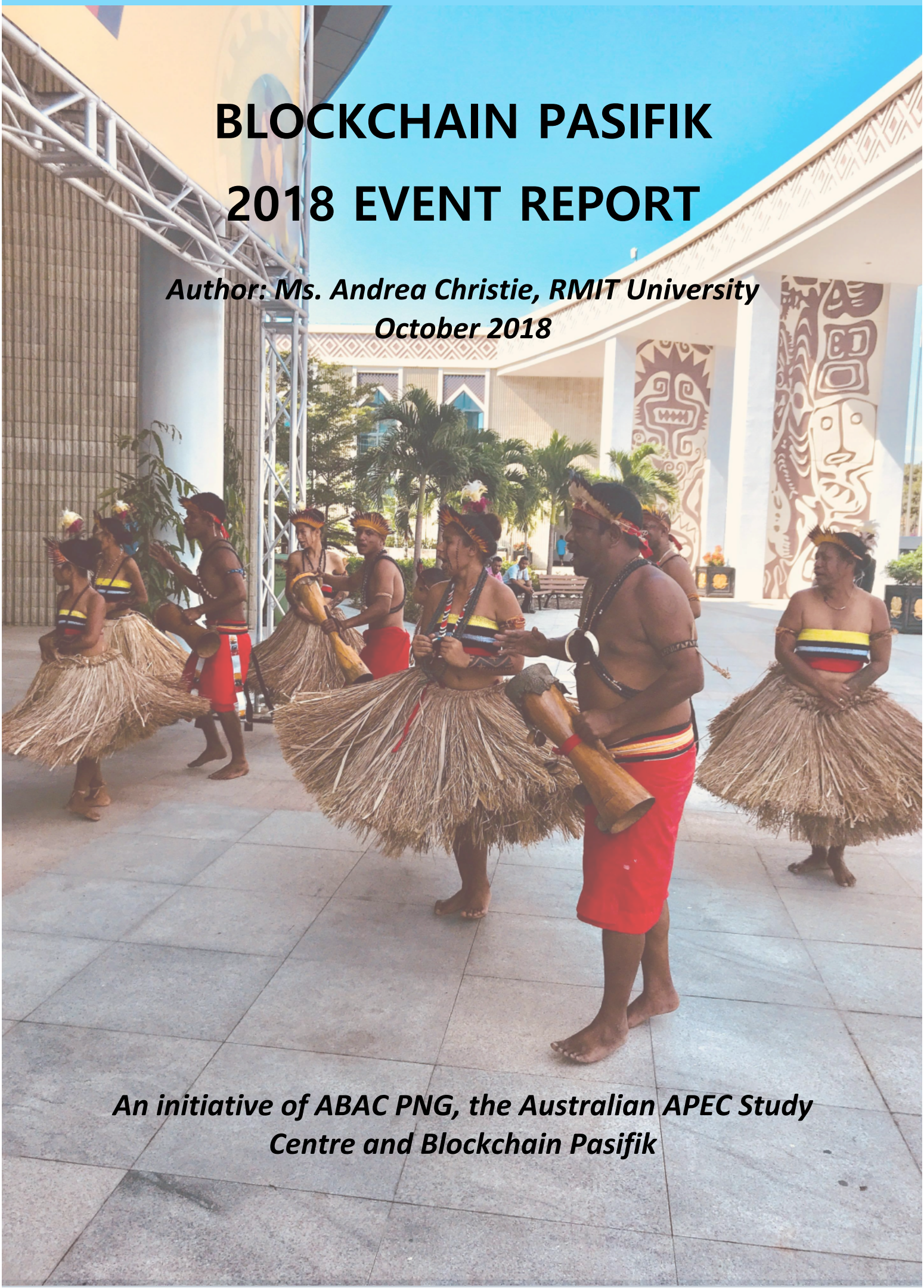
# BLOCKCHAIN PASIFIK 2018 EVENT REPORT

*Author: Ms. Andrea Christie, RMIT University*

*October 2018*



*An initiative of ABAC PNG, the Australian APEC Study Centre and Blockchain Pasifik*

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***Author: Ms. Andrea Christie, RMIT University, Melbourne Campus, October 2018***


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***All featured photos have been taken by Andrea Christie during October 2018***

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# BLOCKCHAIN PASIFIK 2018 EVENT REPORT

## 0.0 EXECUTIVE SUMMARY

The Blockchain Pasifik 2018 event was held in Port Moresby, Papua New Guinea, during the month of October, with the purpose of generating blockchain-based discussions on alleviating some of Papua New Guinea's key infrastructural challenges and priorities relating to digital inclusion. Approximately 300 guests were in attendance, with insights shared by various experts in ICT development, consulting, economic research, academia, financial taxation, law, supply chain, e-governance and social impact education. Key objectives included building consensus on critical areas in which Papua New Guinea will need to train its people, discussing new ways in which to foster design-thinking, creativity and entrepreneurship, and determining blockchain's impacts in the emerging legal governance system, such as how it might affect future regulations.

As a newly developed economic infrastructure, the blockchain ledger provides the possibility of addressing many existing issues regarding cyber-security, property ownership titles and information storage. As such, the speakers outlined several overarching problems faced by Papua New Guinea – such as a poor national property registries, inefficient supply chain systems, and liquidity issues regarding physical cash. Solutions were then discussed throughout the event, such as digitising existing identification records and transferring them onto the blockchain for greater transparency, as well as providing greater educational initiatives, collaborative and entrepreneurial support, to ensure that communities utilise their common resource pools to achieve collective goals.

Future predictions were also presented by presenters, with the blockchain expected to disrupt not only the economic sphere, but the legal and political spheres. This will require policy-makers to radically review policies regarding company law and anti-money laundering. It was also discussed whether the technology will entirely eliminate the role of central authorities in intermediating economic activities. It was agreed that while it can heavily reduce intermediary reliance for specific automated tasks, it cannot completely solve a nation's economic problems. As such, it is recommended that a system is designed whereby the blockchain and other governance mechanisms, such as markets, communities and governments, effectively support and complement each other in delivering tangible economic solutions for Papua New Guinea.

Overall, this event constituted a strong opportunity for participants to share their visionary ideas on blockchain and its potential to shape the economic future of Papua New Guinea. More specifically, it has created a space in which junior thought-leaders, entrepreneurs, technological innovators, members of government and socially conscious individuals can come together to plant the foundations for a sustainable future, founded on values such as transparency, trust, community spirit, knowledge sharing, and ultimately, digital inclusion.

# 1.0 INTRODUCTION

The host economy of APEC 2018 – Papua New Guinea – held its Inaugural Blockchain Pasifik 2018 event in October, with the overarching show theme, *"building an inclusive digital ecosystem in the pacific".* Its purpose was to facilitate open discussion on Papua New Guinea's key infrastructural challenges and priorities, particularly with respect to digital inclusion. This event has been particularly important in light of Papua New Guinea's volatile economic conditions, whereby a severe lack of economic infrastructure has generated institutional problems of trust and information uncertainty. As such, there is dire need to investigate economic solutions. One instrument may be blockchain technology – a digital, distributed, decentralised ledger that records, validates and verifies data without the costly assistance of a centralised intermediary. It is widely accepted that economies that invest in new information and communication technologies (ICTs), such as blockchain technology, are more strongly positioned to drive domestic economic growth, thereby enhancing welfare for civil society. This can be particularly beneficial for developing countries, such as Papua New Guinea, whereby the blockchain's consensus mechanism and in-built protocols can help to alleviate economic problems without reliance on centralised authorities. Consequently, Pacific leaders are encouraged to embrace these rapid technological advancements, more specifically, by providing greater opportunities for blockchain entrepreneurs, developing regulations that support entrepreneurial discoveries in this space, fostering greater discussion on community learnings and failures, and driving world-changing innovations to support Papua New Guinea's transition into a new, prosperous digital economy.

## 1.1 KEY OBJECTIVES

The event's key objectives are listed as follows:

- To explore innovative ICT solutions for Papua New Guinea, such as the blockchain's potential to alleviate institutional problems of trust and information uncertainty.
- To actively prepare Papua New Guinea for a seamless transition into the Digital age, whereby it is more strategically positioned to achieve its goal of digital inclusion.
- To introduce the audience to the basic concepts of blockchain technology, such as, *What is it? How can we harness it? How can it benefit our economy? What challenges to we need to be mindful of?* and lastly, *how do we proceed from here?*
- To build consensus on how we can provide new economic infrastructure for a diverse range of areas, including (but not limited to) property ownership titles, financial inclusion, cyber-security, supply chains and e-governance in civil society.
- To highlight critical areas in which Papua New Guinea will need to train its people.
- To discuss ways in which to foster design-thinking, creativity and entrepreneurship, so that the new generation of entrepreneurs can help to solve critical gaps in Papua New Guinea's economic infrastructure.
- To determine blockchain's impacts in the emerging legal governance system, such as how it might affect the role of lawyers, the legal risks it will provide, and how legal disputes will governed under the new system.
- To discuss energy solutions for Papua New Guinea, with respect to powering and metering its energy supply, and whether it can help process, validate and expedite this more efficiently than traditional non-blockchain means.

## 1.6 EVENT BACKGROUND

- The Blockchain Pasifik 2018 event was held on October 10-12, with approximately 300 guests in attendance. Speakers represented a diversity of backgrounds, including the Philippines, Fiji, Vanuatu, Papua New Guinea, Solomon Islands, Australia, New Zealand, France, Malaysia, Rwanda and the United States.
- On October 10, the Parliamentary Briefing was attended by approximately 70 participants at the Kokoda Ballroom (The Stanley Hotel, Port Moresby). This constituted members from Parliament, Heads of Department, industry stakeholders, entrepreneurs and local high school students. The 2-Day Conference was also an immense success, with insights shared by various experts in ICT development, consulting, economic research, academia, financial taxation, law, supply chain, e-governance, and social impact education.
- These events introduced key Blockchain concepts for economic development in the Pacific region, such as its potential revolutionary impacts in politics, law and supply chain management, and the benefits and challenges posed to local communities, private and public firms. Case applications also enabled the audience to reflect upon learnings and failures and discuss ways in which to move forward in the Pacific region.

