownership systems. On the other hand, new types of intermediaries (aggregators, platforms, gateways) have emerged.[6] Take, for example, the taxicab. When you enter a yellow cab, you rely on the license plate granted by the state to the driver. You enter the cab with the assumption that the driver will charge fairly and take you to your destination. On the other hand, when you 'Uber' it, both you and your driver are relying on the contract with Uber, the platform, to settle your ride and payment respectively. While the state is still a stakeholder because of roads and taxes, its role in enforcing this contract is now altered and the Platform has entered as an implicit enforcer of contract. So, it is unfair to expect that government and multilateral institutions should and can take care of all problems, without active participation from others who exercise tremendous power and access huge amounts of capital. Also, given the magnitude of the problem, it is obvious that any decent shot at achieving the SDGs will have to involve all stakeholders—the Masters of the technology universe, entrepreneurs, capital providers, policy makers and regulators. In short, we all need to give our best to achieve the SDGs.

"BUT THIS TRACTOR DOES TWO THINGS—IT TURNS THE LAND AND IT TURNS US OFF THE LAND."

—THE GRAPES OF WRATH, JOHN STEINBECK, 1939

Entrepreneurship now: "With great power comes great responsibility"

Against this this backdrop, innovators and entrepreneurs of today have a mantle that is different from their predecessors. They have the privilege of accessing capital from sources other than the tightly regulated capital markets. Because of social media, they have the ability to engage their users directly and exercise great influence over them. However, with great power comes great responsibility. Entrepreneurs need to use their power and capital to build a better world. It is also in their business interest. Today, a single tech company owns more data than most governments of the world put together. While not obvious, the truth is that even as users are contracting with the tech companies willingly and sharing data, they also expect them to behave responsibly. Not meeting this expectation can surprise you with legislative action or it can just take you down with the next clarion call for 'cancel'.

Businesses and business leaders are prone to delivering on metrics set for them. Stock markets and analysis over generations set the agenda for business leaders to become more 'efficient' and demonstrate continuous profitability improvement. This, as we now know, may be good for shareholders to build wealth, but has not been good in dealing with pollution and crime and exclusion.

With the agenda now being clear in the form of the SDGs, entrepreneurs can take practical steps, including, but not limited to the following:

- Do not abdicate. It is not going to happen by itself. Nor is it possible to push all social responsibilities to governments. Take this as your responsibility, just like fund raising or client growth.

- Recognise the interconnectedness of things. You may think your business is about deep tech or B2B and, therefore, its application to sustainability or otherwise is the responsibility of the users. Or, you may, like us at SALT, think that your entire business is about an SDG and, therefore, what more can you do to help achieve it? But both scenarios and attitudes would leave out a deeper understanding and a practical application at design stage, which would have cascading negative impact.

- Question the metrics set for you by your investors, shareholders and discuss the sustainability agenda with as much passion as your business plan. Further, set the agenda for your team accordingly.

- Design for the interconnectedness of things consciously.

- Assess your success and talk about it with teams, stakeholders and the wider world. Your influence can go a long way in setting the agenda for other innovators, entrepreneurs, and investors.

- Build Human Resources practices for diversity and inclusion and inclusive leadership.

- Do not kick the governance and sustainability can down the road to pick up once your product is ready, or fundraising is done. Worse, do not wait for your Initial Public Offering (IPO) and your banker to lead you into the light. Good governance, diversity and inclusion are investments that have V-shaped rewards. The ingrained idea that we will do it later because compliance costs are high pales in comparison to the positive argument that it is our opportunity to get it right because we are new and have no legacy.

- Do not wait to give back. Ask yourself what you would like the world to be like for your children and start to make it happen right away. Fund other startups who are building in your ecosystem.

- Be aware of externalities and application of your innovation at every step and allow it to be questioned. If you find unexpected positive externalities, maybe even prioritise it. At SALT, for example, we started with the goal to close the persistent gender gap in finance. Our team challenged us on our efforts for the LGBTQ community. This has helped us continue to push ourselves to greater inclusivity, even though we started out from what we thought was an inclusive agenda.

Governance Now: Downside Protection is Not Enough

So, what is the role of public policy in all this? As much as the agenda setting on sustainability has become decentralised and young people like Greta Thunberg are empowered to play a role, governments and regulators continue to shoulder the largest responsibility to fast forward or slo-mo a sustainable world. It may sound presumptuous to put down an agenda for this already empowered set of institutions, but, there are a few recognized suggestions that can be further enriched by practitioners of public policy.

- Recognise that small is not just a small version of the big. Small entities have different opportunities and challenges. If given the right incentives, they can and should take a fresh approach to solve chronic problems. This becomes difficult if small is just a small big company.

- New technology is creating paradigm that is substantially different from the old and the opportunity to address the SDGs afresh exists. Allow for new business models and make new rules if need be. One thing we discover almost on a daily basis while working on financial products and decisions for women is that old rules just do not help. For example, most financial regulators have rules to prohibit mis-selling of financial products that the buyer does not understand. This has largely translated to women in general, and housewives in particular, not even being shown equity products because their risk classification by default is low. This further perpetuates the stereotype of women being risk averse, when they were not exposed to risk in the first place. Similar examples exist for credit, even though actual data demonstrates that women take well considered investment decisions and are creditworthy. The ability of new technology to build trust, and to put power and information in the hands of the consumer are all constrained because rules are built for incumbent technology.

- Proactively find those who are likely to move the needle and create supportive regulation/legislation. Rule bound implementation of legacy systems with minor tweaks ends up privileging the entrenched players. While it minimises disruption and risk, it also minimises change.

- Indian regulatory institutions have an impressive legacy of proactive infrastructure development, especially for the benefit of the masses. Great examples of this are microfinance regulation[7] (before it swung to the other extreme under different state laws) and payments regulation[8]. Also, the Banking Correspondent regulations that helped over 400 million Jan Dhan Yojna accounts to be opened in a relatively short span of time did a lot to close the financial inclusion gap. [9] Expanding this to specific SDGs related agenda can be very powerful.

- This may call for some amount of positive discrimination, that is currently limited to certain tax benefits. This is a limited toolkit because, in any case, not too many new businesses can look at fiscal benefits as a driver of business. Regulators, on the other hand, have more effective tools, but they almost exclusively design for protection against failures and frauds and impose large downside risks of failure, thus, inhibiting innovation.

- Recognise that great is the enemy of good. By leaving swathes of people outside education, finance or healthcare, there is worse damage that is done than by promoting innovative access. Take note of what makes you uncomfortable and deal with it through dialogue and collaboration with industry rather than block it.

- The travesty is that new tech is always made to hitch its wagon to existing players. because ‘known devil is better than unknown friend’. There is a need to understand that for the consumer base to be included beyond the ‘safe’ customer, the supply side needs to have different propositions, including the standard propositions.

To summarise, human physical effort is limited, human imagination is unlimited. While achieving much ‘progress’ through technology, the world continues to also deal with basic problems of hunger, poor health, exclusion and lack of basic amenities. The SDGs, a commonly accepted set of goals and agenda, exist with the timeline of 2030. There is a need to bring stakeholders other than governments on to this agenda. To be successful, it is imperative that industry leaders, particularly in the tech industry, recognise and shoulder this responsibility directly, as a business choice, rather than as a compliance burden. Policymakers and regulators can make this happen through proactive collaboration and recognising that the past is a good predictor of the future to tell us of the damage that can continue, but the reversal of it requires a break from the past. Therefore, iterative effort needs to be encouraged and a more active positive discrimination from capital providers and policymakers is required because we are past the point of slow and steady. We need to accelerate and reverse, and with a sense of urgency.

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MORSHED MANNAN

Max Weber Fellow, European University Institute

Right

SAIF KAMAL

Founder, Toru Institute of Inclusive Innovation

BANGLADESH

Financial Inclusion through Fintech: Building Confidence and Encouraging Adoption of Emerging Technologies in Bangladesh

In the early 20th century, credit cooperatives were organised by the colonial Government of India to protect rural communities in Bengal from usurious money lending practices, and to encourage self-help in these communities. By pooling their capital and governing the enterprise collectively, they would be able to practice thrift and self-reliance. The Government sought to build public trust in primary, village-level cooperatives by setting up central banks and a Bengal Provincial Co-operative Bank to guarantee the credit of the cooperatives and access wider financial markets. In the words of Iftekhar Iqbal, it was expected that the promotion of such cooperatives would unleash the "hidden wealth" of East Bengal.[1] In spite of this optimism, credit cooperatives were vulnerable to both endogenous and exogenous risks.[2] These ranged from opportunistic behaviour by the members to defraud one another to the collapse of agricultural incomes due to credit crunches and famines. This shook public trust in these cooperatives.[3] However, in Bangladesh, cooperatives of various types continued to be seen as being a strategy for decentralised rural development and social capital formation. This popularity can be seen in the 196,154 cooperatives with 11,649,307 members that exist today, many of which were formed under the auspices of the Bangladesh Rural Development Board.[4] These range from housing and milk production to distribution and women's cooperatives. In spite of the contributions of the cooperative movement to Bangladesh's socio-economic development, several of them suffer from reputational problems and trust deficits. First, for excessive bureaucratic control by the State, and second, corruption and financial mismanagement by cooperative officials and members.

Alongside cooperatives, Bangladesh witnessed experiments with microfinance, in which small loans were extended to impecunious villagers without requiring collateral. These loans were instead guaranteed using community-driven "trust", where the joint and several liability of a community assure the return of individual loans. Microcredit was granted by state banks, statutory public authorities, specialised rural banks and non-governmental organisations. On the one hand, the micro-loans extended to 40 million unbanked people in Bangladesh—primarily women[5]—are considered to have been essential for gender empowerment and breaking the poverty cycle in rural communities. Yet, on the other hand, this system has been criticised for its prevailing high interest rates and limited success in reaching the ultra-poor in the current era. Currently, most banks use microfinance institutions (MFIs) to disburse their agriculture loans, escalating the cost to the borrower to an interest rate of 25 percent and more. Bangladesh Bank data from the 2019-2020 fiscal year shows that 63 percent of farm loans, amounting to US $857.23 million, was disbursed through microfinance institutions.[6] According to The Daily Star, in spite of financial regulations setting an 8 percent maximum interest rate for farm loans, and a requirement for banks to disburse a minimum amount of farm loans a year, these regulations are often flouted due to cost-saving measures and poor supervision by public authorities.[7] The inaccessibility of loans from traditional banks and the high interest rates levied by MFIs, place borrowers in an uncomfortable bind.

