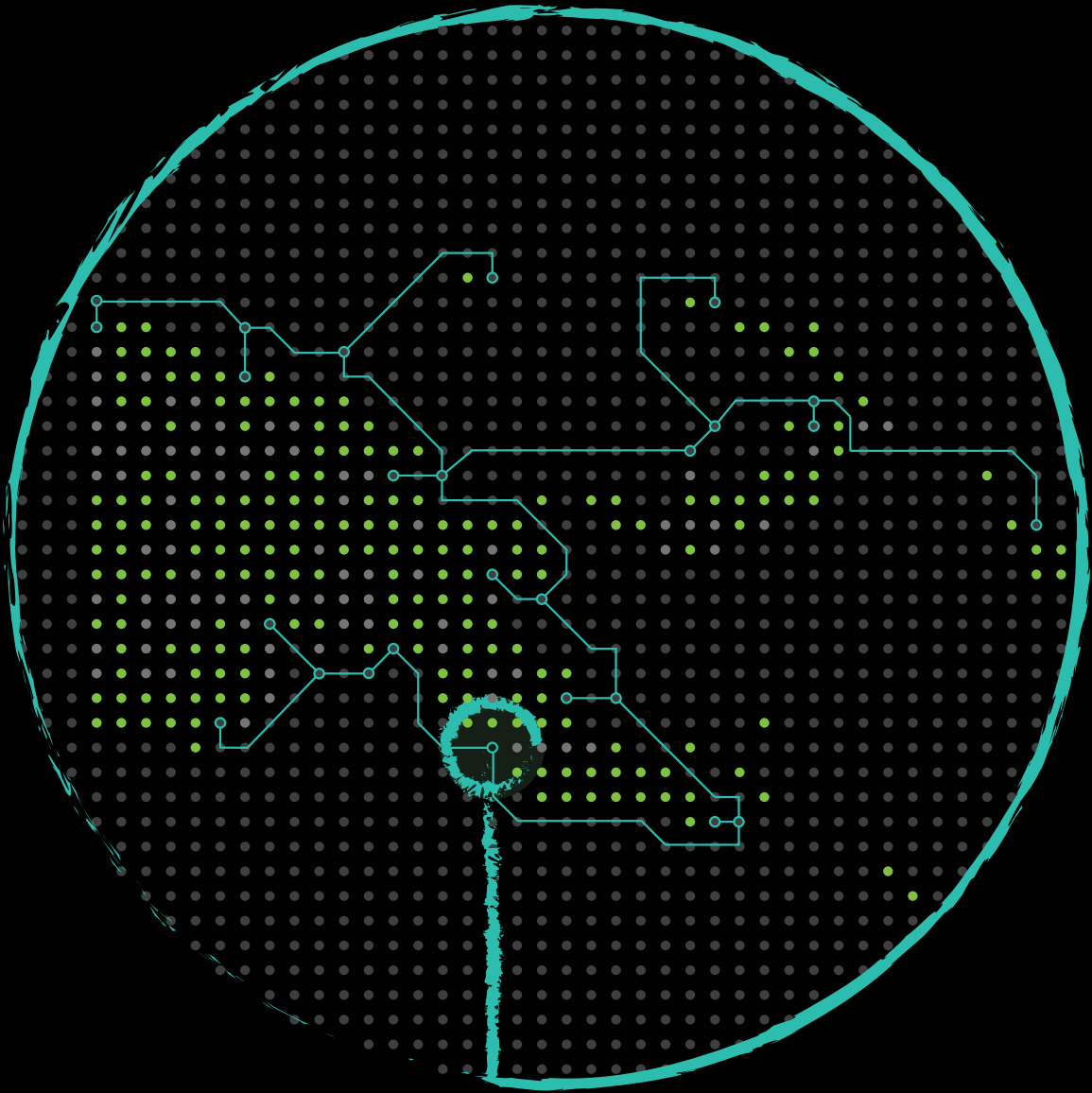


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Connecting Papua New Guinea

The Dawn of the Digital Era

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Centre for the Edge
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Connectivity has been the driving force of the digital era.

The emergence of the web in 1993 was a combination of existing telephone networks, personal computers and the web browser to make information accessible. At that time, there was a small amount of information online, it was slow and expensive to access. As time passed, more and more information became available online. Government and universities were early adopters and then, in the late 1990's we saw the rapid adoption by businesses in the form of websites with the ability to buy products and services online.