## 1.7 SUMMARY ON BLOCKCHAIN 101

The following represents a condensed summary of speakers' explanation of blockchain technology:

- Blockchain technology is a new economic infrastructure for governing economic activity in civil society. It is not a general-purpose technology, but a way to coordinate society both democratically and economically.
- The blockchain is a decentralised, distributed ledger, which records, verifies and validates data on its digital database without the costly assistance of a trusted and authoritative third-party. More specifically, it is a shared record book, with line items of data (i.e. data blocks) that link together in a chain. It was created in the aftermath of the Global Financial Crisis, whereby people lost trust in centralised intermediaries, such as banks, insurance brokers and governments. They demanded a means of verifying legitimacy of transactions and safeguarding the integrity of the underlying asset, without the costly means of intermediation. Therefore, in 2008, Satoshi Nakamoto created the first application powered by blockchain technology called Bitcoin – which was a type of cryptocurrency (i.e. a peer-to-peer electronic currency). In doing so, Nakamoto solved the consensus problem, whereby everyone in the network could come to consensus over shared information using distributed ledger technology.
- Entrepreneurs have since developed other applications, powered by this technology. The blockchain itself is different to a bank, since it relies on everyone in the network to record the transaction and validate it as a collective. It stamps each line item in the ledger with its own unique fingerprint, known as a hash, whereby no two line-items are the same and are ordered in a linear fashion. It also solves the double-counting problem, by prohibiting someone from altering, removing or duplicating a line item through its in-built, crypto-graphically secure governance protocols. As a consensus

mechanism, it only accepts the longest valid chain as the correct version, based on what has been recorded by the majority. This implies that if an individual tries to alter or remove a line item, the blockchain will not accept the change, since 99% of the rest of the nodes will have recorded something different in their own record books. As such, it makes the data-recording process far more secure, verifiable and trustworthy.

- The blockchain can help alleviate institutional problems of trust and information uncertainty. When an individual performs an economic exchange, he or she needs to be confident of the other participant's identity, such as *who are they?* And *do they have permission to perform this transaction?* They also need to be certain that all recorded information is accurate, verifiable, fully transparent, traceable, and that it cannot be tampered with. As such, the blockchain can assist developing nations, by using in-built, crypto-graphically secure governance protocols to ensure the people themselves have full control over their own digital identities, meanwhile prohibiting users from tampering with any data recorded in the blockchain registry system.

## 1.8 CASE APPLICATIONS LIST

The following condensed list represents the case applications mentioned during the event. These may provide inspiration for possible ICT projects:

- **Diwai Network** – a blockchain based application that combats environmental pollution by facilitating the sale of forest certificates, using tokenisation and smart contracts *(see section 3.9)*
- **Startup Angels** - a start-up that aims to increase internet accessibility and affordable for rural communities, by providing them with the educational tools necessary to drive collaboration, so that they can use collective-action to solve community problems using the scarce resources available *(see section 3.10).*
- **Electron** – a London-based blockchain platform that offers energy supply solutions, by enabling users to switch seamlessly between all 26 energy companies operating on the blockchain *(see section 3.11).*
- **Power Badger** – an initiative that processes, validates and provides energy, using the power of blockchain. This can be used not only to power mining activities, but to power households and cities, using crowdsourcing so that communities can more efficaciously share their energy supply *(see section 3.11).*
- **Fiji Tuna Traceability Project** – a WWF initiative that enables consumers, primary producers and organisations to more accurately track supply chain information in real-time, using electronic identification tags that are scanned at every intermediary step along the way; this is especially beneficial for perishable goods and financial aid tracking *(see section 3.12).*
- **AgiUnity** – an ICT solution, powered by crypto-algorithms (similar, but not the same as, blockchain technology), whereby farmers can plan and securely track their produce more efficaciously on an integrated smartphone system. Farmers are provided with a solar-powered smartphone that can be used offline, without internet or energy charging required. This allows them to effectively monitor progress of their harvest throughout the processing cycle, more accurately document transactions, connect

farmers and demanders together more effectively, and protect farmers in situations whereby large corporations could otherwise demand lower prices *(see section 4.4).*

- **Oxlab donations platform –** an Oxfam pilot program whereby the donations supply chain system is powered by the blockchain; more specifically, it enables participants to directly transfer donations to the end user using crypto-tokenisation, thereby eliminating need for an internal middlemen along with any additional administration costs *(see section 3.13).*
- **Oxlab cashless voucher system –** an Oxfam pilot that addresses response-timing issues in disaster areas, using cashless vouchers to ensure victims receive support faster. The victim is given a digital voucher that can be used to pay for goods and services that they need with small, local vendors that have partnered with Oxfam. This not only fixes liquidity issues in vulnerable areas and supports small local vendors, but alleviates victims' concerns that they will be taken care of *(see sections 3.13 and 4.2).*
- **ImpactFolio** – a global blockchain project run by ConsenSys and WWF that enables viable entrepreneurial projects to receive the funding that they need to scale. More specifically, it gives expert "curators" on the blockchain platform specialised utility tokens to vote on projects that they think are of high quality and will be successful (i.e. a process called "staking"). They can also challenge projects that they believe are ineffective, thereby helping to improve the funding process for viable projects *(see section 4.0).*
- **ADB Leasing Smart System** – a blockchain platform that protects indigenous land owners' investments, by giving them full transparency on the lease application process. Applications can be submitted and approved online, along with registration and stamp duties. This streamlines the process for all parties involves, by providing users with detailed land lease and price information, along with greater connectivity and the ability to compare lease prices across districts *(see section 4.6)*.
- **Coin Sure** – a platform designed to mitigate crypto-based risks, by protecting crypto-holders' underlying wallet value against volatile movements *(see section 4.9).*

## 1.9 ECONOMIC PROBLEMS FACED BY PAPUA NEW GUINEA

The following represents a list of economic infrastructural problems raised by speakers and audience members:

- **ICT and blockchain awareness**: There is generally a widespread lack of public, private and community awareness as to the benefits that ICTs (e.g. blockchain technology) can provide and its potential role in ensuring a prosperous future for Papua New Guinea.
- **ICT infrastructure**: Papua New Guinea currently lacks the capital infrastructure needed to power ICT-based solutions, including internet connection, energy supply, funding and ICT devices. For example, with respect to funding, the nation currently relies on either on single rich investors or shared investments for raising funds. However, these are not always effective. For example, in the case of a single rich funder, these are rare to find and can be potentially monopolistic. Meanwhile, with respect to shared investment funding models, these can be hierarchical and profit-centred, with large non-profits rare to find.

- **Entrepreneurship**: incubation centres are very important for fostering innovation and support for entrepreneurs, so that they can build effective technology solutions for our economy. However, empirical evidence suggests that institutions across the globe tend to be unsupportive of entrepreneurship. For example, banks might hesitate in providing loans for entrepreneurial start-ups until these endeavours start to generate steady streams of income, which potentially crowds-out innovation.
- **Public records**: public records pertaining to voting systems, property ownership titles and national identification systems can be tampered with, whereby data can be altered, removed or duplicated due to its hardcopy format. This enables opportunists to steal or misuse this information, thereby creating severe public distrust in the government's abilities to protect their basic citizen rights.
- **Digital literacy:** a lack of digital literacy skills can prohibit citizens from fully utilising ICT technology to transition into a new digital economy. These skills are required to: (1) manage and protect one's own personal digital identity, and, (2) effectively carry out new jobs of the future that are ever-increasingly relying on digital literacy skills.
- **Supply chain management:** inefficiencies in the supply chain management process prohibits participants from accurately tracking supply chain movements in real-time. Modern consumers demand accurate information regarding the purchased good, with questions such as, *How old is the purchased good?*, *When it will it expire?, In which country was it produced?,* and finally, *Is it fair trade?*. Therefore, as the product moves along the supply chain, the information must also be passed along with it. However, there are many intermediary steps involved in the supply chain process, creating enormous inefficiencies such as slow turnaround times, inaccurate data, unnecessary administrational costs, and decreased information transparency. This is particularly a concern for perishable goods and financial aid tracking. For example, local primary producers may struggle to negotiate fair prices with larger organisations, to connect with interested purchasers before their perishable goods expire, and to track where this is sold in the world. Also from a financial aid perspective, donors are unable to guarantee where their donations are being used, as well as the impact that it is making towards achieving the given social mission. There are also unnecessary costs incurred during this process, whereby the inefficient amount of intermediary steps creates additional administration costs, thereby eroding the final output value.
- **Environmental damage**: climate change is a severe global issue that threatens to deplete nations' natural resources and displace communities located in weather-averse regions, thereby decreasing economic prosperity.
- **Physical money**: physical money is vulnerable to theft due to: (1) transportation issues – i.e. theft is reported to be common, with thieves targeting those who transport money from rural to populated areas; and, (2) storage issues – i.e. storing this in a central location creates a point of weakness, whereby someone can more easily steal this. Physical money also creates power inequality due to: (1) High transactions costs – i.e. it is expensive to own a bank account or access banking services, thereby creating a hug power disparity between low- and high-income earners; and, (2) Poor banking infrastructure – i.e. there is currently a limited pool of ATM facilities, which particularly disadvantages rural communities.
- **Legal disputes**: legal disputes in Papua New Guinea often take up to 6 months to resolve, with high administrative costs involved. This causes strain on individuals, and can disadvantage low-income earners who lack the resources to carry this out.