While reliance on a community network mitigated the financial risk of extending loans to a populace with negligible collateral, crucially, it exacerbated social tensions within these communities. The most vivid illustration of this is the occasional practice of ghar bhanga (house breaking), in which the house of a (typically female) loan defaulter is sold off by other women-members who are collectively responsible for the loan, prompting recriminations and even suicides. A system built on collective trust is then, instead, replaced by mutual distrust and an "economy of shame".[8]

In short, the examples of cooperatives and microfinance institutions both show the possibility of trust relations being abused in various ways.

Adopting FinTech

Today, as Bangladesh embraces the emerging technologies of the 4th Industrial Revolution (4IR), there is a convergence and cross-pollination of sectors and functions that worked in silos previously, such as finance, technology, rural development, amongst others. As a consequence of this, we can see how the use of data can drastically reduce risk and increase transparency for financially high-risk communities. The development of financial technologies ('fintech') can, potentially, serve these communities with fewer costs than methods tried previously. New age tools like credit scoring applications and personal finance platforms provide the means for avoiding some of the aforementioned abuses of trust by both institutions and community networks. Use of these emerging technologies have already been initiated by many startups, with the objective of addressing existing pain points: To lower dependence on community performance, greater monitoring of an individual's performance, as well as increased self accountability and transparency.

A noteworthy example to start the conversation on unlocking the potential of fintech is bKash.[9] It provides safe and convenient ways to make payments and money transfer services via mobile phones. Currently, it is one of the leading Mobile Financial Services providers in the world with 45 million users.[10] bKash sought to address the pain point of transferring money from urban city dwellers to their families in rural Bangladesh. Over the years, they built a robust agent network; adopting various techniques that non-tech sectors have used in the global south. These process innovations that were human and talent-centric helped the company establish itself, laid the foundation of the fintech ecosystem and shifted behavioural patterns of users. Complimentary to mobile financial services, we are now seeing the emergence of agri fintech, supply chain fintech companies and much more. Lenders can use financial and behavioural

data that is shared with them by farmers or shopkeepers to learn about their crop cycles, consumption patterns, sales outputs, previous payments etc., which can be used as a substitute for collateral, replacing a community-based borrowing system. ifarmer[11], for instance, allows the urban populace to support farmers to produce goods by availing a lower cost of capital than their existing sources. Further, small entrepreneurs are being supported by ShopUp[12] through end-to-end service of sourcing, delivery and loans. Another upcoming startup named Supplyline[13] is solving not only procurement challenges of small shopkeepers, but by tagging a digital line of credit to the shopkeeper's ID, it provides greater transparency over shopkeepers' data for lenders and brands. Bangladesh government policies have also become more welcoming to financial innovations. The Ministry of Post & Telecommunication has invested in the fintech startup Nagad[14], whose entry and customer acquisition has brought about healthy competition.

In sum, these are some emerging companies using technology to enable the continuous monitoring of various parts and aspects of the capital flow across the financial ecosystem, rather than debt default events that rely on a one-size-fits-all loan repayment schedule. We, thus, effectively see the use of an individual's data as collateral rather than their peers' assurances. MFIs and cooperatives are themselves also experimenting with fintech for a range of purposes, from tracking credit scores of member-borrowers to managing warehouse inventories.[15] As such, these technologies may be said to build confidence among lenders and borrowers in credit markets, instead of relying on the vagaries of institutional, interpersonal or community trust.

Usually, financial technologies face two main entry barriers: Lack of confidence in the technology and low trust in businesses developing these technologies, leading to hesitation in adoption. Sociologists, such as Georg Simmel and Anthony Giddens, argue that confidence, in contrast to the related concept of trust, is a person's state of expectation about the future that depends on a "weak form of inductive knowledge", derived from their experiences, evidence on how a system operates, or reliance on experts.[16] Trust, including in the examples mentioned above, is not merely a cognitive state, as it requires communication between at least two persons, where at least one makes themselves vulnerable to another's potential betrayal. While trust may be lost due to a single breach, confidence is more resilient, as it requires a more fundamental shift in a wider context.[17] This distinction is helpful in thinking about how people adopt technology, as it explains that people may have confidence in a particular software application due to its proper and predictable functioning, even in a low-trust, uncertain environment. Even if people lose trust in a particular e-commerce platform company or CEO due to a corporate scandal, this does not necessarily diminish general confidence in how e-commerce platforms operate. People have evidently gained a high degree of confidence in digital financial services, especially during the COVID-19 pandemic. In July 2021, there were digital transactions of US $7.36 billion[18] in Bangladesh. Nonetheless, only 7.7 percent of the population currently uses digital money transfers. Building both confidence and trust will be central in ensuring the further adoption of these technologies.

"CONFIDENCE IS MORE RESILIENT, AS IT REQUIRES A MORE FUNDAMENTAL SHIFT IN A WIDER CONTEXT."

Risks of adopting financial technologies

There are a host of obstacles to building this necessary confidence and trust. Firstly, there is the possibility that the software used by a financial service provider may not function or may contain vulnerabilities. This not only diminishes the user experience, but also exposes users to hacks. Cybersecurity threats are a material risk for fintech companies as, according to Kaspersky Labs, Bangladesh is one of the countries most vulnerable to malware attacks through smartphones.[19]

Secondly, even if adequate security measures are taken, in the absence of framework legislation on data protection, the use and processing of data for unforeseeable secondary purposes remains an open possibility.[20] This lack of certainty about how a user's data may be used could lead to a lack of trust in fintech startups.

Thirdly, the transparency afforded by such technologies could potentially be abused by public authorities. For instance, user transactions could be placed under surveillance under broadly-phrased grounds of national security. Despite the High Court Division of the Supreme Court of Bangladesh recently finding the collection of private phone records without a warrant or knowledge of a user as being violative of the user's constitutional right to privacy,[21] section 46 of the Information and Communication Technology Act, 2006 still gives sweeping powers to the Government to intercept and decrypt "any information to be transmitted through any computer resource" if national security or public order grounds exist. While there are valid reasons for why the Government may wish to monitor certain information, particularly in the effort to tackle terrorism financing, privacy concerns may also deter people from using fintech applications that require the disclosure of sensitive data about finances or personal networks.

Fourthly, from the perspective of the fintech company, the development of new software for public use can also cause potential conflicts with both public authorities and users. The software could be deemed to violate local laws or challenge social norms. The business model and investment strategies of the company itself could, in certain instances, infringe consumer protection and securities regulation, leading to distrust among three important actors within the ecosystem.

Policy: Regulatory Sandbox

bKash benefited from their association with a well-established institution: BRAC Bank. This allowed bKash to focus on innovation towards a product-market fit, while BRAC Bank, among other things, ensured regulatory compliance. Newer fintech startups also require support. We are of the view that policy support is required for innovative businesses to safely design, test and iterate their products.

One approach towards building mutual trust among these actors, as well as confidence in financial technologies, is to create a FinTech Regulatory Sandbox. A regulatory sandbox is a controlled environment in which early-stage companies are allowed to test their products and services with a limited group of consumers, while being exempted from the full application of certain regulations and laws. The regulator that administers the sandbox is responsible for authorising admission, overseeing the experimentation with the products, and evaluating performance. Importantly, the regulator also evaluates whether the application can build in technical safeguards to protect consumers or whether general consumer and financial regulation needs to be applied once the firm exits the sandbox. This avoids black-and-white decisions about whether a certain product or service is prohibited, by instead focusing on how these products or services may be tailored to address certain policy concerns. In this way, some of the aforementioned risks of technology adoption may be addressed through a process of mutual learning, without suspending the use of the technology altogether. In the Bangladesh context, there are uncertainties about how authorities will perceive financial products and services that are not explicitly addressed in criteria set by recent digital finance regulations, such as the Mobile Financial Services Regulations, 2018, the Prudential Guidelines for Agent Banking Operation in Bangladesh, 2017, and the Bangladesh Payment and Settlement Systems Regulations, 2014. This includes, for instance, products that have both banking/financial and non-financial components. As an official from the UN Capital Development Fund has previously suggested, the Bangladesh Bank itself could be the regulator responsible for the sandbox and could coordinate with other regulatory bodies such as the Bangladesh's Insurance Development & Regulatory Authority (IDRA), Microcredit Regulatory Authority (MRA), and the Bangladesh Securities and Exchange Commission.[22]

This potentially has benefits for all three actors, if the sandbox is implemented properly. For the startup, this means less uncertainty about future enforcement actions and regulatory approvals, quicker time-to-market, and greater investor confidence. Public authorities will benefit from an understanding on how an emerging technology will affect consumers and financial markets, as well as provide an evaluation of the existing regulatory regime. This will also allow for an assessment of whether reforms to existing regulatory regimes are needed, such as changes to current disclosure requirements or new safeguards for over-the-counter trading.[ ] For the consumer, they can be confident that the application they are using has undergone testing with other consumers and has been authorised by regulators after careful review. Thus, the creation of a regulatory sandbox can both build confidence in a particular financial service or product, as well as trust in the businesses and organisations that are responsible for its administration.

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DEENA JACOB

Co-founder and CFO

OPEN FINANCIAL TECHNOLOGIES, INDIA

The role of regulated entities in driving financial inclusion: Open's perspective

Aptly termed Global Goals[1], People, Planet, Prosperity, Peace and Partnerships define the key themes of The UN Agenda for Sustainable Development Goals (SDGs), 2030. [2] Signed up by the Member States in 2015, with the UN defining and championing the cause, SDGs are designed as a collection of 17 interlinked goals with 169 targets to achieve a better and sustainable future for everyone by threading together economic, social, and environmental dimensions. Over US$ 20 trillion investment, with more than 70 percent coming from high income countries,[3] has been deployed in meeting these goals and the UN has designed the implementation framework with definite areas and targets for effective implementation.

The aim is to end poverty and other deprivations, and this must go hand-in-hand with the strategies that improve health and education, reduce inequality and spur economic growth while simultaneously tackling climate change to preserve the planet. The achievement of these goals will require all hands-on deck and the UN global partnerships to ensure its implementation. Each goal has specific targets, ultimately leading to the world being a better place by 2030 by making it more sustainable, equitable and prosperous.