The Internet speeds continued to get faster while prices dropped dramatically and more and more people incorporated digital into the way they lived, learned, worked and played.

In the early days, it was difficult to set up online services of any complexity. Software was expensive, organisations had to manage their own hosting infrastructure or have it managed by a hosting company. Websites were often built from scratch requiring design and development work. The ongoing operation involved identifying fixes and functionality, updating content, as well as measurement and reporting. It also meant that organisations needed to access a wide range of new skills that weren't always readily available.

The 2000's saw some major changes. As the Internet became more pervasive, there was an increasing focus on individuals sharing their content. People began publishing blogs using free software, YouTube provided the opportunity for anyone to share videos online, Wikipedia emerged as the world's most comprehensive encyclopaedia, payment systems such as PayPal made eCommerce easier, Facebook connected family and friends and Amazon launched its Web Services group which made hosting cheaper and simpler.

Software went from something that you installed and managed to something you accessed as you required. The move to software-as-a-service (SaaS), or what we now call cloud services, meant that individuals and organisations could use the software they needed without long implementation cycles and high up-front costs. Prior to this time, success with digital technology generally came to those who outspent others, contrastingly, the new digital era meant success went to those who out-thought and out-executed others as software prices plummeted to the extent that there was often a small monthly fee or in many cases, available for free.

The emergence of smartphones and tablets at the end of the decade meant that rather than computers, devices designed for the digital era were in our pockets, and always connected at high speed through 3G networks and WiFi. As the Internet became mobile, things like paper maps became obsolete as we could navigate anywhere with our devices leveraging the GPS satellites in space.

All the while this digital activity meant we were generating ever increasing amounts of data, we would learn to make use of over the next decade.

The fundamentals of the digital era were forming **Cloud, Mobile, Social and Data.**

Today in countries like Australia, there are many things we take for granted. Whatever we want to know can be found through a Google search; if we want to know how to do something there will be videos on YouTube that show us; we subscribe to Spotify so any song we want to listen to is available; we make free video calls through Skype; the vast majority of payments are made electronically as cash is phasing out; we don't go to the shops but instead we buy online and our goods are delivered to us; our dealing with business and government are done online rather than waiting in queues.

When thinking about the enablers of the digital society: the Internet is available to everyone through the devices they have at home and in their pockets; literacy is a given, everyone has access to electricity; the vast majority of people have a bank account and a credit card; other than a few blackspots the network is available everywhere; data costs next to nothing; people have a wide range of identity documents from birth certificates through to drivers licenses, passports and tax file numbers. Over time, most people have developed a high level of digital literacy and for those that haven't they can always ask the nearest young person for help.

The above scenario is vastly different to the situation in Papua New Guinea. While there has been an explosion in the number of digital devices in the form of mobile phones only around 10% of people have access to the Internet. Electricity, Bank Accounts, Identity documents are only available to a small percentage of the population. Literacy rates are increasing but many people don't have basic literacy skills and for those who don't speak or read English there is a very small amount of Tok Pisin content available in a digital form and even less content in other local languages.

There is the PPC1 cable from Madang with a notional capacity of 10gbps which is to USA and Australia. However, connectivity to Madang over microwave links has been a perennial problem as microwave does not have the latent capacity to carry more than 2-4Gbps.