## 1.6 IMPLEMENTATION IDEAS

In response to the economic problems raised in the previous section, speakers and audience members offered the following solutions:

- **ICT and blockchain awareness**: Implement educational programs to increase educational awareness of the extraordinary social impacts that blockchain can provide.
- **ICT infrastructure**: Ensure citizens have the funding and capital infrastructure needed to power ICT-based solutions. Blockchain can help with funding large scale economic infrastructure for developing nations, by offering new governance models for collective investment. More specifically, it utilises crowdsourcing to help communities share their common resource pools more effectively. For example, with respect to energy supply solutions, both Electron and Power Badger are examples of successful blockchain-based applications that process, validate and provides energy, using the power of blockchain *(see section 3.11).* These can be used not only to power mining activities, but to power households and cities, using crowdsourcing so that communities can more efficaciously share their energy supply.
- **Supply chain management**: the blockchain can significantly improve the supply chain management process by reducing intermediary steps as well as enhancing the speed and accuracy by which information is captured in resource tracking. WWF has created a solution for fishermen in Fiji, whereby the fisherman tags every single fish that is caught with a unique identifier. This information is then recorded onto the blockchain, so that the tuna can easily be scanned and verified at every critical stage of the supply chain process *(see section 3.12).* Solutions such as these can help improve human rights in the tuna industry, by ensuring that fishermen in small, vulnerable communities can track their produce and be fairly paid. Oxfam is also trialling another financial aid supply chain solution using cashless vouchers, whereby disaster victims are given a digital voucher that can be used to pay for goods and services that they need with small, local vendors partnered with Oxfam. This information is entered on the blockchain for accurate real-time tracking. This not only fixes liquidity issues in vulnerable areas, but alleviates victims' concerns that they will be taken care of *(see sections 3.13 and 4.2).*
- **Entrepreneurship**: Promote entrepreneurship by employing a combination of the following initiatives: (1) create a sandbox (also termed an "economic zone"), whereby entrepreneurs can securely and safely test their ideas, before gaining the support to test out viable solutions in the market *(see section 4.8)*; (2) organise hackathons, such as the Junior Blockchain 2018 Hackathon, to promote young citizens to apply their fresh ideas to solving some of Papua New Guinea's economic problems; (3) Establish work-integrated learning opportunities for Australian and Papua New Guinean young-adult entrepreneurs, whereby they can travel to another community and apply and develop their cross-cultural, design-thinking skills in solving economic problems in a practical setting. This could involve leverage existing ties with Australian branches, such as RMIT Activator, who share a vision of promoting entrepreneurship, blockchain education and digital inclusion; and, (4) Ensure viable entrepreneurial projects gain the funds they need to scale by using initiatives such as ImpactFolio – a global blockchain project whereby experts vote on projects that they think are of high quality and will be successful by allocating their utility tokens on the blockchain platform (i.e.

a process called "staking"). They can also challenge projects that they believe are ineffective, which helps to improve funding for viable projects *(see section 4.0).*

- **Public records**: Protect the integrity of public records by digitalising property titles, national identity and voting systems and integrating these existing registries with the blockchain. This could involve providing every citizen with a unique identification number, so that every transaction can be linked to their digital identity via the blockchain ledger. ADB has created a similar solution for protecting indigenous land owners' investments, by giving landowners full transparency on the lease application status via the blockchain platform. Lease applications can be submitted and approved online, along with registration and stamp duties. This streamlines the process for all parties involves, by proving users with detailed status and price information, and the ability to compare lease prices across districts, thereby improving transparency *(see section 4.6)*. In the Junior Blockchain 2018 Challenge, the Kopkop College has also suggested using a mobile device app that works on the blockchain. More specifically, it is a high-resolution device and a fingerprint scanner which captures data, before uploading it onto the cloud-server. It then becomes secured and stored on the blockchain as soon as it receives a WiFi signal. This device will hopefully provide a better means by which to manage and store our data, meanwhile eliminating the inconvenience of gathering data *(see section 2.5).*
- **Digital literacy:** Provide digital training skills to communities through educational training initiatives. This could involve establishing an innovation hub in each province, whereby people can come together to share ideas, participate in community-based programs together, and receive the support their need to use digital devices. For example, Startup Angels aims to increase internet accessibility and affordable for rural communities, by providing them communities with the educational tools necessary to drive collaboration, so that they can use collective-action to solve community problems using the scarce resources available *(see section 3.10).*
- **Environmental damage**: create a carbon emissions trading to regulate environmental pollution – the Don Bosco Technical Secondary School proposes a blockchain-based carbon emissions trading platform, whereby the emitter trades a crypto-token in exchange for land rights, which expires after a set amount of time. This token represents the total amount of land which the emitters can access, thereby making the process more transparent in information tracking, efficient and easier to govern. This will not only increase ease of regulation, but disincentivise emitters from polluting *(see section 2.5).* There is also a solution currently implemented by UPNG, called the Diwai Network – a blockchain-based application that combats environmental pollution in the Pacific island region, by facilitating the sale of forest certificates, using tokenisation and smart contracts *(see section 3.9).*
- **Physical money**: many of the issues regarding physical money, such as transportation, security and accessibility, may be solved by digitising the currency (i.e. crypto-currency). As suggested by the Port Moresby International School during the Junior Blockchain Hackathon 2018, a cashless digital currency can be used as a new medium of exchange for Papua New Guinea and accessed via a mobile interface *(see section 2.5).* The individual uses the digital wallet to carry their crypto-currency wherever they go, using a tap-and-go system to make payments. It operates on a highly secure, cloud database and can be used in areas without internet connection. Crypto-currencies should also be protected against crypto-based risks, by employing ideas similar to Coin

Sure, which protects crypto-holders' underlying wallet value against volatile movements *(see section 4.9).*

- **Legal disputes:** the blockchain offers a new, exciting possibility for dispute resolution, using blockchain oracles. These are third-party trusted sources that can be plugged into smart-contracting platforms. These have the potential to completely disrupt the way in which we can solve legal disputes, using the blockchain as the intermediary *(see Section 3.8).*

## 1.7 KEY CHALLENGES OF BLOCKCHAIN

In summary, speakers and audience members raised the following challenges regarding blockchain implementation:

- As seen with newly developed technologies, the blockchain in its current, nascent form consumes an exorbitant amount of resources (i.e. time and energy) to record transactions on its ledger. As such, blockchain-users experience the following issues:
    - Recording speed: data blocks can take a long time to be confirmed and recorded on the blockchain, especially for crypto-currencies such as Bitcoin.
    - Affordability: it can be both expensive to use and employ.
    - Ease of user-interface: blockchain-users sometimes complain about the poor user-interface, whereby it is difficult for them to navigate, store information and exchange goods and services.
    - Training users on how to use the blockchain.
    - Scaling the platform project and replicating it in other regions.
    - Unnecessary in some cases - there are simply better databases.
    - Environmental damage: the exorbitant energy needed to process transactions (e.g. mining) can negatively contribute to environmental destruction
- However, as seen with all newly developed technologies, it takes time to improve their efficiencies, and it is expected that many of these problems will be solved over the next decade.
- Also, the blockchain may not necessarily be the best means by which to solve many of Papua New Guinea's economic problems. As outlined by Dr. Chakriya Bowman from the Australian High Commission, technology is not a solution, but a tool that needs to be appropriately adapted to fit a given group of people *(see section 3.4).* As such, leader must define the problem, before seeking a tool that will create the best outcome, depending upon the people's needs.
- A lack of legal regulations makes it difficult for crypto-currency holders to protect themselves against crypto-theft. While no one can theoretically alter the blockchain records, it is possible for a user to steal one's crypto-key, thereby creating the risk of digital currency theft. Since there are currently no clear crypto-regulations in the legal system, the user has limited abilities to retrieve their stolen tokens and to hold the thief legally accountable.
- The legal risks of blockchain were also mentioned during the presentation, summarised as follows:
    - Decentralised ledgers operate beyond jurisdictional boundaries, which makes it hard to regulate.

  - Most contracts are incomplete, in that humans do not have the capacity to think of every hypothetical situation that could happen in the future; therefore, to economise on these costs, they seek to mitigate the primary future risks, thereby leaving room for vulnerabilities.
  - Open-source protocols are dynamic and can change over time. This means that advising clients is difficult, since what it lawful at one time can change very rapidly.
  - Permissioned blockchain platforms raise antitrust issues.

## 1.8 FUTURE PREDICTIONS OF BLOCKCHAIN

In summary, speakers and audience members posed the following predictions regarding blockchain technology:

- Over the next 10 years, it is predicted that blockchain technology will disrupt not only the economic sphere, but the legal and political spheres. This will require policy makers to radically review policies, such as securities law, consumer protection law, labour law, companies law and anti-money laundering.
- Blockchain technology will not entirely eliminate the role of intermediaries. While it can reduce intermediary reliance for specific automated tasks, it cannot completely solve economic problems. As such, it is recommended that a system is designed whereby the blockchain and intermediaries effectively support and complement each other in delivering tangible economic solutions.
- With respect to the private market and NGOs, it is expected that they will become leaner and more streamlined due to the supply chain management solutions offered by blockchain technology. This will hopefully free up resources so that these organisations can focus these towards enhancing recipient participation, user experience and civil society leadership.
- Blockchain will disrupt the economy in the following ways:
  - Prices: it will disaggregate prices, as well as offering premium pricing for goods.
  - Economic power: it will provide more accurate, transparent information about supply chains relating to perishable market goods (e.g. coffee beans), financial aid, and intangible resources (e.g. energy supply). All participating parties can track in real-time where products are produced, the expiry date, the prices are being offered in neighbouring regions for similar produce, the demanders and suppliers (i.e. those who are willing to buy and sell products), locations that the resources are being distributed to, the purposes for which these are being used (e.g. especially required for donations tracking purposes), and the amount of waste being generating, thereby shifting economic power back to consumers and primary producers.
  - Quality: since the blockchain has in-built reputational governance protocols, it may provide proxies for quality, in terms of brands and nations.

## 1.9 CALL TO ACTION

Based on the event proceedings, it is advised that Pacific leaders consider the following actions:

- Pacific leaders should adopt a "crypto-friendly" policy position in providing a stable landscape for entrepreneurs. It is important to demonstrate a flexible and adaptive attitude towards technological development in the public arena; this implies that as blockchain evolves, governments also need to adapt, by continuously reviewing and updating their policies where appropriate. Finally, it needs to be clear and open in its policy developments regarding blockchain technology and other emerging ICTs.
- To promote entrepreneurial solutions, leaders are advised to use a sandbox, whereby entrepreneurs are given the freedom to trial and test their ICT-based ideas in a safe, secure environment, so that those that prove to be viable solutions can be later implemented *(see section 4.8).* While it was successfully used in Australia for its Fin-Tech industry, over-regulation perhaps limited the number and types of businesses who could enter this sandbox, with only 10 different experiments utilising this over 3 years. Consequently, policy-makers must careful not to over-regulate, but rather to give enough room for entrepreneurs to experiment with their creative ideas.
- It is important to learn from existing case studies, in which developing nations are employing blockchain to improve their economic problems. Estonia is an example of a developed nation transforming into a digital economy, using blockchain. To preserve the integrity and authenticity of government data, it used this technology to mitigate cyber risks. Therefore, it is advised that leaders reflect upon the successes and failures of other blockchain ventures to enhance outcomes for their own.
- Economic problems are generally complex, multi-faceted and socially systemic by nature. As such, leaders need to discuss a process for social adjustment. This means providing a conducive environment, whereby there is less reliance on top-bottom implementation, and more encouragement for community-driven initiatives.
- Audience members mentioned that they would like greater participation at a political level, for example, by witnessing a greater number of Parliamentarians at the conference to demonstrate their support for blockchain-based solutions.
- It is advised that leaders gather local knowledge in order to create more targeted community solutions towards socially inherence problems. It is important to understand each community's needs, before venturing to implement a tool, such as blockchain technology, to help solve a given problem.
- It is recommended that venture capitalists are invited to future events. This will ensure that entrepreneurs can pitch their start-up ideas to them and start making these a reality.
- Leaders must also ensure that everyone, including those placed in rural areas, are provided with the necessary skills to use blockchain in a way that improves their lives. This involves taking a collaborative approach, whereby the government, market and community sectors pool together their common resource pools (e.g. funds, ICT infrastructure, information and people) and utilise them in a way to solve collective problems.