All Member Nations have adopted the SDGs and aligned them with their national development agenda. In India, it is heartening to see steps being taken in the right direction with the SDG Vertical being set up by NITI Aayog, where they are working closely with key stakeholders including the government, private sector, academia, think tanks, research organisations and multilateral organisations to fast track the achievement of the SDGs.

Since the areas to be addressed touches upon a wide range of issues that could vary in complexity by region and themes, the implementation and execution of goals are only going to be achieved with a cohesive collaboration with a multi-stakeholder approach. The Private Public Partnership is working wonders as seen with radical changes in

the way innovation happened in sectors such as agriculture, banking and financial services, and healthcare, which were led by new-age start-ups and tech companies attracting ample capital to be deployed for building winning solutions. India, with over a billion population, with over 50 percent being rural and 22 official languages spoken has always sought solutions to perineal challenges, namely, financial inclusion and healthcare. We have seen many ways in which the policies and regulations from the Centre—actively taken up by implementation frameworks and effectively advocated and innovated by FinTech companies and banks—setting an example to the world, measured by a Financial Index that considers access, usage, and quality, which stands at 53.9 compared to a 43.4 in 2019.[4]

It is interesting to note how the FinTech sector has evolved in the recent past, enabling and accelerating financial inclusion. India's FinTech market is one of the world's fastest growing markets, 67 percent of the 2,100 fintech entities in operation have been set up in the last five years.[5] India has produced the largest number of Unicorns in the FinTech sector in the last year, taking the overall count to about 16 of the total 65+ unicorns in India. India's FinTech market is now valued at US $31 billion, projected to grow to US $84 billion by 2025. The fintech transaction value size is projected to grow to US $138 billion by 2023 from US $66 billion in 2019.[6]

Forward-thinking regulators' approach to financial inclusion

India's FinTech ecosystem has benefited greatly due to the forward-thinking regulators' approach to how new utilities are jointly built with industry. At Open, we are encouraged everyday by such rapid adoption of new technologies, which drive innovative approaches to solving the needs of customers. It is even more vital for data privacy, data security, and a user-first approach to be fundamental core values in the innovation ecosystem. We are proud to see the entire Indian industry share these values, as is evident in the example of Account Aggregator (AA) and other initiatives like Aadhar, UPI, and the India Stack, which have been tailwinds to lift several industries at once. More financial services-focused utilities are being scaled up, which is driving the inclusion of SMEs and small-town India even faster into the mainstream financial system.

For instance, the AA network has been a recent example of cross-industry collaboration led by the regulators. As per iSPIRT[7], "AA reduces the need to wait in long queues at banks, use complicated internet banking portals, share passwords, or seek out physical notarisation to access and share financial documents securely. Just as UPI, NEFT, or IMPS are key financial utilities for secure flow of money, AA is an urgent and powerful financial enabler for data flow controlled by the individual. Eight of India's major banks have joined the AA network. Together, these banks cover nearly 40 percent of India's banking customers. This move ushers in India's open banking moment and empowers millions of customers with the ability to digitally access and share their financial data across institutions in a secure and efficient manner."

Additionally, iSPIRT stated that AA helped create secure, digital access to personal data at a time when COVID-19 imposed restrictions on physical interactions for services. It also reduces the fraud associated with physical data tampering by introducing secure digital signatures and end-to-end encryption for data sharing. These capabilities in turn open up many possibilities. SMEs in India face over a US $400 billion credit gap[8] that was created by the lack of structured data for underwriting since the country was mainly a cash-based economy. Traditionally, a physical collateral is required for an MSME loan, however, with secure data sharing via AA, 'information collateral'—or data on future MSME income—access to a small formal loan is now a possibility. The industry will see much needed innovation as improved access to data helps meet critical financial needs like small-ticket MSME working capital loans, affordable micro-insurance products, better savings and money management, and others.

UPI remains one of the early and most successful payments and settlement systems any country has seen so far through which the Peer-to-Peer (P2P) and Person-to-

Merchant (P2M) Virtual Payment Address (VPA) based 'Fast payments system' is enabled. Currently, it has 259 banks participating with over 3.65 billion transactions a month, powering over US $90 billion in payments volume.[9] While banks are the enablers and regulated entities provide the infrastructure, FinTechs played a key role in taking the solution to the public in a short span of five years led by popular apps like Phone Pe, Paytm and Google pay to name a few, paving the way towards widespread digital adoption, including mobile-based transfers and QR-based payment methods. Currently, the UPI model is under implementation for cross border solutions as well as recommended for adoption in developed nations including the US.

Yet another critical and overarching step, essential for inclusion and SDG achievement was setting up the Unique Identification Authority of India (UIAI), which was mandated to issue a 12-digit Unique ID to each citizen and validate it at each transaction trigger needing identity verification through a consent-based mechanism. This was a critical foundation laid for the digitally native solutions that came up right from banking, financial services, healthcare, and insurance for the entire billion+ population. Currently, the entire Know Your Customer (KYC) runs on this system, which, in turn, relates to various databases including the taxes infrastructure. Video KYC and O-KYC became a reality during the pandemic just because the infrastructure was already in place.

Bolder moves like providing access to NBFCs apart from banks—both for Aadhar verification for KYC and participation in the inter-bank payments systems and settlement, along with the licenses for Payment Aggregator and Payment Gateway (PA/PG)—all point towards an inclusive ecosystem to pull in digitally strong private players to participate in the ecosystem tightly coupled with the Regulator and Banks.

Regulatory Sandbox approach is yielding results

The intent of the Government in watchfully moving to a digitally native regulation is enabled through Regulatory Sandboxes (RS), picking the key areas that needs to be solved for ease of money movement, settlement, and access to capital. The regulator provides the appropriate support by relaxing specific legal and regulatory requirements for the duration of the sandbox. So far, they have announced three sandbox cohorts, which had relaxed criteria to include start-ups and new players to participate. The first cohort under the RS was on 'Retail Payments' aimed at evolving payments solutions for the unserved/undeserved sections of the society. The second cohort is on 'Cross-border payments' and the third cohort will be focused on 'MSME Lending'

Open had the privilege to be part of the 2nd Cohort in RS, where we developed and deployed a blockchain based cross border payment solution, which is being tested with the first 100 customers with essential regulatory relaxations including limit enhancements that were allowed to implement the solution.

Operating in the FinTech space providing a neo-banking platform for the past four years in collaboration with 15+ leading Indian banks, Open solves the business banking challenges faced by the 63 million+ Small and Medium Enterprises.

Open powers about two million SMEs on its platform, spread across 80 percent of the pincodes , moving over US $24 billion in annual transactions. Open has built a complete Operating System for Businesses crafted specifically for their business banking needs. It is a one-stop solution catering to all the business finance and banking requirements of MSMEs by digitally opening a business current account, bringing sales, purchases, banking, salary payments and tax management on one user-friendly application. SMEs can manage their business and finance processes from one dashboard and oversee all workflows together to get a bird's eye view of operations and focus on decision-making with insightful reports. Open also facilitates business essential services like plug-ins to widely used on-prem accounting solutions like Tally, listing of business on Google my business, running Google Ads directly from the platform, creating an online store to enable sales, to name a few, apart from offering a marketplace aiding demand

growth. Open, via a web-first platform Open.money, focuses on evolved SMEs and through OpenBook offers a mobile first solution focused on the retail customers, which is available in 11 Indian languages. Additionally, we are also building a full stack low/no code and API banking suite to help businesses craft solutions through Embedded Finance for non-finance entities.

Open's end-to-end all-encompassing offering allows small and medium businesses to get an overview of their entire cashflow and helps predict their cashflows. The technology platforms and utilities enabled by Indian regulated entities have allowed Open to develop platforms on top that provide a 360-degree information infrastructure, credit decisioning based on history, and embedded credit at the initiation of a business transaction - all at the click of a button. We aim to bring in financial inclusion and design new ways of providing access to credit for the SMEs through the endeavour.

Needless to mention that the infrastructure, information sharing mechanism and the progressive regulations discussed above, has helped us evolve into an operating system. Depending on the Regulated Entities' license and infrastructure wherever required, and by gaining access to essential licenses directly, we have been able to build a holistic ecosystem, which effectively solved the need for business banking and payments for over two million businesses of all sizes and scale. It has enabled them to predict and manage their cash flows more efficiently by having access to credit through leveraging dynamic transaction data, differentiated products such as embedded lending at the initiation of transaction, underwriting scores based on data patterns, expanding credit to the New to Credit segment, and by building deep tech for doing business cross border, thereby, powering global expansion.

Regulation is key to strengthening India's economic backbone

Evolving into a well-controlled open banking system in a diverse 'Phygital' economy like India, seems intriguing. The foundation is laid by the identification management, both digitally enabled and physically possible framework. It is augmented by an easy inter-operable bank-agnostic payment settlements system that is bank agnostic, which saw a 0-3.65 billion transaction jump in five years.[10] Further, the inclusion of intermediaries and specialised licensed entities to participate in payment enablement and settlement as well as consent management for data sharing to solve access to credit is strengthening India's economic backbone and financial inclusion drive.

Nevertheless, a few regulatory changes that remain desirable are the complete removal of physical touch points when it comes to opening of bank accounts. An example is the 'Original Seen and Verified '(OSV) requirement to be fulfilled by the bank for the opening of new accounts. Currently, this not only hinders new account opening, but also credit disbursal that requires a current account, which blocks many eligible customers access to credit solutions, particularly embedded credit. Another key area that would be very critical is to have digitally native guidelines to define the relationship between the Regulator, Licensed Entities, Banks and FinTechs.

A collaborative partnership will ensure that the right resources are being leveraged while ensuring effective implementation towards a common goal of sustainability and empowerment.

We truly believe the way forward will be for regulatory bodies to be able to balance their policies to address the need of the entities and consumers together. Policies that will enable technology-led innovation, develop financial inclusion, and manage risk while also ensuring growth in the underlying economy and ensuring a trust-based relationship with the end consumer will be the solid foundation for growth.

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Left
YASH NARAIN
Research Associate

Right
AISHWARYA RAMAN
Director and Head of Research
OLA MOBILITY INSTITUTE, INDIA

Driving towards sustainability: A roadmap for leveraging mobility to achieve SDGs

India is at a unique crossroads in history. It is geared with the new-found tools of economic growth to fulfil the exigent demand of its billion-strong population for socio-economic progress and upward mobility. At the same time, a resilient India must chart a path that addresses the looming threat of climate change, and balances growth with equity, prioritising sustainable and inclusive development for all. Enter here mobility innovations and the Sustainable Development Goals (SDGs).