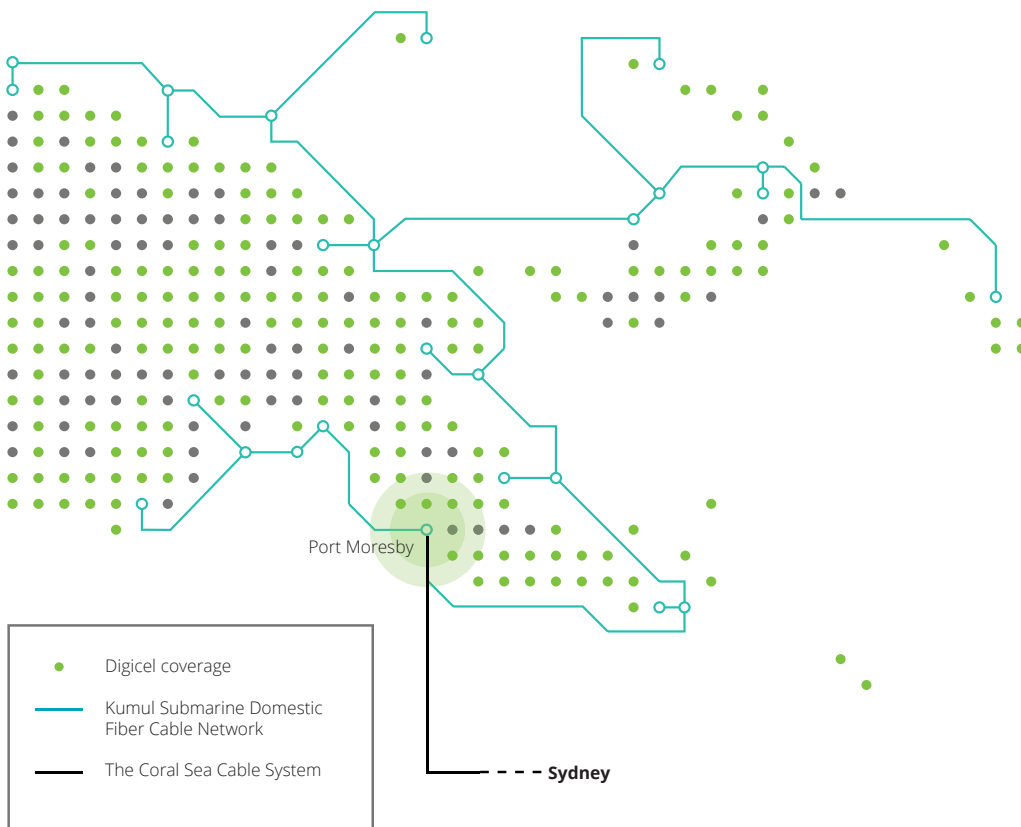
However, this is all about to change.

The new infrastructure

By the end of 2019 it is expected that the Coral Sea Cable, which provides a 1,000 fold increase in capacity compared to the existing cable, will connect Papua New Guinea to the rest of the world. In addition, the Kumul Domestic Fibre Network which comprises three systems will be fully operational.

This is complemented by the ongoing roll out of mobile networks led largely by Digicel Papua New Guinea which includes upgrading existing towers to 3G and 4G to improve connection speed.

Figure 1: Infrastructure coverage in Papua New Guinea



Source: About the Project, www.coralseacablesystem.com.au
Kumul Submarine Cable, www.pngdataco.com
Coverage map, www.digicelgroup.com

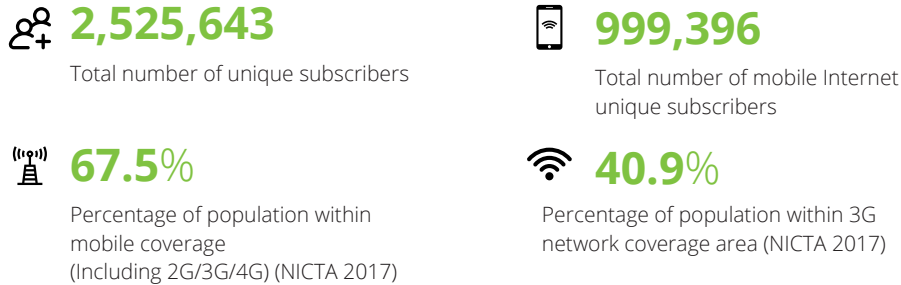
Perhaps the immediate benefit will be reliability of access. The Business Advantage 2019 Papua New Guinea 100 CEO Survey cited Unreliable Telecommunications as the number one impediment facing business right now. It has been difficult for businesses to use cloud software due to reliability and speed issues. The improvement in reliability will mean that cloud computing options are now firmly on the table.

We also expect to see wholesale data prices fall substantially. Modelling by the Business Council of Papua New Guinea suggests that data prices could fall by up to 80%. We expect that adjustments to pricing will take time to work out however reducing prices was a key part of the rationale for building the Coral Sea Cable. Affordable data prices will be a key factor in realising the benefits of the new infrastructure and encouraging people to engage with the digital era.