## 1.10 CONCLUSION

Overall, there were many invaluable insights posed in the Blockchain Pasifik 2018 Conference and Briefing to Parliament – including blockchain's potential to radically disrupt economic governance methods. From a theoretical perspective, it should strongly help to alleviate institutional economic problems of trust and information uncertainty faced by Papua New Guinea, by increasing financial transparency, property rights management, supply chain efficiencies, and digital inclusion. However, it was noted that some of the population still remain hesitant in embracing the new technology. As such, it is recommended that the government employs effective education campaigns and digital training programs to ensure that individuals understand the potential benefits provided by the blockchain, as well as ensuring that they have the skills to effectively run the new blockchain economic infrastructure.

In particular, it was inspiring to see so many young students pitch their innovative blockchain solutions in front of an audience of 70 members of parliament, heads of department, academics and industry guests. The most common issues raised amongst them were as follows: (1) poorly enforced property rights; (2) mismanaged identity record databases; and, (3) inefficient supply chains and inadequate banking facilities.

Overall, the audience provided tremendously positive feedback for the conference *(see section 4.10 for full list of audience's reflections).* One audience member found the event "invaluable" in providing them with real-case applications of how the community can benefit from blockchain implementation. Another member acknowledged that they had now gained a greater appreciation and understanding of blockchain, including the benefits it can provide, the difference between crypto-currency and blockchain, and the importance of employing effective governance mechanisms, such as the blockchain itself, to help to alleviate many of Papua New Guinea's pressing economic infrastructural problems. Finally, they mentioned that it gave them practical ideas for their own business, regarding how they can incorporate blockchain into their business initiatives.

In terms of future actions, the audience provided a comprehensive list of recommendations (*see section 4.10 for full list).* Many agreed that there was greater need for fostering collaboration, entrepreneurship, local knowledge and community education initiatives on blockchain technology, while others mentioned that regulation is a critical challenge in moving forwards. Others addressed issues in technological infrastructure, urging that leaders invest more heavily in this to support any future ICT endeavours.

In conclusion, this event served as a revolutionary means of bringing everyone together into a single space, whereby everyone could create intellectual and entrepreneurial connections, share ideas, learn from others' successes and failures, and pave the way forward as a shared ecosystem. As such, this sets the tone for a prosperous future for Papua New Guinea as it transforms into a world-leading digital economy.

## 2.0 PROCEEDINGS – BLOCKCHAIN BREIFING FOR PARLIAMENT

**Wednesday October 10, 4.00pm - 6.00pm**
***Kokoda Ballroom, The Stanley Hotel and Suites (Port Moresby)***

On October 10, the Parliamentary Briefing was attended by approximately 70 participants at the Kokoda Ballroom (The Stanley Hotel, Port Moresby). This constituted members from Parliament, Heads of Department, industry stakeholders, entrepreneurs and students.

Its primary purpose was to provide thought-leadership discussion on blockchain technology's potential benefits in Papua New Guinea. The proceedings are listed in *sections 2.1-2.5* below.

### 2.1 INTRODUCTORY REMARKS

**Presenter: Hon. Samuel Basil**
**Minister for Communication –** ***Information Technology and Energy of Papua New Guinea***

- The primary purpose of this briefing is to introduce the concept of the ICT distributed ledger – known as Blockchain technology – and how it can enable Papua New Guinea to build a new digital inclusive economy. Since its creation in 2009, the technology has quickly spread to many countries around the world and generated excitement amongst policy makers, media, general public and politicians. As such, it is in Papua New Guinea's best interests to explore this new emerging technology and the potential benefits it can offer the public, private and community sectors.
- From a theoretical standpoint, the blockchain should make transactions more efficient by eliminating the costly assistance of a centralised intermediary and by making transactions faster and more secure. The adoption blockchain will hopefully address many existing cyber-security issues regarding e-governance. As such, Papua New Guinea has a duty to actively seek economic solutions, by using ICT to enhance the value in monetary transactions, identity security and information storage.
- The Government of Papua New Guinea recognises the importance of training its citizens, so that the labour force has the skills needed to successfully support its digital future. Many other countries are already leading the way in blockchain innovation; this creates a competitive opportunity for Papua New Guinea to be the first in the world to drive new, innovative economic blockchain solutions in its own jurisdiction. As generally witnessed with newly introduced technologies, citizens may hold concerns with adopting the blockchain; as such, education campaigns are critical in ensuring that the population understands the extraordinary social impact it can provide.

## 2.2 SETTING THE SCENE

**Presenter: Mr. Isikeli Taureka**
***PNG APEC Business Advisory Council (ABAC)***

- The international digital economy is rapidly expanding, with extraordinary trends in the FinTech, Commerce, Supply Chain, Energy and Agriculture sectors.
- ABAC PNG strives to maximise opportunities brought about by technology. Some of its key priorities include the following:
    - Sustaining economic growth using technology;
    - Creating strong growth for civil society to prosper;
    - Promoting stable growth and investment through digital transparency; and,
    - Breaking barriers through innovative technological advancements.
- What ABAC PNG is currently doing in this space:
    - Reviewing and implementing structural reforms; and,
    - Developing a policy framework for providing capital and training skills needed to enable Papua New Guinea to enter a new Age of Digitisation.
- Papua New Guinea must invest in technological infrastructural developments, as well as ensuring consistent regulatory implementation. Predictions indicate that the global future job market will demand digital literacy; therefore, economies that invest in this area will automatically gain a strong competitive advantage in enhancing economic growth and innovation. Consequently, Papua New Guinea needs to create a national vision, regarding what the nation wants to achieve in the medium and long-term, its collective objectives, and the methods it should employ to achieve such objectives within a plausible timeframe.

**Presenter: Mr. Wayne Golding**
***PNG APEC Business Advisory Council (ABAC)***

- Trust is an essential ingredient that underpins every transaction that we conduct in society. This is especially important for Papua New Guinea as it strives to move into an age of economic transparency. Since the blockchain is an integrity system built on the foundations of trust, it can perhaps fix many of our economic problems.
- Unfortunately, the blockchain (in its current, nascent form) is inefficient in some respects, in that it consumes an exorbitant amount of time and energy to record transactions on the ledger. However, it is a strong system, built on consensus mechanisms that are incorruptible and immutable, whereby a cyber-attacker would need to hack into more than 51% of the nodes in the network to alter the records. Therefore, it can potentially reduce corruption, while also providing a better and more trusting future for future generations.

## 2.3 BLOCKCHAIN BRIEFING

**Presenter: Dr. Chris Berg**
**Research Academic – *RMIT University Blockchain Innovation Hub***

- The purpose of this briefing will be to introduce blockchain from a theoretical perspective and how we see it as a development tool in institutional economics.
- The RMIT University Blockchain Innovation Hub strives to understand not only how the blockchain achieves consensus over a shared database, but how it shapes the economy, which applications can effectively be utilised by governments, markets and communities to achieve economic objectives, and which regulations are needed to support its implementation.
- The blockchain is a decentralised, distributed ledger, which records, verifies and validates data on its digital database without the costly assistance of a trusted and authoritative third-party. In 2008, the inventor of blockchain, Satoshi Nakamoto, solved the consensus problem, whereby everyone in the network could come to consensus over shared information using distributed ledger technology. RMIT University have since created the world's first social science research centre for blockchain technology, called the RMIT University Innovation Research Hub. Using the lens of Institutional economics, it applies standard economic thought to see how this shared distributed ledger technology will shape the economy as a new economic infrastructure for institutional resource governance.
- The RMIT hub predicts that the technology will have disruptive impacts in many facets of civil society, particularly in economic development. It provides developed economies with a new layer in which to solve its institutional problems – a concept known as "institutional layering". One can merely layer another institution atop of an existing one. This creates a platform for smart contracts, while also creating competition for markets, governments, hierarchies and firms, thereby creating strong conditions for economic growth.

**Presenter: Dr. Darcy Allen**
**Research Academic – *RMIT University Blockchain Innovation Hub***

- Blockchain technology can potentially alleviate many economic problems, including: (1) the problem of *information uncertainty* (e.g. issues involving property rights enforcement and cyber-security); and, (2) the problem of accountability (e.g. trust enforcement).
- Firstly, the *problem of information uncertainty* represents a significant threat to global future prosperity. According to the World Bank, 70% of the world's population currently lacks access to basic property rights. Blockchain can help tackle this problem, by acting as a decentralised database for property rights, thereby enabling economic members to more easily transfer property rights to another member in the system.
- Another important problem for developing nations is the concept of *trust*, such as identity verification. When an individual performs an economic exchange, he or she needs to be confident of the other participant's identity, such as *who are they?* And *do they have permission to perform this transaction?* They also need to be certain that

all recorded information is accurate, verifiable, fully transparent, traceable, and that it cannot be tampered with. As such, the blockchain can assist developing nations with respect to the institutional problem of trust, by using in-built, crypto-graphically secure governance protocols to ensure the people themselves have full control over their own digital identities, meanwhile prohibiting users from tampering with any data recorded in the blockchain registry system.

- Additionally, the blockchain can significantly enhance product traceability with respect to supply chain management, by reducing the information costs associated with moving goods across borders. Modern consumers demand accurate information regarding the purchased good, with questions such as, *How old is the purchased good?*, *When it will it expire?, In which country was it produced?,* and finally, *Is it fair trade?*. Therefore, as the product moves along the supply chain, consumers demand that the information is passed along with it. Unfortunately, there are many intermediary steps involved in the supply chain process, creating enormous inefficiencies such as slow turnaround times, inaccurate data, unnecessary intermediary and administrational costs, and decreased information transparency. Therefore, blockchain can potentially provide a solution to these issues, by enhancing cost-efficiencies, as well as information speed and quality captured in supply chains.
- It is advised that the Papua New Guinea government adopt a "crypto-friendly" policy position in providing a stable landscape for entrepreneurs. It is important to demonstrate a flexible and adaptive attitude towards technological development in the public arena; this implies that as blockchain evolves, governments also need to adapt, by continuously reviewing and updating their policies where appropriate. Finally, it needs to be clear and open in its policy developments regarding blockchain technology and other emerging ICTs.

