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TOP 10

Information and Communications Technology Trends for 2022-23

The following is a summary of my predictions of the ICT trends for 2022-2023. They have been selected because of their impact on the industry and they forecast what is expected to happen or start happening, within the next 12-24 months. This information incorporates input and insights from several sources, available in a supporting document.

- Kevin Bloch

> "In 1975, intangible assets accounted for only 17% of total S&P 500 assets. By 2020, intangibles had grown to be 90% of assets."
>
> Australian Financial Review, 2nd February 2022

Digital transformation has now become just digital delivery. Everything the internet did to music and newspapers is happening everywhere. Expectations have changed in both our personal and business lives and interactions. In many instances, we assume 'digital by default'. Innovation platforms including Artificial Intelligence (AI), Robotics, Energy Storage, DNA Sequencing, and Blockchain Technology, are evolving and converging. The impact is enormous as demonstrated in areas such as genome sequencing (reduced from 13 years in 1990 to under 8 hours in 2022), intelligent energy distribution (enabling virtual power distribution) and precision agriculture (autonomous harvesters). The enormous and sudden rise of digital has two-sides. On the one hand, we have been caught short in areas such as skills, supply chains and cyber risk. On the other, technologies such as robotics and AI, may be the ideal solution to address these global challenges.

1 Network & IT Infrastructure – the infrastructure-less enterprise

Cloud and 5G are converging to transform enterprise network infrastructure architecture, acquisition and deployment. Organisations today typically host most of their applications in 3-6 public clouds allowing these apps to be generally accessible from anywhere. 5G has become the de-facto connectivity service globally. It enables broadband (100Mbps – 2Gbps)) connectivity at scale. Cloud and 5G will profit from the fly-wheel effect of increasing demand, falling costs, technology maturation and an expanding footprint. They will question the need for enterprise investment in - and ownership of - infrastructure, including compute, storage, cybersecurity and network. Infrastructure managers will shift focus from managing hardware elements (such as switches, routers and servers) to managing the user-or-device-to-app experience. Legacy software and hardware providers are likely to be vulnerable.

2 Mobile - 5G becomes mainstream, more open, and chews into fixed line services

Innovation, investment and standardisation of 5G has led to its enormous and rapid deployment and uptake globally. 5G became mainstream in 2021 with the commercial availability of a variety of 5G handsets and intense competition. Focus is shifting to the Radio Access Network (RAN), in particular to OpenRAN, where operators hope to drive down costs through increased competition and by leveraging economies-of-scale afforded by cloud. Geo-politics and supply chain challenges have further intensified interest in OpenRAN and shared / multi-tenanted RAN. 5G will transform traditional broadband access networks and technologies. Some predict that as much as 50 per cent of fixed connections will move to FWA (fixed wireless access) by 2025. Private 5G will be deployed initially in manufacturing. 5G will also challenge the viability of alternative access methods such as Wifi, Dedicated Short-Range Communications (DSRC, in connected vehicles) and Low Power WAN (LPWAN) technologies such as LoRaWAN and Sigfox (5G's first victim).

3 Cloud/Edge – cloud growth is inexorable, intelligence spreads to the edge

The top 3 hyperscalers continue to consistently deliver double-digit growth, and cloud continues to dominate every aspect of IT in every industry. Hyperscaler capital expenditure, which surpassed that of telecommunications operators last year, is expected to double over the next 5 years to US$350B. Interestingly, the move to cloud is still just beginning, with only 10-15 per cent of enterprise IT spending moving to cloud so far and 20-30 per cent of workflows. From an end-user perspective, as more workloads move to cloud, the need to simplify operations will intensify.

Intelligence will spread towards the network edge driven by use cases requiring low latency (such as connected/autonomous vehicles, metaverse/Virtual Reality (VR) apps and cloud gaming) and/or where backhaul bandwidth is insufficient. New low-cost systems-on-a-chip that integrate compute, storage, communications and AI on low-cost silicon will enable this migration of intelligence closer to the endpoints. Deployment of edge data centres will support this demand and in doing so, alleviate energy constraints confronting data centres in major cities. The edge is a strategic opportunity for cloud, Over-The-Top (OTT) and satellite operators to insert closer to the customer and broaden their footprint.

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4 Cyber security - unpredictable, unstoppable attacks demand a different approach

Latest cyber security breach statistics have one thing in common - matters are only getting worse - from data breaches to ransomware (US$6T damage in 2021), to cryptocurrency laundering (up 30 per cent). Remote work became the default mode during the pandemic rendering organisations and individuals even more vulnerable to cyber-attack. While some workers will return to the office, hybrid work will become the norm and accelerate demand for new approaches such as:

- *Zero Trust* – cyber experts (National Institute of Standards & Technology, NIST) and governments (eg US, UK) advocate that the foundation tenet of building a secure architecture is that "no actor, system, network, or service operating outside or within the security perimeter is trusted". Zero Trust will increase priority of app security, policy and identity management.
- *Cloud migration* – workloads hosted on cloud increased from 46% (2020) to 59%(2021). Leading vendors are shifting their product offers to cloud as quickly as they can.
- *Software supply chain* – over 500 million new apps are expected to be developed over the next 3 years, nearly all of which will use open-source software (OSS). The trustworthiness of OSS will become more pronounced particularly given the fallout from incidents such as SolarWinds and Log4j.
- *Consolidation of vendors and platforms* – as cyber complexity, attack sophistication and acute skill shortages increase, organisations will consolidate both their platforms and number of vendors. Automation and extended detection and response (XDR) become more significant.