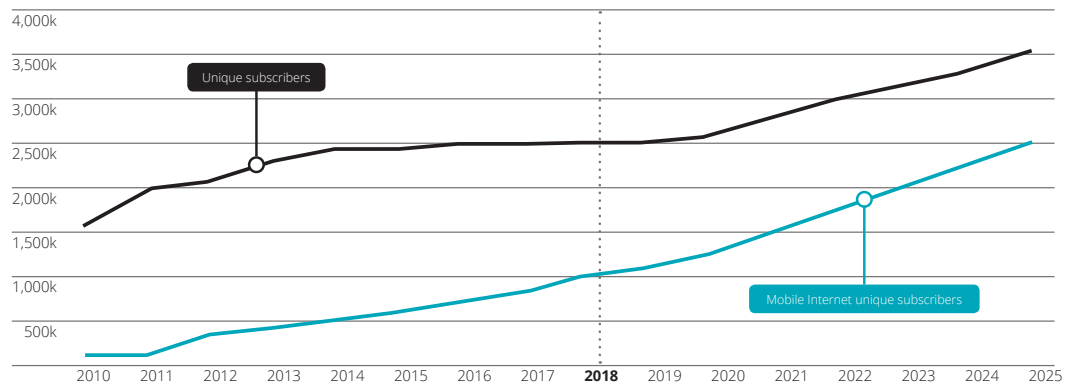
Mobile and Social

Budde Communications estimate that 90% of Internet usage in Papua New Guinea is via mobile devices. As such, any digital initiative undertaken by business or government should be viewed through a “mobile first” lens. While data relating to subscriber numbers varies, there has been a rapid adoption of mobile phones in Papua New Guinea. Not all mobile subscribers access the Internet however as more affordable smartphones and tablets come into the market, and with data prices expected to fall, we expect to see a strong increase in mobile Internet use going forward. What the adoption of mobile demonstrates is that there is a strong appetite among the people of Papua New Guinea to be more connected. It also demonstrates that people learn to use technology organically without formal training.

Figure 2: Papua New Guinea key mobile facts



Total number of unique subscribers and mobile Internet subscribers from 2010 to 2025

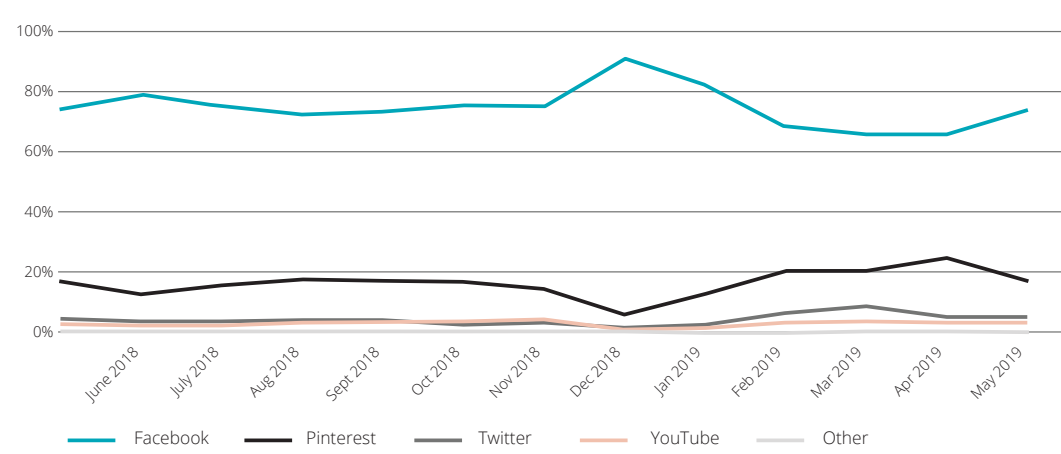


Source: Hightet, C., Nique, M., Watson, A. H. A., & Wilson, A. (2019). Digital Transformation: The Role of Mobile Technology in Papua New Guinea. London, United Kingdom: GSMA.

Social Networks dominate Internet usage in Papua New Guinea, specifically Facebook.