## 2.4 PANEL DISCUSSION: BLOCKCHAIN FOR DEVELOPMENT

**Moderator: Dr Peter Lovelock, *TPRC***
**Panel speakers:**

- **Dr. Aaron Lane – Research Academic, *RMIT University Blockchain Innovation Hub***
- **Ms. Rosa Thompson – Project Manager for Social Impact, *ConsenSys***
- **Mr. Isikeli Taureka – *ABAC PNG***
- **Mr. Nou Vada – Co-Founder, *Coin-Sure***

***Panel Discussion Question: What made you first interested in blockchain technology?***

Mr. Isikeli Taureka:

- *"I became heavily engaged in blockchain technology when my team at ABAC PNG began discussing digital ID solutions. We are now currently working with the Bank of Papua New Guinea to establish a trust framework, that will hopefully be underpinned by a private blockchain technology. I am hoping that this will transform the way in which we conduct banking in Papua New Guinea."*

Mr. Nou Vada:

- *"As an insurance lawyer, my client asked me one day how blockchain will disrupt insurance. At first, I was a sceptic, but then gradually became an evangelist over time. My interest in blockchain has since taken me around the world, where I've been dedicated to educating people on blockchain. Many people are confused with its concept, whereby they erroneously believe that Bitcoin and Blockchain are one and the same. As such, I am very glad that we are having these sorts of discussions today, to bring clarity in Papua New Guinea, as well as to pave a way forwards together."*

Ms. Rosa Thompson:

- *"I am currently a project manager at ConsenSys – one of the largest blockchain consulting companies in the world. I have always been interested in following technological innovation trends, and so when I started to realise the decentralised opportunities for blockchain, it made me excited about the possibility for inclusion and equity and security. As such, I joined ConcenSys, where I am now developing dapps, as well as consulting for corporates, governments and the European Union."*

Dr. Aaron Lane:

- *"As an Australian Melbourne-based lawyer, part of my job was to provide small, non-profits with strategic advice. I later became an academic in financial tax law, where I started observing payment systems and regulations within the Australian legal system; this made me interested in whether blockchain could perhaps alleviate some of its problems. I am now currently working at the RMIT University Research Innovation Hub, whereby our academic research team investigates the institutional crypto-economic impacts of governance, trade and democracy of blockchain technology in both developed and developing regions, such as the Pacific."*

***Panel Discussion Question: What are your predictions for the future of blockchain technology?***

Dr. Chris Berg:

- *"I believe that blockchain is not a general-purpose technology, but a way to coordinate ourselves democratically and economically. In terms of blockchain predictions for future adoption, we currently lack real-case examples of the ways in which we can govern ourselves. As such, it is impossible to make such predictions at this time."*

Ms. Rosa Thompson:

- *"The technology is still new, and we are slowly learning what we can do with it. But it is still important to be a part of the learning process, particularly as the technology is advancing so rapidly."*
- *"I notice that there are many young people present today, from countries all over the world. Therefore, I hope to see the next generation take part in solving our economic problems."*

- *"Blockchain is a global industry – I myself work offsite in Melbourne, which implies that the borders are starting to crumble, and we are no longer prohibited in where we can work, so that's an aspect that I predict for the blockchain movement."*

Mr. Nou Vada:

- *"Many students are present today, and they are already participating in blockchain-based initiatives, such as the Junior Blockchain Challenge Pitch, which we will be hearing about shortly. I wish I had been exposed to similar programs during my primary and secondary education. It took me a while to realise the importance of technology in our society. The journey here has been amazing for me, and has validated my secret assumptions and hopes for Papua New Guinea's bright future. Today's students are now involved in technology more than when I was back at school. Therefore, I am hoping that they can design better economic solutions for Papua New Guinea, using ICTs to create radical, world-changing ideas."*

## 2.5 JUNIOR BLOCKCHAIN CHALLENGE PITCH

***Junior Research Hackathon – applying Papua New Guinea's youngest minds to the nation's most complex economic problems***

In 2018, the Junior Blockchain Pasifik Hackathon challenged Papua New Guinea's brightest students to participate in Papua New Guinea's economic development, by developing blockchain-based pilot projects which could help alleviate some of Papua New Guinea's economic problems. The challenge was accepted by four schools located in Port Moresby. In total, 40 students participated in the hackathon, with 4 groups selected to effectively pitch their ideas to Parliament. Their pitches are outlined as follows:

**PITCH 1:**
***Identity (Kopkop College)***

- *"Our nation is currently faced with the problem of data duplication – an issue in which data is copied over and over. Our National Identity Card (NID) system is failing, with research suggesting that the department lacks equipment and qualified personnel to carry out identity procedures."*
- *"Therefore, my team has devised the following solution: a mobile device app that works on the blockchain. More specifically, it is a high-resolution device and a fingerprint scanner which captures data, before uploading it onto the cloud-server. It then becomes secured and stored on the blockchain as soon as it receives a WiFi signal. This device will hopefully provide a better means by which to manage and store our data, meanwhile eliminating the inconvenience of gathering data."*

**PITCH 2:**
***Carbon Emissions (Don Bosco Technical Secondary School)***

- *"Globally, we are faced with a severe environmental emissions problem. Solutions are currently being trialled across the globe, such as permits which can be used to regulate pollution. However, they mostly run on moral ethics and human discretion; as such,*

*they are open to opportunistic behaviour and are altogether ineffective in stopping emitters from polluting."*

- *"Therefore, my team offers the following solution: a blockchain-based carbon emissions trading platform, whereby the emitter trades a crypto-token in exchange for land rights, which will expire after a set amount of time. This token represents the total amount of land which the emitters can access, thereby making the process more transparent in information tracking, efficient and easier to govern. This will not only increase ease of regulation, but disincentivise emitters from polluting."*

**PITCH 3:**

***Land Titles (Kila Kila Secondary School)***

- *"Papua New Guinea is currently faced with the serious problem of land title duplication, which causes severe issues in the Department of Land Registry. It is common knowledge that the individuals who manage Papua New Guinea's land titles sometimes accept bribes for creating duplicate land titles, since they do not earn enough money to support their families. Another problem is that the property land titles are being stored in a central location in hardcopy form. Therefore, we need to digitalise this registry to restrict not only the potential for cyber-attacks, but to stop the titles from being duplicated."*
- *"My team proposes the following solution: digitalise the property registry, using blockchain to secure the database. If someone tries to create a duplicate entry, the blockchain will automatically prohibit this activity, thereby protecting our property ownership. This gives reassurance to the property owner, knowing that no one can take away their land."*

**PITCH 4:**

***Cryptocurrency (Port Moresby International School)***

- *"Papua New Guinea currently faces severe issues with respect to physical cash. Theft is common, with thieves targeting those who transport money from rural to populated areas. Also, physical cash must be stored in a central location, thereby creating a point of weakness for those who plan to steal it. ATM facilities also constitute as a problem, with a severe lack of machines placed across the country. Additionally, many of our citizens cannot afford to hold a bank account, due to the significantly high banking and intermediary fees it entails. This is propagated by problems of ICT infrastructure, with 85% of our population with little to no mobile coverage or internet connection."*
- *"Therefore, we propose the following solution: a cashless digital currency to be deployed in the agriculture, e-commerce and online business sectors. Representing a new medium of exchange for our people, it can be readily deployed on a mobile interface. The individual simply uses the digital wallet to carry their crypto-currency wherever they go, using a tap-and-go system to make payments. It operates on a highly secure, cloud database and can be used in areas without internet connection. We are hoping that this solution will help increase digital inclusion and enable Papua New Guinea to embrace a more equitable future."*

## 3.0 PROCEEDINGS – BLOCKCHAIN CONFERENCE DAY 1

**Thursday October 11, 8.30am - 5.00pm**
**International Convention Centre, Port Moresby**

The Blockchain Pasifik 2-Day Conference was held on October 11-12, with approximately 300 guests in attendance. Speakers represented a diversity of background, including the Philippines, Fiji, Vanuatu, Papua New Guinea, Solomon Islands, Australia, New Zealand, France, Malaysia, Rwanda and the United States.

It was an immense success, with showcases from various experts in ICT development, consulting, economic research, academia, financial taxation, law, supply chain, e-governance, and social impact education. The proceedings are listed in *sections 3.1-3.13* below.

### 3.1 NCD GOVERNOR'S WELCOME ADDRESS

**Presenter: Hon. Powes Parkop, MP**
***Governor – National Capital District***

- *"Since the introduction of the internet in Papua New Guinea, our lives have been enhanced dramatically. Only a few years ago, our population was relying upon landlines and public telephones to communicate with families and conduct business. But since we introduced technological advancements such as mobile phones, it has significantly improved the way in which we conduct business, and will hopefully continue to do so well into the future. As such, we need to understand how we can embrace this technology and how we can start planning now for a more equitable future."*
- *"Blockchain has enabled developing economies across the globe to become more transparent, efficient and incorruptible. Already, it has reached many countries – Malta (i.e. the first country to regulate blockchain, Canada (i.e. paving the way in generating education courses, the United States (i.e. through the Blockchain exchange), and lastly, China (through its pro-blockchain and AI initiatives). These innovations are changing the way in the world conducts business. As such, we need to keep abreast of the technological innovations around us and understand the socio-economic impact on our people, and plan our response accordingly."*
- *"We need to start talking about technological change; as such, events like today will help us develop cutting-edge technology for positive development. We must not be afraid of technology, but embrace its abilities to improve governance systems and reduce corruption, and will create opportunities for employment, accuracy of data, quality of life and living standards. I encourage you all to meaningfully participate in this project and to walk away with an appreciation of this technology and its role in shaping Papua New Guinea. Let us not be passive observers, but participate in the technological revolution that is taking place in Papua New Guinea. I look forward to a constructive discussion on our digital future."*

## 3.2 PAPUA NEW GUINEA GOVERNMENT ADDRESS

**Presenter: Mr. Dairi Vele**
***Secretary – Department of Treasury***

- *"Papua New Guinea has the potential to improve the lives of our people. Our government cannot do this alone, but must work in partnership with the private sector to foster creativity and ideas. This forum will help us learn, share ideas and explain our vision."*
- *"As part of our government, we need to understand how it will shape our ecosystems, as well as how we can mitigate any inadvertent challenges. We are currently underway with a project that will boost Papua New Guinea's growth and development, including internet infrastructural improvements that will increase internet speed by 20 times the current speed. Additionally, the Bank of Papua New Guinea aims to increase digital inclusion in Papua New Guinea. The solution is IDBox, which is being created in conjunction with the Australian government. Its purpose is to empower people in remote districts to pay for goods and services, with a wireless and solar-powered device."*
- *"When we create new technology, it does not necessarily replace people, but creates new jobs that differ to those that currently exist. Therefore, as the Government, we need to contribute to these conferences to understand the new kinds of values in the new digital age, and so we can invest in them and support our people."*
- *"This conference will be your passport in traversing the ideas of tech and opportunities across the borders without leaving Papua New Guinea behind."*