Mobility is central to all such balancing acts between economic progress and sustainability. Access to affordable and reliable mobility solutions is one of the primary determinants of an individual or community's extent of economic participation. It dictates who can travel for education or work and how far; it acts as a limiting barrier on the spaces one can physically access; and even determines the extent to which a city is livable. India's transport sector emits 13.5 percent of the total energy-related CO2 emissions, with road transport accounting for 90 percent of the internal share[1]. With India's road-based energy demand expected to double over the next two decades, drastic and irreversible shifts in existing mobility paradigms are essential for India to sustainably meet its mobility needs[2].

Concerted, collective, and continuous efforts from all stakeholders, including the private sector, constitute today's urgent imperative. India has a rich history of the private sector's innovations being designed for, benefitting from, and servicing the masses. The first wave of Foreign Direct Investment (FDI) in the domestic automobile sector from 1981 to 1991 was premised on the need to "introduce modern, fuel-efficient, and low-cost utility cars ...affordable for "the common man."[3] Even today, cost-effective two-wheelers constitute over 80 percent of total annual vehicle sales[4], while per capita

car ownership rates in India—at 23 per 1,000 population —continue to be exceedingly low compared to countries with similar levels of socio-economic development[5]. Private ownership of a car, therefore, continues to be aspirational and unattainable for most Indians. And this is a good thing. With the omnipresence of ride-sharing options, growth of multi-modal public transport, the seamless integration of passenger mobility and hyperlocal deliveries, encouragement of non-motorised transport, amongst others, a new age of mobility is unfolding in India. India's mobility trajectory has sidestepped the stage of widespread prevalence of private four-wheelers, and is, instead, rushing to create a just and equitable future. Indeed, the future of mobility in India is shared, connected, electric, AI-powered, and autonomous. The future is now and is here to stay, buttressed rightfully by the pillars of Industry 4.0 and stakeholder capitalism, which foregrounds equity, access, and affordability in mobility innovations, embodying the principles of the SDGs.

This chapter will, thus, emphasise on how private sector-led mobility innovations in India are helping to achieve various SDGs, especially SDG 11, which envisions to "make cities and human settlements inclusive, safe, resilient and sustainable."

Sustainable Mobility

Over the last decade, the private sector has pioneered sustainable mobility innovations through platform-driven ride sharing (Ola, Uber), micro-mobility solutions (Yulu, Oye! Rickshaw), and adoption of Compressed Natural Gas (CNG) in shared mobility (Mahindra & Mahindra, Ashok Leyland, Agility Fuel Solutions), amongst others. The major push towards sustainability, however, has understandably come from advances in electric mobility. The launches of highly anticipated, high quality, disruptive products from the likes of Ola Electric and Ather Energy has meant that for form factors like two-wheelers, Electric Vehicles (EVs) in the market are competitively priced and functionally superior to contemporary internal combustion engine (ICE) vehicles. They are more fuel efficient, promise cleaner air and improved societal health, and are considerably cheaper to operate over the long term.

No wonder, EV sales recorded a 236 percent month-on-month increase in June 2021 and crossed the 2 percent mark in monthly new vehicle sales for the first time ever in August 2021, according to data from the Vahan Dashboard. Just the first seven months of this year saw collective investments worth over INR 25,000 crore being catalysed by the electric mobility industry in the country[6]. Table 1 shows the growth in registrations of EVs by form factor.

This growth has been supplemented by electrification of fleets by companies such as Amazon, Flipkart, Swiggy, Zomato, and other e-commerce, hyperlocal delivery platforms, as part of their climate action pledge and to save operational costs[8]. Notably, manufacturers and energy operators like Kinetic Green, Mahindra Electric, Zypp, Altigreen, Sun Mobility and Fortum are enabling this transition.

Private sector-led e-mobility initiatives help combat climate change and its impacts (SDG 13), tackle air pollution and related health effects (SDG Target 3.9), and reduce the adverse per capita environmental impact of cities (SDG Target 11.6). India's FAME II (Faster Adoption and Manufacturing of Electric Vehicles Phase II) alone has achieved a CO2 reduction of over 6,40,000 kg. When powered by clean energy sources, EVs can additionally help in increasing the share of renewables in the energy mix (SDG Target 7.2). Closing the loop to ensure circularity, spent batteries can be mined for precious metals, helping achieve sustainable management and efficient use of natural resources (SDG Target 12.2). Recycling coupled with responsible end-of-life management of used batteries can also substantially reduce waste generation (SDG Target 12.5). A number of Original Equipment Manufacturers (OEMs) and partners like MG Motor India, Umicore, and Tata Chemicals are taking steps to ensure safe and environmentally sustainable handling of end-of-life batteries.

Vehicle Category	2017	2018	2019	2020	2021 (registrations till October 04, 2021)
Electric two-wheeler	1,451	15,433	27,752	27,272	78,433
Electric three-wheeler	84,531	1,14,095	1,31,619	88,140	95,590
Light Motor Vehicle	919	821	678	3,124	6,640
Light Goods Vehicle	914	760	58	11	933
Light Passenger Vehicle	333	807	732	998	476
Multi-Purpose Vehicle	4	8	90	35	251
Heavy Passenger Vehicle	9	36	370	53	586
Other	185	143	13	22	24
Total	88,346	1,32,103	161312	119655	182933

Source: Vahan Dashboard Data 7

Undoubtedly, demand incentives through FAME and state provisioning, localised manufacturing programmes, stimulus under production-linked incentive schemes for advanced batteries, EVs and EV components, creation of charging infrastructure, amongst other incentives, are accelerating the adoption of e-mobility in India. At the same time, a few challenges persist for the private sector. Directives on charging points inside residential societies, open-source charging station directories, vehicle-to-grid integration[9], AI-driven digitalisation of local EV supply chains, fintech initiatives to boost lending for the EV sector, etc. are existing grey areas which should see heightened activity across the policy, regulatory, and business innovation domains in the coming years.

Inclusive Mobility

India's mobility innovations need to continue with their thrust on equity and inclusion. This is important because, firstly, a majority of the population relies on shared mobility (public transit and intermediate public transport like taxis and auto-rickshaws), and non-motorised transport (cycling and walking) for their everyday commute, as is captured in Census 2011[10] and the Ease of Moving Index (EoMI) 2018 by the Ola Mobility Institute[11].

Second, the largest category of women commuters traverse less than 1 kilometre for work. For those who travel longer distances, the use of two and four wheelers is much more uncommon when compared to men[12]. The disparity in the commute patterns of men and women can be attributed to the lack of individual mobility assets for women[13], concerns around safety, pervasively entrenched patriarchal social norms that seek to limit women's economic agency, as well as a consistent deprioritisation in the division of disposable income within the household[14][15].

Another section of the population experiencing barriers in accessing public and private transport are the persons with disabilities (PwDs) (10 crore), and those experiencing reduced mobility due to ageing (40 crore)[16],[17]. At 50 crore, or 42 percent of India's population, i.e., 2 out of 5 Indians, India's transport-disadvantaged community is larger than the combined population of the USA, the UK, France, and Taiwan.

It is imperative that cities pay special attention to fulfil the mobility needs of women (SDG Target 11.2); promote their empowerment (SDG 5); enable economic participation and access to economic resources (SDG Target 5.A); reduce inequalities and promote the social, political, and economic inclusion of all (SDG Target 10.2); and strive for productive employment and decent work, irrespective of any disability (SDG Target 8.5).

A number of private sector-led initiatives are underway to make our cities more inclusive in the mobility domain. Taxshe and Sakha Cabs by Azad Foundation, for instance, work to make travel safer for women by having women drivers ferry women and children to their destinations. Companies like Ezy Mov, Kickstart, and Sarathi provide wheelchair-accessible taxis. Likewise, Neomotion Assistive Solutions have introduced an electrical tri-wheeler which lugs a detachable wheelchair, making the lived environment of our cities more accessible for PwDs.

Of late, AI is being leveraged to service remote areas.[18] Dunzo Digital and Skye Air have recently conducted trials for AI-powered drone delivery of medicines and vaccines under the Telangana Government's 'Medicines from the Sky' project. AI can also be leveraged to make public transit efficient, reliable, demand-responsive, integrated with first- and last-mile connectivity, financially viable for public and private sectors, and affordable for the masses.[19] EVs are also being put to use to attain inclusion goals, with the Delhi Metro piloting the use of Metro Smart Card-enabled electric feeder buses to offer last mile connectivity at select Metro stations.

While such initiatives are praiseworthy, India needs to urgently overcome many hindrances on the path to accessibility and inclusion. OEMs may invest in creating accessible, low-floor buses with accessibility features. Similarly, Corporate Social Responsibility (CSR) funds may be utilised for installing well-lit footpaths and dedicated cycle lanes. Collateral free, cash-flow based lending may be provisioned through disruptive fintech innovations to increase ownership of productive assets among city dwellers, especially clean mobility assets. Several start-ups such as CreditMantri, ClearScore, and MoneyTap along with FinTechs like Avail Finance[20] are coming up with innovative mechanisms to assess potential borrowers in the absence of a well-established credit history, and offer institutional credit respectively. They look at alternate data such as mobile payments, data from social media sites, and earnings from digital platforms etc. The government has a civic obligation to further inclusion in our cities. But it cannot do so alone; the private sector must lend a helping hand.

Safe Mobility

Safety is a non-negotiable prerequisite for any conversation on mobility, especially in India, which records the highest number of road accident fatalities in the world despite accounting for just 1 percent of the global motor fleet. Innovations in enhancing road safety using AI and Advanced Driver-Assistance Systems (ADAS) have been on the rise over the past few years. Intel's MobilEye has been deploying a host of alerts on cars worldwide, relaying vital information on cruise control, collision avoidance, lane changes etc. The States of Uttar Pradesh and Karnataka commissioned buses with AI-equipped front bumpers way back in 2019 itself.

Likewise, Ola has partnered with Microsoft to build a connected vehicle platform to facilitate regular vehicle diagnostics, improved in-car productivity, advanced navigation, predictive maintenance of vehicles etc., thereby, harnessing high-end AI safety features for a mass mobility ride-sharing platform. Ola has also launched Guardian, which sends automatic alerts whenever route deviation occurs. In Nagpur, Intel, Mahindra & Mahindra, IIIT-Hyderabad, CSIR-CRRI, and the Nagpur Municipal Corporation have jointly launched Project iRASTE (intelligent Solutions for Road Safety through Technology and Engineering), to help the city achieve Vision Zero.