Anecdotally, it is quite common to hear that to many people in Papua New Guinea, Facebook is the Internet. This makes sense as accessibility to the Internet, driven by the roll out of Digicel's mobile network started in 2007, around the same time as social networks really started to gain traction globally. People in Papua New Guinea use Social Networks to keep in touch with family and friends, share significant moments, organise events, discuss issues relevant to their community, report suspicious or concerning activities and finding the help or resources they need.

Figure 3: Papua New Guinea social media statistics (May 2018 - May 2019)



Facebook	Pinterest	Twitter	YouTube	Instagram	Tumblr
74.1%	16.63%	4.78%	3.06%	0.71%	0.22%

Source: Social Media Stats from statcounter - GlobalStats

Businesses should have mobile and social as key elements of their digital strategy for activities like promotion, marketing, recruiting and customer service. Business should also be looking at how to use social technologies to better coordinate and communicate internally. For example, Workplace by Facebook is social networking technology focused on improving workplace collaboration and productivity. The good news is that you don't need to do a lot of training as many employees are already familiar with the technology, it is just that they will be using it in a work context. There are many similar technologies such as Microsoft Teams, Yammer, Slack, WhatsApp or Telegram. For more complex project work, social project management software such as Asana or Basecamp are effective.

Cloud

Without reliable digital connectivity to the external world, Papua New Guinea businesses have not been able to take full advantage of cloud computing. The adoption of cloud computing by business and government in developed countries has gradually increased over the last 15 years, a recent Deloitte report, The CFOs Guide to Cloud identified 93% of businesses have or were actively considering adopting cloud computing. They see the promise of lower costs, but more importantly, it is strategic value that often tilts the balance.

- **Reduced time-to-market.** Cloud platforms enable companies to scale and launch new products and services quickly—and assess their impact in real-time.
- **Scalability.** By being able to provide extra resources when required, businesses can effectively manage spikes and lulls in demand.
- **A way to drive agility and innovation.** Major vendors are bundling significant new capabilities with their cloud offerings, providing more ways to stay nimble and innovative.

Software-as-a-service	Infrastructure-as-a-service	Platform-as-a-service
<p>SaaS is the most commonly used cloud service. With SaaS, companies pay for finished application on a subscription basis. Almost any software you can think of, is available as a service or will likely be soon.</p>	<p>IaaS allows customer to obtain resources without actually purchasing hardware. This approach has the potential to eliminate capital expenses. The marketplace for IaaS has matured rapidly, with dozens of provider eager to handle almost any need you have.</p>	<p>PaaS can be used by organisations that want to develop new software applications without needing to acquire and install the hardware and operating system. It also provides access to different, new and innovative services, such as facial recognition, the Internet of Things and Artificial Intelligence.</p>

Another key point is that the cloud has leveled the playing field between large and small businesses. The subscription model used by most cloud computing companies is based on paying for what you use as you use it. So large companies with many users will pay more than a small company with only one or two users. For example, Salesforce, a pioneer in cloud technology for customer relationship management, it is used by many of the world's largest companies as well as many micro not-for-profit business across the world.

The eCommerce opportunity

While there are some good examples of eCommerce in Papua New Guinea, particularly in tourism with the major hotels and Air Niugini, it is not mainstream. In the domestic market low levels of financial inclusion, particularly in the rural areas, difficulties with logistics and low levels of trust in technology combined with the lack of connectivity to the external world and high data prices mean that eCommerce is in a very nascent stage. There are good examples such as Fortuna Online which servicing the urban centres of Port Moresby and Lae.

The new infrastructure will make it easier from a software and reliability point of view as there are low cost cloud based tools for setting up an online store such as Shopify or Big Commerce, however businesses may have to introduce new capabilities to engage in eCommerce from picking, packing and dispatching to customer service and dealing with returns.

For Papua New Guinea businesses looking to sell internationally, these same software tools can be used, however, they will need to develop new skills in digital marketing, search engine optimisation and building their online brands.

In terms of payments, cash is still the king for the majority of day-to-day transactions. This creates security issues as well as long queues at banks and government agencies. The absence of electronic payment options means that people need to be physically present to transact.

There is a focus in Papua New Guinea on its national identity scheme together with creating digital identities for individuals to enable inclusion and participation. While an identity framework could be an important long-term goal, perhaps the short-term focus could be on how to achieve financial and digital inclusion without identity while working on the longer-term outcome. Most developed countries do not have a digital identity system or National ID Card notwithstanding that their citizens have a multitude of identity sources such as birth certificates, drivers licences, Medicare cards, electoral rolls, utility bills, land titles, and bank accounts etc. A way to think about it could be that 'identity' is an end-point rather than a pre-requisite.