## 3.3 THE NEED FOR DIGITAL INCLUSION

**Presenter: Amabassador Ivan Pomaleu**
***APEC Secretariat***

- *"In 2014, the Government of Papua New Guinea formally recognised the role of internet in increasing economic participation. It endorsed APEC to promote a digital economy and further instruct member economies and facilitate economic and policy exchange to address the internet divide. Papua New Guinea now needs to develop strategies to enable its people to embrace a digital future in emerging technologies and to eliminate the digital divide."*
- *"The challenge here is ensuring that everyone, including those placed in rural areas, are provided with the necessary skills to use blockchain in a way that improves their lives. Another key challenge is the government's abilities to work with the private sector to make blockchain a success."*
- *"I am confident that we can make significant progress in today's conference, by discussing how we can embrace this technology for the long-term betterment of Papua New Guinea."*

## 3.4 THE AUSTRALIAN EFFORT IN BLOCKCHAIN

**Presenter: Dr. Chakriya Bowman**
***Counsellor – Australian High Commission***

- *"We currently possess a strong partnership with Papua New Guinea and aim to work with the people to increase economic growth. Our vision is to deliver cost-effective solutions that improve the lives of those living in Papua New Guinea. We have invested half a billion dollars in bilateral assistance to the country, with additional spending in multilateral projects from our headquarters in Canberra."*
- *"Our priority for 2018 is to enhance digital inclusion through technological innovation. Technology is not a solution, but a tool that needs to be appropriately adapted to fit a given group of people. As such, we first need to define the problem, before seeking a tool that will create the best outcome, depending upon the people's needs."*
- *"Innovation is about peer-to-peer learning, whereby we learn from others and share our failures, so that we can exponentially increase the speed at which we undergo the entrepreneurial discovery process. As such, we have partnered together Australian and Papua New Guinean experts to help bring Papua New Guinea into a new digital age."*
- *"In conclusion, we need to combat economic problems, not by simply employing the technology itself, but by changing people's mindsets, and teaching them how to solve critical gaps in technological infrastructure using a combination of thought-leadership, creativity and innovative design-thinking tools."*

## 3.5 BLOCKCHAIN 101

**Presenter: Mr. Ira Warner**
***Director – Clique Consultants***

- Historically, technological advancement has helped humanity to fulfil its fundamental "gaps" in its needs. In the 1400s, humanity needed a more efficient means by which to access and record knowledge, thereby creating the "knowledge gap". Therefore, humans used technological advancements such as the printing press, to record and disseminate ideas more efficiently. In the Industrial revolution, humanity then experienced a power gap, whereby it needed more power to sustain the global economy, so its developed industrial technologies to help fulfil this need. Humanity now has a new gap in the 21st century – the trust gap. Humans need to trust other participants when transacting in the economy. However, trust is not inherent, so humans must rely on centralised intermediaries, such as government branches, insurance companies, health providers and banks, to manufacture trust. Yet this can be corruptible. As such, there is need for a new solution.
- Blockchain has the potential to solve today's trust gap. It is a shared record book, with line items of data (i.e. data blocks) that link together in a chain. Bitcoin was the first to be built onto the technology for peer-to-peer electric payments. Entrepreneurs have since developed other applications, powered by this technology. The blockchain itself is different to a bank, since it relies on everyone in the network to record the transaction and validate it as a collective. It stamps each line item in the ledger with

its own unique fingerprint, known as a hash, whereby no two line-items are the same and are ordered in a linear fashion. It solves the double-counting problem, by prohibiting someone from altering, removing or duplicating a line item. As a consensus mechanism, it only accepts the longest valid chain as the correct version, based on what has been recorded by the majority. This implies that if an individual tries to alter or remove a line item, the blockchain will not accept the change, since 99% of the rest of the nodes will have recorded something different in their own record books. As such, it makes the data-recording process far more secure, verifiable and trustworthy.

## 3.6 KEYNOTE: BLOCKCHAIN TO DRIVE NEW BUSINESS AND GOVERNANCE MODELS

**Presenter: Dr. Peter Lovelock**
***Director – TRPC***

- Blockchain technology offers new opportunities, including new systems of exchange and storing value. It enhances business operations by streamlining cross-border transactions, enhancing cyber-security and reducing intermediary costs.
- It is important to learn from existing case studies, in which developing nations are employing blockchain to improve their economic problems. Estonia is an example of a developed nation transforming into a digital economy, using blockchain. To preserve the integrity and authenticity of government data, it used this technology to mitigate cyber risks.
- However, it is still unclear *if* and *how* blockchain technology will impact governance models. While public and private bodies experiment with the technology in financial services, regulators are still debating how to respond. As such, they need to understand the technology's benefits and risks, by observing such case studies, before deciding on ways to move forward. Therefore, participation and affordability are two of Papua New Guinea's key challenges.

## 3.7 INSTITUTIONAL CRYPTOECONOMICS

**Presenter: Dr. Darcy Allen**
***Research Academic – RMIT Blockchain Innovation Hub***

- Blockchain technology currently experiences the following problems:
    - Slow speed of block confirmation times
    - Expensive to use (e.g. transactions costs)
    - Hard to scale, due to the long transaction times
    - Horrible consumer experience, making it difficult for consumers to store information and exchange goods and services
    - Unnecessary in some cases - there are simply better databases
    - May destroy the planet (e.g. energy consumed through mining)
- However, just like with all new technologies, it takes time to improve their efficiencies, and so we can expect many of these problems to be solved over the next decade.

- Blockchain has the exciting potential to radically disrupt society, not as a general purpose technology, or a productive technology that merely enhances production efficiencies, but as an *institutional economic infrastructure* that helps to solve economic problems. The reason why economists are interested in observing blockchain is due to the importance of ledgers. Historically, whenever a new ledger is introduced in society, there is a radical global economic transformation. For example, when writing tablets were introduced thousands of year ago to record transactions, this transformed the way in which people could conduct businesses across borders, thereby leading to increased trade and economic growth. Since blockchain technology is a tool for mapping and verifying agreed facts about relationships, it should theoretically have a significant impact in helping to solve some of Papua New Guinea's fundamental economic problems.
- Economies currently rely on several institutional structures to help govern its activities:
    - Governments: they provide identity, keep property registries, manage health data and govern democratic voting
    - Firms: they move information of supply chains, provide bank services, etc.
- So how can blockchain, as a new economic institutional structure, govern the future economy?
- Blockchain will disrupt the economy in the following ways:
    - Prices: it will disaggregate prices, as well as offering premium pricing for goods.
    - Economic power: it will provide more information about consumers such as prices paid etc. Also, there might be a shift in power back to primary producers.
    - Quality: since it has inbuilt reputational governance protocols, it may provide proxies for quality, in terms of brands and nations.
- Key challenges for the future implementation of blockchain:
    - Regulatory incompatibility – government must ensure that regulations support blockchain endeavours.
    - Information standards – governments must develop information standards to ensure data integrity is protected.

## 3.8 NEED FOR SMART LAWYERS

**Presenter: Dr. Aaron Lane**
***Research Academic – RMIT Blockchain Innovation Hub***

- The objective of this session is to determine how blockchain will change the legal profession. This involves determine what will be the new role of lawyers, how will it change the way in which disputes are governed, what are the legal risks posed by the blockchain, and what will the new emerging legal governance system look like.
- Smart contracts are an example of how it will change the legal space. It is a digital, self-executing agreement that can be enforced through the blockchain.
- Predictions: blockchain will not completely take over the role of lawyers. They will still retain the same responsibilities:

  - Offering legal advice to clients – they need to understand and continually update their knowledge on how mechanisms works in order to give appropriate and targeted legal advice;
  - Providing a commercial partnership in trying to solve commercial problems together;
  - Being advocates for their clients, by liaising on their behalf with third parties;
  - Litigating and being an officer of the court.
- Legal risks of blockchain include the following:
  - Decentralised ledgers operate beyond jurisdictional boundaries, which makes it hard to regulate;
  - Most contracts are incomplete, in that humans do not have the capacity to think of every hypothetical situation that could happen in the future, so to economise on these costs, they seek to mitigate the primary future risks, thereby leaving room for vulnerabilities;
  - Open-source protocols are dynamic and can change over time. This means that advising clients is difficult, since what it lawful at one time can change very rapidly;
  - Permissioned blockchain platforms raise antitrust issues; and,
  - Regulatory uncertainty exists in many jurisdictions. Therefore, it is recommended that regulators start with applying broad, existing legal frameworks to crypto-assets, based on its similarities with traditional assets. E.g. if a crypto-currency appears like a share, then the existing laws for shares should be applied to this.
- With respect to legal disputes, the blockchain offers a new, exciting possibility for dispute resolution, using blockchain oracles. These are third-party trusted sources that can be plugged into smart-contracting platforms. These have the potential to completely disrupt the way in which we can solve legal disputes, using the blockchain as the intermediary.

## 3.9 CLIMATE CHANGE AND BLOCKCHAIN

**Presenter: Ms. Charlotte Vada**
***Environmental Science Department – UPNG***

- At UPNG, our goal is to create a working group that will develop sustainable blockchain models for use cases in climate change and risk management.
- We are currently looking at mitigating environment risks in the Pacific islands. As part of the Small Island Developing States (SIDS), they face a unique set of development changes. They are prone to severe weather condition, like prolonged wet and dry seasons and cyclones, so climate change will only exacerbate these problems, leading to natural shortages (e.g. food and water).
- However, as heavy promoters of collaboration and innovation, they have begun exploring blockchain solutions to help mitigate climate change. As such, there are many use cases that Papua New Guinea can perhaps learn from.
- One example of a use case it the Diwai Network – a blockchain application, built on the Ethereum platform, that facilitates the sale of forest certificates, using

tokenisation and smart contracts. As a digital, self-executing agreement, the smart contract sets out the terms of the forest agreement, and all the parties on the blockchain have to agree to these terms before issuing a forestry certificate. Each token represents a supply of an agreed standard of unit (e.g. a hectare of land) and contains unique information, such as the geographical longitudinal and latitudinal values and other associated data, such as the token holder's details, forest type and certificate expiry date. The value of the token determined by the opportunity cost of not using the area for logging plus the costs of monitoring. The purpose of the Diwai Network is to create a commercially viable, self-regulating, voluntary, cross-border marketplace that connects forest owners and their state level actors with polluters and their state level actors, by enabling them to trade a non-fungible crypto-token that is pegged to a fiat currency. This will streamline institutional frameworks, by making it easier for parties to work with UNFCCC requirements listed under the REDD+ Framework.