While we may not have achieved SDG Target 3.6, which sought to halve the number of global deaths and injuries from road traffic accidents by 2020, we can certainly achieve the goal for India by taking proactive, collaborative steps. The government, for its part, has long stressed on the 4Es of road safety- i) Education (raising awareness), ii) Enforcement (strident application of existing regulations), iii) Engineering (updation of road and vehicle design to optimise safety), and iv) Environment and Emergency care of road accident victims (sanction of cranes and ambulances for relief services). The private sector can pioneer engineering-based solutions. Further, the government may encourage regulatory sandboxing[21] to develop data-driven[22], evidence-based solutions, which can be live-tested in a controlled environment before being implemented at scale.

Resilient Mobility

Post-pandemic resurgence has underscored the centrality of resilience to our civil infrastructure and transport ecosystems. Mobility, which is functionally robust despite pressures, and is flexible, adaptive, demand-responsive, as well as nodally efficient is crucial for sustainability.

Needless to say, private sector initiatives that optimise mobility flows, reduce energy intensity, mend previously existing gaps in the network, bolster mass transit, or help transition towards a low-carbon future make mobility systems and cities more resilient. To take a few examples, charging EVs using decentralised renewable energy such as solar rooftop photovoltaic (PV) systems reduces grid dependence and makes the charging setup more self-reliant, as could be seen in Ola's Nagpur pilot. [23] Provisioning last-mile connectivity through micro-mobility solutions, enabling smart charging infrastructure, encouraging bike-taxis, strengthening facilities for non-motorised transport—all of these allow for incremental gains that eventually help create a more interconnected, dense, responsive, and resilient mobility ecosystem.

Pandemic-induced climate change consciousness has made access to affordable, reliable, sustainable and modern energy for all (SDG Goal 7) the highest civic order. Accelerated adoption of shared, connected, electric, AI-powered, and autonomous mobility will bode well for our cities. To build resilience, regulatory paradigms must be reconfigured to value incremental gains while being application agnostic. Focusing on outcomes and letting the private sector innovate freely to fill existing interstices in mobility networks will lend strength, cohesiveness, and resilience to our cities.

India is truly at a crossroads. It needs to prioritise clean mobility outcomes over the method employed, data-driven mobility governance over regulatory ambiguity, and sustainable development over boorish economic pursuit. Until that happens, the private sector, and the world at large, will wait for the signal to turn green.

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KSHITIJ BATRA

Co-Founder and CEO

TERRA ECONOMICS AND ANALYTICS LAB (TEAL), INDIA

Technology platforms and the future of jobs in India

"We are far from understanding how to achieve adaptively efficient economies because allocative efficiency and adaptive efficiency may not always be consistent. Allocatively efficient rules would make today's firms and decisions secure - but frequently at the expense of the creative destruction process that Schumpeter had in mind." – Douglas C. North[1]

The Austrian economist Joseph Schumpeter was, perhaps, the first scholar to theorise and articulate the centrality of technological innovation and entrepreneurship to economic growth and development. In his seminal tome Capitalism, Socialism and Democracy (1942), Schumpeter popularised the notion of "creative destruction", the replacement of less productive firms by more productive ones, as an essential churning process fundamental to capitalism itself. Since then, Nobel laureate Robert Solow's foundational growth model postulated technological change as the augmenter of labour and capital productivity, which can induce shifts in the economic growth trajectories of nations. The Solow "residual", which became the topic of study in macroeconomics for decades, postulated that technology and human capital accumulation were the only means for economic convergence between poorer countries and the rich.

In the age we live in today, we are very much in the middle of a significant transformation taking place in both economic and social structures in society. Our daily lived experiences are going through more changes than they ever have been in the past, enabled by dramatic technological advances spearheaded by a handful of global technology firms. Some of these enterprises are more powerful now than the governments of large countries. While the adoption of the mobile phone, internet and associated set of innovations built on top has made the global distribution of digital products easier than ever, it has also raised questions about social inequality, moderation of speech, cybersecurity and monopoly practices.

This piece aims to answer two questions:

1) What has been the role of technology companies in promoting the Sustainable Development Goals (SDGs)?
2) What is the ideal policy design to balance the incentive to innovate with the need to limit social harms potentially exacerbated by new technologies?

Technology disruptions and Developmental goals

Our current generation has witnessed the most meaningful improvement in human welfare than ever in history: 59 percent of the world's population in 1950 lived in extreme poverty; in 2018, this was down to less than 10 percent.[2] Global life expectancy has increased from 65 years in 1990 to 73 years in 2019.[3] The global infant mortality rate has reduced from 65 per 1,000 live births in 1990 (12.5 million deaths) to 28 in 2019 (5.2 million).[4] Improvements in access to education, healthcare, finance, mobility, information and communication have transformed the lives of millions across the world.

Substantial investments in network infrastructure, semiconductor development, software engineering and product development strategies have resulted in a software and digital service revolution. Small, agile teams, with access to global distribution channels at the click of a button, coupled with some of the lowest costs of capital in the history of finance, have resulted in a blossoming of technology startups across the globe. Some of these startups have become multinational behemoths, making the technology sector the largest by market capitalisation globally.

Modern-day technology companies are often precocious combinations of technological development and entrepreneurship. While governments can invest in fundamental research and provide public support to universities and research institutes, they suffer from implementation challenges to scale innovations in society. In developing countries, these challenges are further exacerbated due to capacity constraints.[5] In addition, technology firms and other private enterprises constitute a significant fraction of overall R&D investments worldwide. In India, 41 percent of R&D investments are made by private businesses (the rest by the government); in more advanced economies such as China, the US, Japan and Korea, this share is more than 70%.[6]

The technology sector is critical for economic growth, jobs and exports for every major economy. In India, this sector has been one of the major triumphs of the post-1991 liberalisation growth story. Large IT services firms such as Infosys, Wipro and TCS, which gained prominence in the global BPO cycle in the 1980s and 90s, have become multinational giants. More recent technology startups are also crossing a significant threshold of maturity; several have recently listed on public stock exchanges in both India and larger markets.

More broadly, the tech sector has become a significant driver of exports, jobs and ancillary industries. According to HSBC Global Research, "high-skill exports" of manufacturing and services (mobile phones, machinery, pharmaceuticals and IT services) have increased as a share of overall exports from 59 percent in 2014-16 to 64 percent in 2017-19 (see figure below). "New-age digital" firms are similarly also driving drastic increases in the construction of warehouses and data centres, all

Graph: India IT Services Export,
Source: Nasscom, CEIC, HSBC[8]

contributing to domestic growth. HSBC estimates that E-commerce alone could add 0.25 percentage points to India's GDP every year for the next decade. In addition, they estimate it could create up to 12 million jobs *on net* at the same time.[7] Similar impacts could be expected from logistics and delivery, customer care, IT and managerial roles for various recent industries such as on-demand transport, food and grocery delivery. Furthermore, the products and services provided domestically by both domestic and foreign tech firms are making our daily lives better in many ways by expanding access to finance,[9] skilling, communication and information. Well-documented evidence shows that the introduction of cellphone coverage by mobile providers in Kerala improved the wages of fishermen and consumer welfare by substantially reducing price volatility (since communication allowed them to take their fresh catch to the local market at the best price), and wastage of fish.[10] More recently, ride-hailing has been shown to improve consumer welfare by improving demand-supply matching and reducing unpredictability.[11] Mobile service providers have arguably created greater impact to improve the lives of the poor in many parts of the world than years of development aid and efforts put together. Fintech, HealthTech, EdTech, InsureTech, AgriTech, and logistics efforts hold similar promise today.

Regulatory frameworks and policy priorities for Technology Firms

Despite the progress of several IT and newer-age technology companies, they remain islands of successes in an otherwise vast sea of challenges that India faces economically and demographically. Estimates place the total salaried jobs in India at only 80 million. [12] Yet its working age population (above 15 years of age) is growing rapidly at roughly 16 million per year.[13] Employment shrank further during COVID, particularly for smaller firms.[14] Add to this the number of people leaving agriculture, as the economy goes through structural transformation, India will need to create 18-20 million new jobs a year just to keep up the current rate of employment.

In the past few years, India has underperformed in labour-intensive manufacturing sectors such as textiles and apparel, which have been the key job-creation engines for economies such as China, Bangladesh and, indeed, even the UK during the industrial revolution.[15] These sectors had the potential to create the volume of formal employment

needed.[16] While high-skilled technology firms bring all the benefits elaborated above, in the absence of more broad-based development of multiple different sectors, these firms will not be able to themselves prevent India's demographic dividend turning into a demographic disaster. The top priority for policy is to enable newer industries that can provide as many jobs as possible to grow and thrive. Several of these industries will have to rely on exports to advanced markets since the Indian market will not be large enough of a consumer market by value.

Indian technology companies have the potential to build locally and supply to global markets. Product companies relying on data labelling, testing, image tagging and annotations for training AI can be new employers of relatively less skill-intensive tasks. There are many other possibilities which we may not be aware of now given how rapidly technologies are progressing, and enterprises experimenting. But in order for India to be able to take advantage of these opportunities for job creation and growth, there needs to be several reforms to the regulatory environment and investment in enabling infrastructure. This holds true for both domestic and foreign firms since innovations have strong interlinkages and spillovers. India can create knowledge clusters that can drive innovation for consumers and businesses across the world.