We have also observed enthusiasm in some areas for emerging technologies such as blockchain for managing identities and payments. Blockchain is an emerging and to a larger extent, unproven solution that is yet to achieve mainstream usage. The most prominent blockchain project is Bitcoin. Statista estimates that there are 35 million Bitcoin wallets globally as of March 2019. This is less than ½ of 1% of the global population that use Bitcoin, excluding the fact that many users have more than one wallet. Blockchain solutions require bandwidth, low cost data and electricity with sophisticated users and strong technology skills. This is certainly not the environment in Papua New Guinea. It could be that blockchain emerges as a viable solution at some point in the future but it is not the place to start in Papua New Guinea.

The opportunity for Government

The New Infrastructure provides a world of opportunities for government. In developed countries, the various levels of government have found their way online over the course of the digital era. Interactions with Government that require registrations, renewals, completing forms or making payments are in the most part carried out online.

In Australia, Deloitte has been working with local government and cloud software partners to help local government rapidly migrate online. Deloitte have developed a menu of services that digitise many of the transactions between government agencies and their citizens. It is a digital government services solution-in-a-box, offering a simple, scalable way to build a digital service catalogue. It allows government to transform the way it engages with citizens over time.

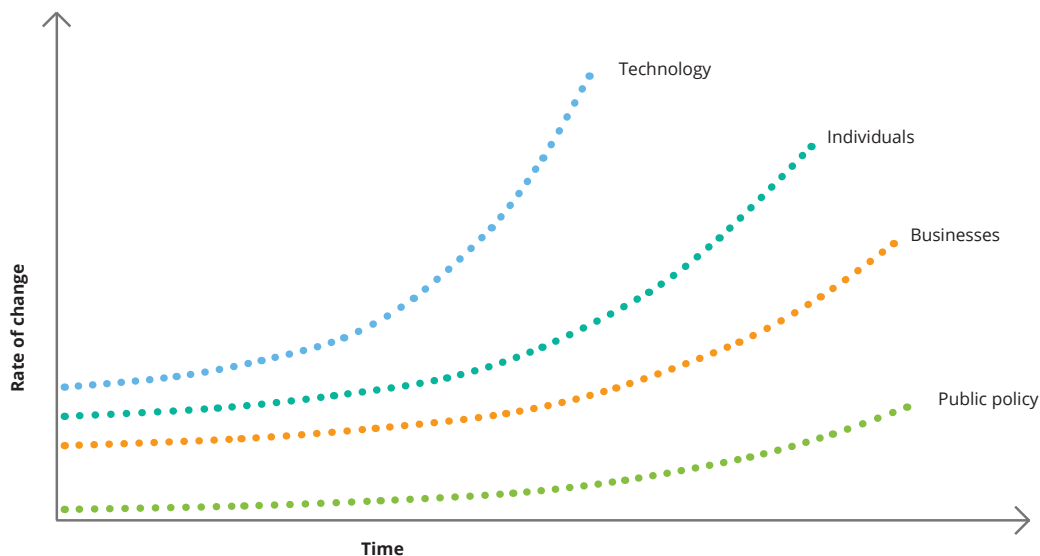
Again this is an opportunity to leap frog without needing to make large upfront investments in technology.

On the policy front, typically, we see that technology emerges and is initially adopted by individuals, then business and government, however there is generally a lag in developing policy. This makes sense in that governments cannot make policy for technology before it exists. As with any technology, digital creates many opportunities but it also creates new issues to deal with, for example privacy, security or online harassment.

Perhaps the most pressing policy focus should be maximising the benefits of connecting to the digital era by:

- Ensuring that data prices fall in line with the massive increase in capacity.
- Encouraging use by government departments and agencies both within their organisations and in their dealings with citizens.
- Leveraging digital as part of the education system, both in terms of accessing education material and resources together with building digital capability in students and teachers.