## 3.10 PANEL: NEED FOR TECHNOLOGICAL INCUBATION

**Panel speakers:**

- **Mr. Axel Peyriere – *Startup Angels***
- **Ms. Vani Nades – *Blockchain Junior Project***
- **Mr. Ian Hetri – *LinkPad Design***

***Panel Discussion Question: What are the primary challenges that we face with respect to technological incubation?***

Ms. Vani Nades:

- *"One of the primary challenges that we face is serving rural communities with a lack of infrastructure. At Startup Angels, our goal is to increase internet accessibility and affordable for rural communities. As such, we strive to provide these communities with the educational tools necessary to drive collaboration, so that they can use collective-action to solve community problems, using the scarce resources available to them."*
- *"I believe that education and critical thinking are the keys to economic growth. I grew up in a rural area with no internet or technological advancements. However, I was always hungry for new opportunities and new ways of solving problems. Later, when I moved to the commercial capital, I started my own business. That is when I realised the importance of thinking critically, by using the little resources on hand to solve problems. That is why I am so happy to see so many of Papua New Guinea's youngest, brightest minds participating in the junior pitch challenge and offering fresh, innovative solutions."*

Mr. Axil Peyriere:

- *"We share the same challenges globally – it is not only confined to Papua New Guinea – so we need to provide communities with an opportunity to collaborate and support each other to drive change, bottom-up."*

Mr. Ian Hetri:

- *"We need to fix the great disconnect between developed and rural areas, by reaching out. We cannot simply remain here and discuss ideas in this convention. Instead, we need to actively visit these communities, and use our online presence to reach out to the masses and drive change. Only then can we hope to connect our people to the rest of the economy."*

***Panel Discussion Question: What are your thoughts on society's institutional support for technological start-ups?***

Mr. Axel Peyriere:

- *"I think that incubation centres are very important for fostering innovation and support for entrepreneurs, so that they can build effective technology solutions for our economy. However, empirical evidence suggests that institutions across the globe tend to be unsupportive of entrepreneurship. For example, banks might be hesitant in providing loans for entrepreneurial start-ups until these endeavours start to generate steady streams of income. This potentially crowds out innovation; as such, we need to encourage banks to provide loans to those who can present viable business models, so that they can use this capital to grow their businesses."*

Mr. Ian Hetri:

- *"We need to create a culture for entrepreneurship, by readdressing how we are teaching entrepreneurship in our school. The business landscape has shifted, whereby those without digital skills will suffer immensely. Branding and marketing is a highly important way to enhance commercial success and connect to the market. As such, we have a duty to teach our people how to use powerful mediums, such as technology, to grow their business ideas. This implies that we need to need to blend incubators, education programs and accelerators into the existing economy and encourage the next generation of entrepreneurs to develop new infrastructures for economic betterment."*

## 3.11 A DECENTRALISED ENERGY MARKET BASE

**Presenter: Mr. Jonathan Ewing**
**Blockchain Solutions Architect – *Power Badger***

- Blockchain technology can transform the way in which both energy suppliers and demanders both provide and receive energy. It has the incredible ability to both power and meter Papua New Guinea's energy supply, by effectively processing, validating and expediting this more efficiently than traditional non-blockchain means.
- For example, Electron, a London blockchain platform, enables you to switch seamlessly between all 26 energy companies operating on the blockchain.
- Another example is Power Badger, which was initially conceptualised in order addresses the significant energy costs consumed during the process of mining for Bitcoin and other cryptocurrencies. As such, Power Badger created a blockchain data

processing facility that processes, validates and provides energy, using the power of blockchain. This can be used not only to power mining activities, but to power households and cities, using crowdsourcing so that communities can more efficaciously share their energy supply.

## 3.12 SUPPLY CHAIN AND BLOCKCHAIN – FIJI EXAMPLE

**Presenter: Mr. Kenneth Katafono**
***Traseable***

- Blockchain technology can be used to help supply chain inefficiencies, particularly in fishing industries. Currently, empirical research suggests that two-thirds of the world's tuna supply is fished in the Pacific Ocean, with its final value placed at approximately $28.5 billion USD. However, very little of its value is returned to the Pacific Islands. As such, WWF has created a solution, called Fiji Tuna Traceability Project. It incorporates blockchain into existing infrastructure, thereby providing a level of traceability and transparency whereby the consumer can trace the tuna back to the beginning of the supply chain. How it works: the fisherman tags every single fish that is caught with a unique identifier. This information is then recorded onto the blockchain, so that the tuna can easily be scanned and verified at every critical stage of the supply chain process. This can help improve human rights in the tuna industry, by ensuring that fishermen in small, vulnerable communities can track their produce and be fairly paid.
- One of the primary challenges is providing adequate training to people involved in every stage of the supply chain, including fishermen, processing and distribution centre staff, transportation companies, wholesalers, commercial businesses and consumers. Without the skills, the blockchain solution will fail. As such, the private, public and community sectors need to effectively collaborate and communicate, meanwhile developing expertise here in Papua New Guinea.
- In order to foster a blockchain community here in Papua New Guinea, it is recommended that we employ the following:
    - host local blockchain thought-leadership events and meetups to promote collaboration, information sharing and learning.
    - raise awareness through educational initiatives.
    - encourage development of a technical community, by supporting entrepreneurial initiatives.

## 3.13 PANEL: THE PACIFIC STORY

*Sharing stories of blockchain developments in the Pacific Region*

**Panel speakers:**

- **Mr. Ira Warner – *Papua New Guinea***
- **Ms. Sandra Hart – *Sandra Hart***
- **Mr. Kenneth Katafono – *Fiji***
- **Ms. Sharon Inone – *Solomon Islands***

***Panel Discussion Question: What blockchain solutions are you currently working on in the Pacific Region?***

Ms. Sandra Hart:

- *"I am currently working with Oxfam to deliver humanitarian assistance to victims post-disaster. We are exploring blockchain solutions to help increase the distribution of disaster aid to communities such as Vanuatu."*
- *"OxLab is an incubator group dedicated to alleviating issues in the Oxfam's donations supply chain. In one pilot, we are looking at ways to reduce friction in internal transactions occurring in Oxfam, using blockchain technology. Currently, when a donor donates funds to Oxfam, these are sent to the local Oxfam branch, before being sent overseas to the main Oxfam headquarters. Later, it is redistributed to the Oxfam branch located closest to the disaster area, before finally being distributed to the end user. This is a costly process, in terms of time and intermediary costs. As such, we have used blockchain technology to provide a solution. Built on the Ethereum platform, it directly transfers donations from the donor to the end user using crypto-tokenisation, thereby cutting out the internal middlemen along with any unnecessary administration costs."*
- *"Our second pilot involves addressing response-timing issues in disaster areas. One of our major problems is ensuring that disaster victims immediately receive the support they need in a timely manner. However, providing them with cash slows down this process, thereby increasing the risk of them not receiving emergency help in time. As such, we have created a blockchain-based solution that involves giving cashless payments to disaster victims. More specifically, the victim is given a digital voucher that can be used to pay for goods and services that they need with small, local vendors that have partnered with Oxfam. This not only fixes liquidity issues in vulnerable areas, but alleviates victims' concerns that they will be taken care of. It also allows Oxfam to capture accurate data in real-time, thereby providing a basis by which we can make more effective decisions in the future."*

Ms. Sharon Ione:

- *"I am a part of Youngo – the only youth representative group to receive official government permission to represent the Solomon Islands in international events."*

Mr. Kenneth Katafono:

- *"I am dedicated to discovering blockchain supply chain solutions for fishing industries in Fiji. Currently, the technology is limited, however, when it improves in the future, I am hoping that it can streamline the process, so that when a local fisherman catches a fish and records its unique identifier on the blockchain, it can be commercially sold through the blockchain before it has even reached land."*

***Audience Reflections:***

- *"Before we drive blockchain identity solutions, we need to establish a strong identity framework, whereby we decide on a standard system we recognise what identity is and how we should verify this."*
- *"We also need to think about how to connect with the masses, where are the entry points (i.e. do we drive it through public sector, and then to public sector), who will be championing blockchain solutions, and how we should effectively regulate and govern this in the Papua New Guinean economy."*

# 4.0 PROCEEDINGS – BLOCKCHAIN PASIFIK CONFERENCE DAY 2

**Friday October 12, 8.30am - 5.00pm**
**International Convention Centre, Port Moresby, Papua New Guinea**

Day 2 of the Blockchain Pasifik 2018 Conference was held in the International Convention Centre, continuing discussion from the previous day. The proceedings are listed in *sections 4.1-4.11* below.

## 4.1 BLOCKCHAIN AND SOCIAL IMPACT

**Presenter: Ms. Rosa Thompson**
**Project Manager, Social Impact – *ConsenSys***

- ConsenSys is a blockchain venture that seeks to provide innovative technological solutions across the globe. Its vision is to build and scale a world where distributed applications enable a new class of frictionless global commerce with inclusion for all.
- Its main activities:
    - Providing consultation advice to organisations and governments regarding Ethereum blockchain-based solutions.
    - Offering products by incubating new companies that develop their decentralised applications on the Ethereum blockchain.
    - Providing educational awareness, training programs and technical skills to developers, communities, clients and entrepreneurs.
    - Providing capital through token services, crypto asset management and venture capital.
    - Supporting the development of infrastructure to help build an ecosystem.
- ConsenSys has 4 independent ecosystems, each with a board of directors, including *Blockchain for Social Impact*. It has partnered with SlaveFreeTrade, Microsoft, Santander, Dubai Properties, Monetary Authority of Singapore, as well as WWF.
- *Blockchain for Social Impact* provides the following key benefits, using blockchain technology:
    - Alternate sources of funding - i.e. through crowdfunded for community projects;
    - Transparent supply chain, whereby donations and other project resources can be securely tracked and verified;
    - Self-sovereign identity – an enduring private and portable digital identity that accumulates reputation and credentials;
    - Tamper-proof records, whereby it can store rights, titles and records in a fraud-proof database.
- Case study example: ImpactFolio is a global blockchain project that enables viable projects to receive the funding they need to scale. Research by ConsenSys reveals that the funding gap in social impact projects it not because of a lack of private funding, but because people are unable to link private dollars to viable large-scale projects. As such, there is dire need to create a solution that increases the project curation process. ImpactFolio seeks to solve this funding gap by harnessing collaborate power

of thousands of experts around the world and supporting impact to deliver projects. Curators on the platform use utility tokens called ImpactTokens to vote on projects that they think are of high quality and will be successful (a process called "staking"). They can also challenge projects that they believe are ineffective, which helps to improve the curatorship process. All participants can access this app from a tablet, such as a phone or a computer, thereby making it easy to use the platform.