Expectations from policy:

• Stable institutional and macroeconomic climate that can ensure continuity, low costs of capital
• Rapid and affordable dispute resolution, and improve contract enforcement
• Provide the physical infrastructure to develop urban areas that can serve as knowledge clusters with agglomeration benefits

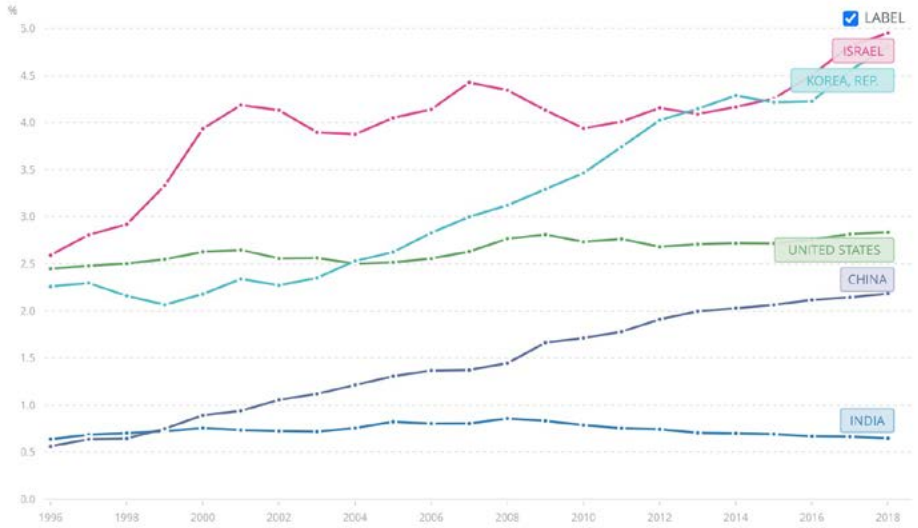

Chart: Research and development expenditure (% of GDP). Source: World Bank Data[17]

• Reduced compliance burden, transparent and fair enforcement of rules, especially for sectors that can potentially be job creators either directly or indirectly
    • Priortise relying on incentives (such as taxation, access to infrastructure) over restrictions by diktat
• Scale up government support to promote innovation and fundamental research (see chart below on how India lags behind other countries)

The startup ecosystem in India still remains at a relatively more nascent stage than in countries such as the US and China. The potential of digital firms to create impact on the physical economy can grow; Amazon in the US has large delivery fleets, has bought not just entire jets for delivery but now also entire airports[18]; in China, the E-commerce behemoth Alibaba has created 4,000+ "Taobao" villages across the country just to service E-commerce deliveries for the firm.[19] Indian tech firms still have a relatively more modest scale in the corporate landscape.

India has done well to create digital public goods such as Aadhaar and UPI; these have further enabled various other applications to be built on top. Mobile and digital penetration is now fairly high post the entry of Reliance Jio and with the costs of data in India are the lowest in the world. However, it is important to avoid getting complacent. Technological innovation is highly globally integrated by nature: Open source tools developed by programmers in different parts of the world (such as some of the most widely used programming languages and their various open source packages), subscriptions to globally used services (such as github), technical training and education, and venture capital. Capital is highly fungible globally, and talent is as globally integrated and mobile as it has ever been. Flight is very easy for all these to transport across borders—much more than any traditional industry. The regulatory balancing act will, thus, have to ensure minimising this loss of competitiveness while preventing domestic social harms.

Avoid putting the cart before the horse: State capacity in India to design the right set of rules and meaningfully enforce them remains limited in many respects. Therefore, it is vital to prioritise the allocation of resources, time and capacity by the state when aiming for the most socially beneficial outcomes. Regulations that fail to take into account the limited enforcement capabilities often make the underlying problem worse.[20] In addition, many new-age industries are yet to develop and scale to the same extent they have in other parts of the world. Instead government policies should focus on first providing the basic enabling infrastructure that only the state can provide, but that can have significant multiplier effects across the board. For instance, India still only has 1.4 broadband subscriptions per 100 people (China has 31.3, the US 34.7 and South Korea 42.8).[21] While mobile phone usage has grown substantially in the last few years especially after Jio's entry into the market, internet usage in India still limited to 41 percent of the population (in China it is 71 percent, the US 89 percent, and South Korea 97 percent).[22] The gaps in physical infrastructure for mobility, affordable housing and logistics are even more severe.

Conclusion

Schumpetarian "Creative Destruction" poses a challenge for rapid technological change in democracies; if, indeed, there is long-term benefit to society through allowing the short-term disruptions created by new technologies, how can political leaders look out for what is in the best long-term interest of society and still get re-elected? The only way out is to design, empower and maintain independent institutions who can seek out long-term societal benefits without the fear of losing office.

The transformative nature of technology and the gains it can bring in the current fourth industrial revolution are not pre-ordained for every country. In the original industrial revolution in the 18th century, the same changes that occurred in Britain, the US and Europe did not happen in other parts of the world. There is now significant literature documenting the key role played by institutions.[23] Institutional structures and their strength can alter the arc of history of nations; the choices in these made today will be significant in the role of technological changes, and economic prosperity, and poverty reduction for the future.

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APRAMEYA RADHAKRISHNA

Co-founder and CEO

KOO, INDIA

Regulation of the Platform Economy: A Case Study of Microblogging Site Koo

This era belongs to platform business models. One cursory glance is enough to reiterate that platform businesses are disrupting traditional marketplaces in almost every industry and at lightning speed.[1] Supported by robust technology infrastructure and enhanced user interfaces, platform businesses facilitate valuable exchanges and interactions between buyers and sellers, or between vendors and consumers; or take the approach of longer-term social collaborations like those between friends and families.

For digital-first platform models, Asia, in general, and India, in particular, is the newest playground. Besides, owing to quick adoption by tech-savvy millennials, home-grown platforms have scaled rapidly and attained the coveted unicorn status[2], thus, heralding a new way of doing business.

Over the last decade, the platform industry has added immense value to the societies of the world. In Asian countries, the industry has gone beyond creating just economic value; the platform economy has touched the lives of people at a local level by fostering deep connections and allowing individuals to express and communicate with one another in an engaging manner. This can be attributed to the emergence of innovative social media platforms from across Asia, and more so from India, which have become a very intimate part of an individual's life. They have created online spaces for people to express themselves and connect not only with each other but also with people of eminence in their communities, in a personal manner. New-age social media platforms are now going a step further as compared to established tech giants, leveraging the value of India's multiple native languages and offering content to users in their mother tongues. As per a report on Inc42[3], the market for vernacular content in India is pegged at US $53 billion. With the internet user base in India expected to grow to a humongous 900 million by 2025[4], the opportunity for emerging social media platforms is significant.

The significant economic and social impact and deep reach of platforms often occur without the active oversight of governments. More often than not, government agencies are trying to catch up with the newest technology or the coolest ideas.[5] These ideas and technologies, fuelled mostly by venture capital from western parts of the globe, challenge the status quo and pose new administrative challenges for governments.[6] From questions like who is responsible for safety in a pooled car arranged via a platform; or, how do you trace terrorism on an encrypted chat platform; to managing a venture capital-backed monopolistic private platform who may, at its will, create social and economic barriers by controlling food supply or groceries or media—governments and their agencies have their hands full.

In this context, the desire of governments to regulate platforms is understandable, especially when the actions of platforms—often backed by capital controlled from outside their national boundaries—have the ability to create significant social, economic, and political changes in a country.

It is also pertinent that in the Asian context, the services and offerings of platforms are often revolutionary in the sense that they leapfrog the natural demand-supply evolution. Asian consumers are offered services way beyond what was hitherto unavailable only a short while ago and, hence, may not understand the context, use, or abuse of such platforms. Hence, it can be argued that government regulation is a proxy for the lack of user responsibility when it pertains to the use of technology.

Why governments are regulating digital platforms

Government regulations are focused on content regulation, fake news, antitrust, and data protection as these directly control the three engines on which digital platforms operate, i.e., content and content creators, public opinion, and access to capital.

From Koo's perspective, the reasons for regulations are understandable. Global social media organisations use standardised responses and algorithms, which are not compatible with local and regional voices, ethos, and customs. Regulation is one way of retaining local flexibility and flavour. From this perspective, regulations should reflect society, its demography, and reality, and should not be a copy of laws from other countries. It is necessary to customise laws to meet the needs of the citizens of a country. This becomes important in Asian countries, especially India, where demographic diversity is vast and intricately woven into its cultures.

Regulators across Asia have realized the need to control the spread of fake news as they cause discord and deepen ethnic/religious divides or tend to mislead, which has been particularly true during this COVID-19 pandemic. Regulations around fake news not only help citizens at a personal level but also enable them to maintain the quality and credibility of social media platforms themselves.

Here are a few examples of regulation on fake news across Asian countries:

- Vietnam's Cybersecurity Law (2019), places stringent controls on technology companies pertaining to storing data locally and complying with the Government's demands to delete content on social media.[7]

- In March 2021, Malaysia passed a 'fake news' ordinance that made publishing false information related to COVID-19 punishable by up to three years imprisonment.[8]

- Singapore passed The Protection from Online Falsehoods and Manipulation Act (POFMA) in 2019, which allows the Government to take down any online information they perceive as being either false or misleading.[9] Later, under POFMA, Singapore issued a correction order to the owner of a Facebook page that claimed the Government was unable to trace the source of COVID-19 cases in the country.[10]

The case study of microblogging site Koo

While social media platforms help connect people, in the past few years, they have also been misused by anti-social elements for financial fraud, terrorism, invasion of privacy, data theft, and other heinous crimes. Not only is this a risk to the safety of individuals, but it can also endanger national sovereignty. Thus, regulations requiring social media platforms to act responsibly and establishing processes for users and governments to interact with these platforms are a welcome step. For instance, Koo supports well-balanced and locally tailored regulations that protect platforms as well as users from potential hazards associated with the creation, publication, and exchange of data on social media platforms.

Further, regulation is crucial from the perspective of protecting national interest as well. For instance, recently, the Indian government banned certain Chinese apps[11] and several other countries followed suit. It is common knowledge that Chinese apps have had a way to collect vast amounts of user data, thereby, posing a grave risk to national security. This ban on Chinese apps led to a spurt of home-grown technology and social media platforms that provided well-designed products, customized to the requirements of the local market.[12] Koo, with its microblogging features being offered in multiple Indian languages, was one such innovative platform that enabled conversation and the exchange of thoughts between individuals in their mother tongues. Today, Koo offers its features across eight Indian languages and will cover the breadth of all 25 native languages in the future. In a short span of 16 months since its launch, the platform has witnessed over 1 crore downloads.[13]

Regulations pertaining to anti-trust are relatively well-settled and intended to protect platform companies, including indigenous platforms, from the predatory business practices of established global players. This enhances confidence in entrepreneurs to build a unique regional language platform from scratch and expand it globally. There is an urgent need to look at predatory business practices followed by Chinese mobile companies that are hampering the growth of Indian app developers. For example, Chinese mobile companies are known for installing excessive bloatware and charge high fees for whitelisting apps on their phones.[14] Access to technology and opportunity must be fair and artificial technology threshold barriers should be discouraged.

Most users of evolving networking platforms like Koo, which has offerings across multiple Indian languages, are first-time users of social media. Apart from regulation by the Government, there is also a need for platform self-regulation and education of users about misinformation and about their responsibility of verifying information before they share content on an open social media channel.

