



Looking Back – Building Strong Foundations

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The development and growth of Singapore's telecommunication sector has come a long way over the past 50 years. From the 1970s, when the Telecommunication Authority of Singapore (TAS) was set-up to provide citizens with access to reliable and dependable telecommunication services and to help drive the development of telecommunication as an essential infrastructure for the country's economic and social development; to the privatisation of SingTel in 1992 that paved the way for the subsequent liberalisation of the telecommunications market in 2001; to today where household

penetration for fibre broadband and mobile is 95% and 153% respectively, and the infocommunication (infocomm) media sector in 2016 contributed about 8.6% of Singapore’s nominal value-add and employed a significant 5.3% of the workforce.

Throughout this journey, the one constant has been the need for regulators and industry to adapt and transform to stay relevant amidst the evolution of the infocomm landscape; and to help Singapore benefit from, and exploit opportunities in, the new digital economy. For example, whilst as a regulator the Info-comm Media Development Authority (IMDA)¹ is focused on ensuring proportionate and pro-competition regulation so that businesses can confidently invest and thrive and consumer interests are protected, it has also looked at promoting and developing a robust and dynamic infocomm industry in Singapore. This is to recognise that greater synergies and better regulatory outcomes can be achieved through deeper industry engagement and involvement in its development.

Taking on Multiple Roles to Achieve Policy Outcomes

By the mid-2000s, despite market liberalisation and the development of a national broadband network (NBN), other regional economies were surpassing Singapore – with higher broadband penetration rates, faster broadband access speeds, and lower broadband prices. The IMDA (then the Info-communications Development Authority [IDA]) believed that, left to market forces, there was little incentive for the incumbents to invest in new broadband infrastructure ahead of demand, nor to open-up control of bottleneck resources to drive the transformational improvements in broadband speeds, penetration and prices needed to maintain and boost Singapore’s economic competitiveness.

To bridge this gap, there was a need for the government to facilitate

¹ In 1999, the Info-communications Development Authority (IDA) was established through the merger of the TAS and the National Computer Board (NCB) to centre the key responsibilities for the ICT industry in one agency. More recently in 2016, the IDA and the Media Development Authority (MDA) were merged to form the IMDA, to deepen regulatory capabilities for a converged infocomm and media sector, and ensure a consistent regulatory framework.

and provide funding to catalyse private-sector investment for an NBN that would: (a) deliver high access speeds far in excess of the prevailing DSL (digital subscriber line) and cable broadband infrastructure; (b) offer competitive wholesale and retail prices to promote adoption; and (c) support the delivery of innovative services. This required engaging the broadband industry and restructuring it via an effective open-access industry structure that covered a combination of regulatory and contractual requirements:

- **Commercial considerations** – such as acceptable business models, limits on pricing and charges for key services, permitted rates of return and financing arrangements.
- **Regulatory considerations** – such as the need for an open-access industry structure to ensure effective non-discriminatory wholesale access, competition issues, price-control mechanisms and interconnect offers (acceptable to the telecommunication industry and bringing about greater vibrancy and innovation in the retail services market).
- **Technology considerations** – such as whether the network would be futureproof and how the network and business systems would be designed and deployed to meet strategic requirements such as ‘effective open access’.

With the critical bottlenecks being addressed by the open-access industry structure, there are over 30 service providers in the NBN broadband market today, offering a gamut of innovative and differentiated services at lower prices with better value, such as 1Gbps plans for as low as ~US\$25 per month.

Still, the perennial question “is this enough?” kept arising as Singapore looked to the future. The answer was decidedly “no” and so the solution was to be bolder – especially in this new digital age, with the digital economy knocking at the door.

Fostering a Positive External Regulatory Environment for the Digital Economy

Globally, digital transformation is changing the way businesses operate, creating new growth prospects for firms, and providing new opportunities for citizens. Regionally, Southeast Asia's internet economy continues to experience rapid growth, more than doubling since 2015 to hit US\$72bn in 2018.

As a small and open economy, Singapore is keenly aware of the importance of helping its businesses and workforce prepare for, and thrive in, a digital era, against this backdrop of digital transformation and regional opportunities. IMDA's framework for action consists of three thrusts to enhance Singapore's digital economy:

- to help industries and companies accelerate their digitalisation journeys;
- to strengthen Singapore's ability to compete internationally, through open innovation and the fostering of new ecosystems, enabled by digitalisation; and,
- to transform the information technology and telecommunications sector (including media) to deepen capabilities in frontier technologies and nurture the next generation of globally competitive digital champions.

A key and critical enabler to support the above growth pillars is to ensure that policy and regulations remain relevant and forward-looking in a digital world, particularly in the areas of data-privacy laws and data protection, whilst promoting cross-border data sharing and calibrating and collaborating with industry in areas such as artificial intelligence (AI) governance and ethics.