5 Telecoms - Hyperscale telco transformation

When ATT handed over its network cloud business to Microsoft, it signalled that one of the oldest, largest telcos is incapable and/or doesn't have the skills to build and operate its own cloud-centric infrastructure. More telcos are expected to follow and the hyperscalers are ambitious, armed and ready.

Operators have been under increasing margin pressure ever since the OTTs emerged in the early 2000s. Given the massive amount of capital investment required for modern telco infrastructure, the situation is unsustainable. Cloud providers, who already own and operate some of the largest global networks and telecommunications assets, are well-placed to move deeper, as cloud-centric, cloud-native architectures prove to be more commercial and technical viable. It is becoming easier to predict the role of hyperscaler providers in telecommunications in the future, than it is to predict the future of telecommunications providers.

6 AI - general purpose AI showing significant cost reductions

Artificial Intelligence (AI) training costs are declining at more than twice the rate of Moore's Law, as performance is increasing significantly. When OpenAI released Generative Pre-trained Transformer 3 (GPT-3) in July 2020, it marked the first time a general-purpose AI became available. GPT-3 is a large language model that uses deep learning to generate text, ranging from translation to poetry composition, using just a small amount of input text. From 2015 to 2020, the cost to train a GPT-3 sized model dropped 65% at an annual rate, from $875 million to $4.6 million. It is predicted that this cost will decline another four orders of magnitude to $500 in 2030. The implications are profound and transformational – from generating code from a spoken command (AlphaCode) to recent breakthroughs in protein folding (AlphaFold) which opens new options for treatments for diseases or finding enzymes that break down industrial waste.

7 Gaming – to cloud then the metaverse

Microsoft's audacious $US75 billion move on games publisher Activision Blizzard detonated a bomb under the games industry. Gaming is set to become a key battleground for tech companies that want to maintain their central role in the digital lives of billions of users. In 2021, revenue from virtual games and platforms reached US$129 billion far outpacing the pre-COVID global box office or three times streaming video. Fifteen years ago, there were about 200 million gamers in the world, and today there are about 2.7 billion. Video games have come to be seen as one path towards these more immersive online worlds. Gaming, according to Microsoft CEO, Satya Nadella, "will play a key role in the development of metaverse platforms." Stakes are sky-high and intense competition will occur led by global brands including Tencent, ByteDance's TikTok, Amazon's Twitch, Google's YouTube and Meta through its Oculus headsets.

8 Metaverse - important trend or next Dotcom bust?

Put simply, the metaverse is the 2022 version of virtual reality (VR). It is a world built out of software that at first glance could be dismissed as a fad but there are several important signals that suggest it should be taken seriously. For example, Facebook changed its name to Meta (it may have had other motives) and committed $10b to the metaverse business unit in 2021. Goldman Sachs' recently called the metaverse an "$8 trillion market opportunity", or about the size of the GDPs of Germany and Japan combined. Covid accelerated the metaverse vision. It forced most of the planet to go digital and in doing so, to gain familiarity with a virtualised world for work and play. At the same time, the tech around us continued to get better, faster, cheaper: the AR/VR headsets; the compute power of mobile phones, laptops, and gaming consoles; the chipsets; the nearly ubiquitous cloud; 5G and fiber-to-the-home. The metaverse is considered to be a part of the next form of the internet (Web 3.0). Is it already too big to fail or simply too big to ignore?

9 Web 3.0 – trust and control raises the stakes

Web3 is a decentralized version of the internet where platforms and apps are built and owned by users. Unlike Web2 (the current web), which is dominated by centralised platforms such as Google, Apple, and Facebook, Web3 will use blockchain, crypto, and NFTs to transfer power back to the internet community. The reasons Web3 is attracting so much interest comes down to two key elements:- higher levels of trust in 'the system' (such as payments, valuation, certification); and decentralised ownership and control. The stakes are extremely high which explains the intense level of interest and multi-billion dollar investments by all of the world's largest technology companies (who also happen to be the most highly capitalised).

10 Skills, Talent - crunch worsens, automation critical

Absenteeism and Covid, supply chain challenges, border constraints, personal stress and changing skill requirements are amongst several factors that has led to a massive, global shortage of skills and talent. These changes happened faster than anyone could have imagined or prepared for. The problem is nowhere more evident than in technology-related roles. During this turbulent period, employees have been under such pressure that one survey showed 90 per cent had experienced burnout (up from 71 per cent a year ago) with many saying that hybrid work isn't cutting it. Many are quitting. Unfortunately, none of the skill shortage problems are expected to change soon. Organisations will resort to boosting wages to attract talent, while future-fit firms will accelerate adoption of automation, cloud-first and platform-based architectures and low-code/no-code solutions, to reduce their need for the most advanced technical skills. Robots and automation will become less an ethical issue of replacing jobs and more an existential issue of improving productivity and filling vacancies.