Koo is taking multiple steps to inform and educate users, including:

- Working towards crowd-sourcing content moderation, where users will be rewarded for flagging content that is fake. Similarly, they can be penalised for labeling content as misinformation without verifying the same.
- Make users aware of the free resources online that they can use before sharing any information on the platform.
- Koo is also in the process of setting up an advisory board that will guide the platform in making the right decisions vis-à-vis its content moderation policies.

Therefore, Asian legislators need to identify best practices and bring locally workable solutions that balance consumer interests with that of platform enterprises. The regulatory landscape should help advance innovation, competitiveness, and growth of the platform economy, which would benefit all.

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MOHAN CHATHURANGA

Head of IT Governance and Data Protection

MAS HOLDINGS, SRI LANKA

Cross border digital influence and attention economy

We live in a time of globalisation, open systems and interconnection where collaboration between governments and businesses has resulted in globalisation of supply chains, thereby, opening new markets and new business models.[1] As the Internet and cloud technology have become the new norm of operation in the business landscape, the role of data in today's economy has also become paramount. Thus, data protection, data localisation and cyber sovereignty have emerged as the new buzzwords, and authorities across the globe have been attempting to make sense of how to regulate the ever expanding footprint of the internet in our lives.

Cyber sovereignty concerns in today's age

"Cyber sovereignty" refers to the assertion of state control over technology-linked flows, whereby the state both defines and guarantees rights in the digital realm[2], and "data localisation" refers to various policy measures that restrict data flows by limiting the physical storage and processing of data within a given jurisdiction's boundaries.[3] However, data localisation also facilitates the collection of sensitive data by government agencies, allowing for more restrictions on freedom of speech, privacy, and other human rights.[4]

Social media has changed the political game, allowing incumbents and newcomers alike to speak directly to voters on everything from their own to their opponents' parties' policies.[5] Social Media campaigns allow diffusion of various political communications directly to the users. Therefore, an Internet company's biggest challenges are centered on fundamental rights of the natural persons, which impact the core of the democratic

process. The following are some of the instances where the internet has impacted democratic processes:

- The US 2016 presidential election was subject to Russian Propaganda led by digital advertising to target conservatives in campaigns with posts on immigration, race and gun rights[6], as highlighted by the University of Oxford's Computational Propaganda Project and the social network analysis firm Graphika. Research says YouTube, Tumblr, Instagram and PayPal as well as Facebook and Twitter were leveraged to spread propaganda[7].

- American Pro-Life groups attempted to influence public opinion on Ireland's Abortion Law through web ads and a propaganda campaign[8].

The gravity of the problem of influencing democratic processes is also demonstrated by Election Security being one of the biggest issues social media giant Facebook has to contend with.[9] Moderating content from a private organisation's point of view is extreme considering the consequences that could follow in the real world. For instance, a video posted by someone seeking help during a riot/movement could be taken down and reported as violent content, while simultaneously affecting the Freedom of Speech of individuals/groups. Platforms like Facebook now hire about 30,000 employees on security to address these issues.[10]

It is interesting to note that building up to and during an election, there is so much intervention that can be done by foreign interests to polarise and run propaganda campaigns to rig the elections; and with very little comparative investment, a large chunk of the population can be reached. This is where local regulations need to be established around identity validation prior to election campaigns in Asian countries, especially developing economies, to work collaboratively with private organisations like Facebook as they already do in the US and European Union (EU).[11] Establishing transparency measures like having access to archives of political advertiser's ads brings more credibility and limits misinformation as well. None of this would be possible without strong legislation in the country and without the election commissions working collaboratively with private organisations.

Privacy concerns around digital technology

Several jurists have attempted to define "privacy", but due to its abstract nature and the constant redefinition of the elements belonging to the private sphere of the individual, most of these definitions only highlight an aspect of what is privacy.[12] While most scholars have struggled with defining it, privacy has primarily been categorised into seven categories:[13] privacy of the person, privacy of behaviour and action, privacy of personal communication, privacy of data and image, privacy of thoughts and feelings, privacy of location and space and privacy of association (including group privacy).

With the adoption of digital technologies in companies and at individual levels, companies are collecting more data in each digital engagement they perform than most people are aware of. From personalised consumer experiences, automated marketing messages to science-based insights, organisations exchange personal data for goods and services. All companies collect different types of data from users for various purposes, with information becoming a more valuable commodity than ever, making it an economic asset for the organisation. When consumers' private and sensitive information is seen to be available, ready to be reviewed, and replicated by machines for user behaviour analysis, advertising, spying, amongst other purposes, data privacy and protection becomes a subject of contention.

The legislative answer to the privacy equation has mostly been consent[14]. Allowing choice to the user gives power back to people and builds user sovereignty. The real test lies in Data Science and AI rather than the (often illusory) choice users have in giving away certain information about themselves. User's consent often fades away in the complexity of data used. For instance, a user would want all their friends on Facebook to wish them on their birthday but not get bombarded with spam from restaurants with offers for birthday dinners. At the same time, a user wouldn't mind their favourite restaurants/hotels offering them a 50 percent discount in a lucky draw.

Consent cannot be given to the same data set every time someone uses it. There is no such computational power, and one wouldn't want to be receiving millions of requests for data sharing approval every day. This paradox is primarily bonded to the misconception that people can use the world's largest content platforms like Facebook and Video libraries like YouTube for free without any costs, while being unaware that they are free simply because the monetisation model involves advertisers using the data of users. The only real alternative to this model is introduce a fee for membership.

Most people don't realise that consent and patterns are also data sets that can be used widely. Every time something that you are not interested in (content/sponsored ad) pops up, instead of slowly scrolling down, users can provide feedback, which changes the rest of the feed. Providing more and more feedback allows the algorithm to accurately identify and suggest posts to users. It is similar to the real world, where when you walk into a shop, you will be subjected to the salesperson's sales pitch, whether you like it or not. Unless you make the conscious choice to go out of the shop, it stays quite true for the online world as well. This becomes a grey area when it comes to non-conscious preferences. For instance, user's scroll speed or eye movement might be different based on one's subconscious responses, and these inputs can be recorded and used for behavioural analysis to suggest content. This could be very harmful. For instance, a recovering alcoholic may see some images of friends enjoying a night out with drinks or promotions for alcohol brands, which are likely to have a negative impact on their recovery. It is important to set such preferences on one's settings. However, legislation like the EU's General Data Protection Regulation (GDPR) and other emerging data protection legislations try to tackle this by providing controls around automated decision making across behaviour analysis. These laws give certain rights to governments in controlling how data is used. Although these laws are developed to protect people, data protection laws aimed at imposing cyber sovereignty can turn into a double-edged sword if not done cautiously.

Thus, data privacy and data protection are crucial to ensure people's privacy rights are not violated with the rising number of data breaches and cybercrimes in the world[15]. Cyber hacks are a threat for individuals, organisations, and governments alike; hence, a rising number of governments are debating data protection legislation and other cyber sovereignty laws.

Cyber Sovereignty in Emerging Economies

China has been promoting and practicing the concept of Cyber Sovereignty and using it to legitimise data filtering, monitoring and localised control, all of which are part of China's "Great Firewall".[16] With this concept, the capacity of the Chinese people to exercise their human rights online has drastically deteriorated, making China the world's most restrictive information environment. However, China has played a great role in shaping the global internet and the cyber sovereignty model, which is expanding to more and more countries such as Russia, Brazil, India, Vietnam, Indonesia and Turkey[17]. Following its long-standing suspicion of the internet as a Trojan Horse for Western influence, Russia has asserted national sovereignty by reproducing national borders online. The country has enacted strict rules on data localisation, demanding

organisations to store Russian user data on servers located in Russia, or else the consequence will be severe like a ban on the organisation.[18]

Vietnam's cyberlaw demands service providers and technology companies to aid the government in monitoring the communications of their users and to store Vietnamese user data locally and provide that data to the government upon request.[19] Pakistan's cyber laws requires social media companies to establish at least one data server in the country and to share data upon request with the government, which is among many such rules.[20] In India, a Data Protection Bill is underway, which gives the government the right to compensation for improper disclosure of personal information, including health and sexual orientation and *critical personal data*[21].

New laws and policies for data protection and privacy are emerging in emerging economies restricting the freedom of the internet. Many democratic countries have long condemned these practices, advocating for a global and open internet in which the government has little influence over traffic flowing across its borders.

Many countries are now banding together regionally, introducing regional policies and privacy frameworks. The intergovernmental economic organisation, OECD, bases its privacy framework on "the importance of risk assessment in the development of policies and safeguards to protect privacy"[22]. The APEC's privacy framework set forth a set of "principles and implementation guidelines to establish effective privacy protections while avoiding barriers to information flows for continued trade and economic growth in the APEC"[23]. Protecting and preventing misuse of an individual's personal data and ensuring and facilitating the free flow of information among the ASEAN Member States has been the objective of the ASEAN's privacy framework, while the GDPR has been designed to "harmonise" data privacy laws across all of its member countries for providing greater protection and rights to individuals[24].

Even though some countries' approach to cyber sovereignty is questionable, it seems that carefully developed policies and laws keeping the best interests of people at heart can do tremendous good when considering the global expansion of the cyber sovereignty concept and the rise of cyber-attacks, data breaches and cybercrimes.

Sri Lanka's approach to data protection

Sri Lanka is also on its way to adopting data protection laws with its Personal Data Protection Bill.[25] The bill defines measures to protect personal data held by organisations such as banks, telecom operators, hospitals, businesses etc. It has been drafted considering international best practices, including the OECD Privacy Guidelines, Council of Europe Data Protection Convention, APEC Privacy Framework and the EU's GDPR. The drafting committee has also taken into account the laws enacted in other jurisdictions such as the United Kingdom, Australia, Singapore, and more[26].

According to the Information and Communication Technology Agency (ICTA) of Sri Lanka, the proposed law aims to govern data breach incidents where organisations are expected to inform authorities about data breaches and other data subjects. The bill imposes several obligations on those who collect and process personal data. This includes processing of personal data limited to the specified purpose they were collected, ensuring security and confidentiality of the personal data, responsibility to meet the transparency obligations and deploying appropriate data protection management programs. It also gives the right for users to share personal data based on consent and the right to withdraw their consent. The bill does not mention any data localisation requirement except for the public authorities. Entities that do not adhere will receive penalties subject to a ceiling instead of fines calculated on the global turnover.