Promoting cross-border data flows

Data plays an important role in the global digital economy, where rapid adoption of cloud computing, Big Data, the internet of things (IoT) devices and AI increases the need for data to flow across geographical boundaries. However, at present, companies continue to encounter challenges that hinder such cross-border data flows, eg. having to grapple with a patchwork of different data-protection laws in various jurisdictions.

Singapore supports a more seamless flow of data across borders, as long as it is done securely and between jurisdictions that have comparable data-protection standards. At the regional level, IMDA has helped set baseline data-protection principles by contributing to the Association of Southeast Asian Nations (ASEAN) framework on digital-data governance. It also supports multilateral certification mechanisms like the Asia-Pacific Economic Cooperation (APEC) cross-border privacy rules and privacy recognition for processors systems. The IMDA also participates in free-trade agreements that safeguard data flows such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

The IMDA will continue to work with like-minded regulators around the world to nurture such an environment of trust. For example, it has recently signed a memorandum of understanding with both the UK and Hong Kong to foster greater collaboration in this area.

The rapid growth of the global digital economy also requires the adoption of a different approach to the thinking around trade and trade rules. Recently, the IMDA began talks with Chile and New Zealand on the Digital Economy Partnership Agreement (DEPA). Through DEPA, the IMDA aims to set forward-looking standards on digital trade, and establish new international approaches to support the digital economy and trade in the digital era.

Responsible and accountable use of AI

Frontier technologies such as AI have immense potential to deliver benefits to businesses, workers and citizens. However, harnessing the value of such new technologies can present difficult trade-offs, especially for regulators – in giving sufficient space for the industry to develop innovative applications and services, while at the same time ensuring that the interests of the end-users, and society’s trust in the digital systems, are protected.

To that end, the IMDA has been working on several initiatives to promote the responsible and accountable use of AI.

It has set up an advisory council on the Ethical Use of AI and Data to assist in engaging stakeholders on issues that support the development of AI governance capabilities and frameworks. These include engaging commercial enterprises on ethical and related issues arising from private sector use of AI and data; consumer representatives on consumer expectations and acceptance of the use of AI; as well as members of the private-capital community on the need to incorporate ethical considerations in their investment decisions into AI-related business.

It has also released a Model AI Governance Framework for adoption and feedback. The framework seeks to provide private-sector enterprises with readily implementable guidelines on how to address key ethical and governance issues when deploying AI solutions, and exemplifies Singapore’s commitment to invest and build capabilities in AI.

Singapore also partners the World Economic Forum’s Centre for the Fourth Industrial Revolution (C4IR) to bring a global perspective to our work.

Looking Ahead – Balancing Future Growth and its Risks

Singapore's and IMDA's experience over the past 50 years have demonstrated that the pace of technology change will only get more rapid and that as a regulator (and for the industry at large), we must embrace change pro-actively and be constantly on the lookout for what new technologies are out there, and how in turn these may impact markets, consumer demand, and shifts in the global infocomm environment.

Looking forward, the new world out there is full of promises and challenges. Even as regulators grapple with the ongoing developments in fields of data, AI and IoT, other new technologies such as quantum computing and quantum communications and the decentralised, dense and connected network infrastructure of the future (5G/6G; software-defined networking [SDN] and network functions virtualisation [NFV]) are already almost upon us. While these provide opportunities for even greater communications advancements, they also imply that challenges such as cyber-security threats will multiply exponentially, and with increasing sophistication and complexities. The dynamics illustrate a key quandary encountered when looking to the future – ie. how we as regulators maintain a balance between facilitating innovation and driving growth, whilst mitigating/containing risks?

No one has all the answers. But the IMDA looks forward to working with its industry partners and like-minded regulators around the world to address these challenges and develop forward-looking policies and regulations that strike the right balance between supporting greater digitalisation, and technology development, whilst protecting consumer interest and trust.



Leong Keng Thai

Leong Keng Thai is the Deputy Chief Executive of the IMDA of Singapore, and has more than 36 years' experience in the telecommunications industry. He has played a key role in significant milestones for the industry, including the full liberalisation of the sector; the introduction of a competition regulatory framework; and the deployment of the Next Generation Nationwide Broadband Network. He concurrently serves as the Chairman of the Personal Data Protection Commission (PDPC). In addition, he is a Commissioner to the UN Broadband Commission for Sustainable Development; and Senior Advisor, International Strategy Unit at the Ministry of Communications & Information. He holds a Bachelor of Engineering (Hons) from the University of Singapore and a Masters in Business Administration from the University of Southern California, USA. He also attended the Advanced Management Programme at Harvard Business School.



Chia Aileen

Chia Aileen is the Deputy Chief Executive and Director-General (Telecoms and Post) of the IMDA, a statutory board in the Singapore government which regulates the infocomm, media and postal sectors. She seeks to create a competitive, internationally connected and trusted environment to enable the development of these sectors. Chia Aileen is also a member on the Competition and Consumer Commission of Singapore. She holds a Bachelor Degree in Economics (Hons) and a Masters in Public Policy from the National University of Singapore.