Figure 4: What is *actually* happening



Building and accessing capability

A consequence of Papua New Guinea being unable to participate fully in the digital era, is that many people have minimal exposure to the art of the possible in the digital world. Even in urban areas, digital literacy and capability is low. As digital technology has not been a key part of education, business, government or society there is a shortage of people with digital competency employed throughout the economy.

One attribute that Papua New Guinea has that many countries do not is a high percentage of young people. Our observation is that like most countries in the world, young people in Papua New Guinea have higher levels of confidence with digital technology compared to older people. Even though Papua New Guinea hasn't had the high speed connections our experience is that young people in Papua New Guinea have strong digital "saviness" or "street smarts", they are able to work out how to get the most out of the technology available to them even though they are in a constrained technology environment. Another common factor is that the older generations call on the younger generations to help them navigate through the basics.

Many young people in Papua New Guinea do not have the opportunity to go onto higher education but have good digital skills. It occurs to us that with some basic training these young people could be assisting and coaching people in business, government, education and health in the use of digital technologies. Combined with their skills in using social media, they could be sharing their challenges and solutions to maximise the opportunities digital offers to Papua New Guinea.



Source: Annalucia.

A call to action

To make the most of the digital opportunities, business will have to take a leadership role. This will be as much about developing new attitudes to how business could be done in the digital era together with a willingness to try new things.

One way is to “apply a set of digital lens” when looking at an opportunity or problem. For example if there is a long queue and people standing in it are all looking at their phones, that would suggest that there could be a digital solution to clearing the queue.

Another would be to bring in some young people who can coach and assist existing employees on how to use the technology, together with identifying possible solutions. This is not a matter of training, it is about having people who can help others build their confidence and capability.

Be willing to look at how your employees and customers currently use technology and make your services fit with how they currently operate. If your staff all use WhatsApp to message each other, encourage them to use it for work purposes. If your customers are all on Facebook, make sure you are there as well.

If your employees don't have access to financial services or mobile, help them get established. Wherever possible ensure that your employees have access to the Internet. Provide WiFi at your business locations so employees can build their digital literacy and become familiar with using technology as part of their work. Ensure employees have access to digital devices and provide support in how and when to use them. Run lunch and learn sessions where you collectively explore different aspects of digital. Teaching people how to search effectively could reap significant benefits and help people learn to help themselves to learn. A big mistake made by many businesses in developed countries was to block access to the Internet only to make it available some years later. We saw the same pattern with social media and cloud computing. YouTube was often blocked, seemingly around the concern that people would be focused on entertainment rather than work. It makes more sense to focus on the benefits of having the world's most diverse collection of “how to” videos, where people can learn to solve problems they encountered in their day-to-day work. Many businesses establish policies around social media and IT use in the workplace and there are templates available online. Policies oriented to what people should do rather than what they shouldn't do, create a more positive digital culture. Choose a social media platform that suits your businesses and employees and encourage people to share things online. This could include posting about new products or services, interesting news articles relevant to your business and industry, seeking help around day-to-day issues or providing remote technology support.

In an earlier Centre for the Edge research publication, *Rethinking Social – Building the Social Organisation*, we stressed the importance of leaders engaging with their workforce through social software to maximise the benefits and also learn about what is happening at the front line of your business.

The fundamentals of the digital era are cloud, mobile, social and data; make sure any digital initiative ticks all of those boxes.

Focus on using the most simple and basic tools that are accessible. For example, Google offers Google Drive for file-sharing, and Google Docs for writing and collaborating on documents. These services are free and high quality, remember the digital era is out-think and out-execute not out-spend.

The digital era will continue to evolve so starting with the simple things to build your digital muscle is far more preferable than starting with the hard stuff.

There is an enormous body of content online, encourage people to explore and share with others. If you need specialised skills you will find that there are places online where you can access them. For example, 99Designs has a large cohort of freelance designers who can help you with anything from designing logos and packaging to a mobile website or application. Upwork has a cohort of people who can assist with technology related skills through to accounting or customer service.

Perhaps the most important thing is a determination to try new things with a willingness to learn as you go. Many large businesses become paralysed as they avoid trying new things in case they fail. With the digital era dawning in Papua New Guinea, a new world of opportunity awaits and the benefits will accrue to those who take action.

With the **digital era** dawning in **Papua New Guinea**, a new world of **opportunity** awaits and the **benefits** will accrue to those who **take action**.

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