What this means for organisations...

With the new global, regional, and soon-to-be imposed government laws and regulations on data privacy, organisations in Sri Lanka have to adopt new internal practices to ensure compliance with the laws. Companies will have to pay more attention and care to how they collect and store data, implement effective measures and technologies and train their staff to ensure data privacy and security. From websites, online transactions to social media marketing campaigns, organisations have to be more responsible and transparent in handling and using personal data they collect as those laws clarify user rights on data privacy better than ever before. This also helps companies adhere to better and more standardised practices on data security.

On the other hand, ICTA strongly believes that the introduction of the Personal Data Protection Bill establishes Sri Lanka as a safe destination as a data processor, enabling the country to stay ahead of competition in the data-driven economy. With the world's movement towards more protection to its data in the areas of IT/BPM service and product segments, Sri Lanka will be able to gain a competitive edge over the regional competition.

Summary

Privacy and data privacy rules provide a level of justice that cuts across borders and is applicable to businesses at any stage. Companies would be able to do worldwide operations much more easily as a result of laws governing privacy. On the other hand, consumers should also have a right to know who has access to their data and why, especially as services and apps grow increasingly linked to make transactions easier. They should also have the right to have their personal data erased upon request, as well as the ability to prohibit corporations from selling their data without their consent.

As a community, we need to isolate the challenges and come up with specific answers to each problem we face with Privacy, Data Protection and Cyber Sovereignty. It is important that policymakers and technology leaders work towards a common goal. Private organisations should particularly be responsible enough to respect different states' requirements while upholding the principles and rights agreed upon as humanity. Each country needs to bring forward and accelerate legislative process and talent and capability building in this domain. Most of the emerging economies are currently turning a blind eye to the problem, assuming it's far-fetched. However, when the very system of democracy is being threatened by Cyber Influence, maintaining the sovereignty of the country and upholding fundamental rights becomes challenging.

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ABOUT THE AUTHORS

Aishwarya Raman

Aishwarya Raman is the Director and Head of Research at the Ola Mobility Institute (OMI). She is the co-founder and ex-CEO of AutoRaja, one of India's earliest and largest book-an-auto services. She also created India's earliest all-women auto-rickshaw fleet, AutoRani. Aishwarya started her journey with Ola as the head of the Ola Auto category across North India in 2015. Today at OMI, Aishwarya conducts research in areas such as sustainable urban mobility, electric mobility and energy, gender, accessibility and inclusion, future of work and the platform economy, Artificial Intelligence, and much more. Aishwarya is a member of the Global Future Council on Urban Mobility Transitions at the World Economic Forum. She is a Salzburg Global Fellow participating in the Japan-India Transformative Technology Network. Aishwarya advises and mentors organisations, researchers, and young professionals, including the Global Partnership for Informal Transportation and Young Leaders for Active Citizenship.

Aprameya Radhakrishna

Aprameya is a serial entrepreneur and Angel Investor. He is the Co-Founder and CEO of microblogging site Koo. He was also the co-founder of TaxiForSure, which was acquired by Ola at a valuation of about US $200 million, which was one of the biggest acquisitions in the startup world in 2015. Aprameya continues to encourage the startup ecosystem with investments in over 35 startups. Some note-worthy startups include Unacademy, Trell, Open Bank, Dailyninja, Fisdom, Vogo, Healthians. Aprameya is an alumnus of IIM Ahmedabad and NIT Surathkal.

Deena Jacob

Deena Jacob is the Co-founder and CFO of Open, a neo-banking start-up based out of India. Currently, she anchors the finance function of Open along with heading the lending and wealth management verticals. Open is Asia's first neo-banking platform that helps SMEs automate their business payments, banking, and accounting functions in one unified service to help business owners focus on their core business. Previously, Deena was associated with Tapzo as the CFO, and with TaxiforSure and Zansaar.com as the Head of Finance.

Deena recently won Best CFO Startup from BW CFO in August 2021. She was a winner of CIMA (Chartered Institute of Management Accountants) Most Influential CFOs Award in 2016 and was also chosen in the top 100 CFO roll of honour by CFO India in the category management controls in 2017.

Kailash Nadh

Kailash Nadh has a PhD in Artificial Intelligence & Computational Linguistics from Middlesex University. He has been the CTO at Zerodha since 2013, where he co-founded its tech arm. Zerodha is now the largest stockbroker, and one of the largest fintech companies, in India.

Kailash has been a hobbyist software developer for close to two decades and writes codes every day, building technology at Zerodha, and building and contributing to open-source projects. He co-founded and volunteers at the FOSS United Foundation, a non-profit that promotes the open-source software ecosystem in India, and Rainmatter, an initiative that works on climate change projects.

Kshitij Batra

Kshitij Batra is the Co-Founder and CEO of TEAL (Terra Economics and Analytics Lab), a technology startup digitising land and property data in India. He previously served as Additional Private Secretary to a Union Cabinet Minister to advise on policy and data. He was a Junior Fellow at the IDFC Institute, where he led projects on housing, urbanisation and geospatial analytics. Kshitij has also worked with Housing.com as a Senior Economist, with the World Bank's Global Urban team in Washington DC and Africa, the MIT Jameel Poverty Action Lab and NERA Economic Consulting in New York. He holds a Masters in Public Administration & International Development from Harvard's Kennedy School of Government.

Mohan Chathuranga

Mohan Chathuranga (MBA, Bsc, CISM, CISA, CDPSE, ITIL) is a strategic leader for Cyber Security and Data Protection and is currently providing leadership for IT Governance and Data Protection for the largest apparel and textile manufacturer in South Asia. He is also the Co-Chair for the Cyber Security Centre of Excellence for SLASSCOM (national chamber for the knowledge and innovation industry in Sri Lanka) and a Membership Director for ISACA Sri Lanka Chapter.

Chaturanga has spent more than five years in the Big4 Consulting arms providing Cyber Security consultancy services for primarily Banks and Telco operators. He has managed and led multiple ISO 27001:2013 implementations and has been pivotal in introducing Cyber War gaming for Sri Lanka. He is experienced in managing implementation and monitoring of EDR, SOC operations, and Data Leakage Prevention activities at the enterprise level. Additionally, he has been an IT Auditor for a Sydney-based Infrastructure Services company.

Morshed Mannan

Morshed Mannan is a Max Weber postdoctoral fellow at the Robert Schuman Centre for Advanced Studies at the European University Institute. His research focuses on blockchain governance, particularly within the ERC project 'BlockchainGov', and more broadly on cooperative governance. He recently submitted his PhD dissertation at Leiden Law School on the emergence of democratic firms in the platform economy. He has published academic articles and book chapters on blockchain governance, startup exit strategies and platform co-operativism. He has also co-authored a book Freedom of Establishment for Companies in Europe (EU/EEA). Mannan is a Research Affiliate of the Institute for the Cooperative Digital Economy at The New School and is a dual-qualified lawyer (England & Wales/Bangladesh). He has also acted as a consultant on cooperative law for the International Cooperative Alliance, NCBA CLUSA International, and as an expert for the UN Department of Economic and Social Affairs.

Saif Kamal

A champion for social innovation, Saif Kamal founded Toru Institute to address the inequalities social entrepreneurs face in the Global South. Since 2014, he has converged and channelled resources from the public, private and civic sectors to accelerate the culture for innovation and entrepreneurship in Bangladesh. Till date, the institution has incubated 50 impact startups across seven Sustainable Development Goals. Graduating ventures have impacted the lives of five million people and raised upto US $100 million. Some graduating startups include 10-minute school, Solshare, ifarmer, ShopUp.

Kamal is an Alumni of Global Shapers at the World Economic Forum and member of Davos 50 (2017 & 2021). He serves as an advisor to J P Grant School of Public Health at Brac University.

Shinjini Kumar

Shinjini has spent three decades in senior roles in leading financial institutions including the Reserve Bank of India, Bank of America Merril Lynch, PricewaterhouseCoopers, Paytm and Citibank. She is now Co-Founder of SALT (mysaltapp)—a Fintech platform with the aim to close the gender gap in finance. She is also the co-founder of @ indiannovels, a not-for-profit initiative to promote Indian storytelling in translation

Siddarth Pai

Siddarth Pai is the Founding Partner, CFO and ESG Officer of 3one4 Capital, an early-stage Venture Capital Fund house based in Bangalore with cumulative assets under management of US $230 million. Two of their funds have been named as the top performing Indian VC funds by Preqin. Some notable investments include Licious, Koo, Darwinbox, Open, amongst others. Siddarth is the youngest Executive Council member of the IVCA (Indian Venture Capital Association)—the apex body for Indian funds investing into alternative assets and serves as the co-chair of the Regulatory Affairs committee, working on matters related to security markets, alternative investment funds, taxation, foreign exchange, law and startups. He is an expert policy member of iSPIRT, the Indian Software Product Industry Round Table, a Bangalore based think-tank, and is part of the startup councils of CII and AIMA.

Yash Narain

Yash Narain works as a Research Associate for the Electric Mobility track at the Ola Mobility Institute where he studies India's dynamic, and ever changing, electric mobility policy landscape. He completed his undergraduate and Master's degrees in Political Science from Delhi University. He has previously interned at a data driven, development sector research consultancy and additionally worked with an advisory group to suggest amendments to India's then draft model Bilateral Investment Treaty. His interests lie at the intersection of mobility, energy policy, technology and social justice.

Umakant Soni

Umakant Soni is the co-founder and CEO of ARTPARK (AI & Robotics Technology Park) focused on "AI & Robotics for next 6bn users". He is also Chairman, AI Foundry. He is a pioneering thought leader in building a global think tank to use AI for bringing cheaper and more efficient access to resources in the developing world. Before this, Umakant co-founded pi Ventures (India's only Artificial Intelligence focused US $32 million early-stage venture fund) along with Manish Singhal.

With almost a decade of experience in AI as an entrepreneur and investor, Umakant is a technology advisor for Government of India initiatives like the NITI Aayog, DST (Department of Science & Technology) & MEITY, helping create an "idea to impact" AI innovation engine for India. Previously he has served as Director, Science-inc India, one of the leading Global Startup Studio. He also served as Digital Strategy Advisor to Lunar Designs.

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20, Rouse Avenue Institutional Area,
New Delhi - 110 002, INDIA
Ph. : +91-11-35332000. **Fax :** +91-11-35332005
E-mail: contactus@orfonline.org
Website: www.orfonline.org