## 4.2 BLOCKCHAIN FOR HUMANITARIAN RESPONSE (VANUATU EXAMPLE)

**Presenter: Ms. Sandra Hart**
**Project Manager, Humanitarian Disaster Relief – *Oxfam (Vanuatu)***

- Oxfam is a global NGO operating in 90+ countries worldwide. It seeks to provide humanitarian assistance through value transactions, in the form of cash, cheques or vouchers. In 2016, it delivered $1.9 US billion via cash transfers to disaster victims alone, with this figure annually increasing by 40%.
- With respect to its mission, it aims to reduce poverty and inequality by promoting equal participation and collective action, empowering smaller groups to raise their voices, providing education, improving economic infrastructure, decentralising power, and giving flexibility to disaster victims to choose how they want to spend money on the key things they need in emergencies.
- Oxfam sees blockchain as an invaluable tool for helping to achieve many of these goals, more specifically, by increasing costs-savings, leanness and transparency of its donations supply chain. The blockchain will not only to increase reputational trust, but will increase trust internally, whereby all participants involved in a given social project can more efficaciously coordinate their resources together to achieve maximum humanitarian impact.
- More specifically, it provides the following key benefits to Oxfam's social projects:
    - Increases the speed of delivery, particularly by accelerating the time taken to deliver cash to disaster victims;
    - provides digital identification and verification to beneficiaries, which is especially beneficial for those in areas without economic infrastructure to support identification;
    - enhances the decision-making process by enabling real-time tracking of where people are using cash vouchers, how much they are spending, etc.
    - reduces transaction costs by reducing the number of intermediaries and transactions involved in the donations supply chain process;
    - increases social project coordination through the use of shared platforms;
    - eliminates the problem duplication using a tamper-proof database;
    - promotes digital inclusion by making platform accessible offline, so participants without internet can still use the platform.
- How it works:
    - The beneficiary is registered on the blockchain and given a digital identification. They are then given cash vouchers with a QR code, as well as an expiry date and a financial value amount. They can then go to small, local Oxfam-partnered vendors to pay for the goods and services they need. The

vendor uses a tablet (provided by Oxfam) to scan the QR code, verify the recipient's identity, before giving them the goods they need.

- Challenges:
  - Generating awareness of blockchain's benefits;
  - Training users on how to use blockchain;
  - Making the user-interface easy to use and intuitive;
  - Getting user feedback on how to continually improve blockchain platform
  - Scaling the platform and replicating in other countries.
- In conclusion, the role of NGOs will change, whereby it becomes leaner and more streamlined. This will hopefully free up its resources so it can focus these towards enhancing recipient participation, user experience and civil society leadership.

## 4.3 PANEL: IDENTITY AND CUSTOMARY LAND REGISTRATION USING BLOCKCHAIN

**Panel speakers:**

- **Hon. Gary Juffa, *MP Governor, Oro Province***
- **Ms. Chee Anne Reno**
- **ADR: Sarah Sipani**

***Panel Discussion Question: What are the challenges that Papua New Guinea faces, regarding land registration?***

Hon. Gary Juffa:

- *"Land is the only real resource that we own in Papua New Guinea, with approximately 97% owned by landlords. And yet there is enormous pressure to hand this land over to foreign investors with large investment ideas. We need to protect our land ownership against the people who enter this country with fraudulent intentions. It is possible for anyone to infiltrate an economic system. These people are very intelligent and resilient, and they will do anything they can to take advantage of our system, thereby posing an enormous threat for our natural resources. If we are not careful, we will lose the only thing we have left – land. As intermediaries who represent the people, governments across the globe are not doing enough to protect the people's interests. If we had done more in Papua New Guinea, we could have stopped many of the scams that we see today, and yet our land is still being stolen by international and local pirates. We need to do more to combat this problem. With the introduction of Blockchain technology, we now have an incredible opportunity to protect Papua New Guinea future, but like any modern system, it presents a series of challenges, whereby it could potentially take away the interest of the clan regarding property ownership. But if we get it right, we will be the first in the world to solve this critical economic problem."*

***Panel Discussion Question: What is the current mediation process in Papua New Guinea regarding land disputes?***

ADR: Sarah Sipani:

- *"Currently, with legal land disputes, the mediation process takes approx. 3-6 months. In the first few months, all participants will register their legal disputes, before everyone establishes and discusses their interests. Finally, they establish a resolution."*

Hon. Gary Juffa:

- *"I have to commend this government, specifically the Attorney General's Office by providing affordable legal services to our people. For the first time in Papua New Guinea's history, we have a legal system whereby public solicitors can represent land owners. This means that we can all access legal services, which would otherwise be too expensive to take our land concerns to court. As such, this has given power back to the people by enabling us all to receive legal services."*

## 4.4 BLOCKCHAIN IN AGRICULTURE

**Presenter: Mr. David Davies**
**Founder CEO – *AgUnity***

- AgUnity was founded at a London hackathon, whereby the co-founders were given the challenge of providing a distributed technological solution to poor farmers dispersed across rural communities. These farmers were typically unable to receive assistance from NGOs due to their geographical location. Through their research, the co-founders of AgUnity discovered that small, local farmers in the chocolate and coffee bean industry only receive 3% of the sale price. This implied that trust, transparency and power distribution were essential issues. Therefore, they created an ICT solution, powered by crypto-algorithms, whereby farmers could plan and securely track their produce more efficaciously on an integrated smartphone system. Farmers were provided with a solar-powered smartphone that could be used offline, without internet or energy charging required. This allowed them to effectively monitor progress of their harvest throughout the processing cycle, more accurately document transactions, connect farmers and demanders together more effectively, and protect farmers in situations whereby large corporations could otherwise demand lower prices. This initiative successfully increased the income of each farmer from $300 to $1000 per season.
- They have since scaled this project to become an integrated "plug and play solar energy system". This enables farmers to access a range of ICT services on the app, including:
    - access to small lines of credit through one-click micro loans;
    - solar energy banking solutions;
    - more affordable insurance; and,
    - mobile money.
- This example shows how ICTs, such as blockchain, can radically reduce the cost problems associated with microloans. Generally, it can be very expensive to provide

these in rural areas, with issues surrounding the travel distance, information collection, and the process of connecting end-users to the service-providers. Therefore, ICTs have the incredible opportunity to enhance many of these supply chain issues and provide greater wealth distribution to rural communities.

## 4.5 ELIMINATING CORRUPTION WITH BLOCKCHAIN

**Presenter: Ms. Arianne Kassman**
**Director – *Transparency International PNG***

- Blockchain is a tool that can be used to help reduce corruption and build trust in civil society. Papua New Guinea is currently in its discovery process, whereby it seeks to solve many systemic issues regarding government corruption. When a plan is developed, everyone should be around the table to participate and have their say. However, in reality, the information is not made public, and not openly advertised to the public. Therefore, the public is demanding relevant, accurate information that is presented in a more accessible and transparent format.
- Blockchain can help to tackle these issues, by ensuring that the community plays a role in verifying their own information as it is recorded onto the platform. This provides an audit trail so that the public, private and community sectors can track and trace their transactions in civil society.
- One key challenge with blockchain adoption involves ensuring the reliability of the records being recorded onto the blockchain, as well as the development of policy regulations. Although blockchain itself is a governing mechanism, the real challenge is determining *who* will oversee the blockchain, and what these policies will look like. Therefore, one needs to look at government initiatives across the globe in reducing similar transparency issues.
- Blockchain Recommendations: Papua New Guinea needs to integrate all of its political administration systems so that information can more effectively be shared and communicated across all sectors. The Department of Finance can particularly benefit from blockchain adoption, by entering their financial records onto the blockchain, thereby instilling trust in their operations. It is also recommended that government funding is operated on the blockchain, to ensure more efficacious distribution and allocation to appropriate public services across the country. Finally, with respect to government elections, the blockchain can greatly assist with enhancing equity and security in Papua New Guinea's voting systems, by reducing the problem of voting duplication.

## 4.6 KEYNOTE SPEECH: SMART CITIES

**Presenter: Ms. Chee Anne Reno**
***Promoting Smart Systems* – ADB**

- In an effort to promote urban development and smart cities, ADB (in conjunction with KPMG Digital Village) has created a platform to protect indigenous land owners' investments, by offering them a hassle-free property leasing process. It is currently in its nascent stages, having only started this blockchain-based project last month.
- Before the introduction of blockchain, landowners faced significant leasing problems, including the following:
    - Difficulties in collecting and distributing lease payments – it can be difficult for small, local investors (particularly in rural areas) to travel multiple times to leasing offices to organise a lease;
    - Inefficiencies in the lease approval process – this is paper-based, with typically high administration costs; and,
    - Inefficiencies in the consent process, which can be extremely time-consuming due to the number of unnecessary intermediary steps involves.
- As such, ADB has strived to solves many of these issues, by developing a blockchain-based mobile system that enables landowners to possess full transparency on the lease application status. Lease applications can be submitted and approved online, along with registration and stamp duties. This streamlines the process for all parties involves, by providing greater connectivity, as well as proving users with detailed land lease and price information, and the ability to compare lease prices across districts.
- In conclusion, developing a smart city does not happen overnight, but rather starts with small changes. This can then be scaled up to contribute to a more liveable urban city. Therefore, Papua New Guinea needs to start planning how this technology can be integrated into its long-term urban plan for future economic growth.

## 4.7 CRYPTO-CURRENCIES 101

**Presenter: Mr. Ira Warner**
**Director – *Clique Consultants***

- Bitcoin was created in the aftermath of the Global Financial Crisis, whereby people lost trust in centralised intermediaries, such as banks, insurance brokers and governments. They demanded a means of verifying legitimacy of transactions and safeguarding the integrity of the underlying asset, without the costly means of intermediation.
- Therefore, in 2008, Satoshi Nakamoto created the first application powered by blockchain technology called Bitcoin – which was a type of cryptocurrency (i.e. a peer-to-peer electronic currency).

**PHYSICAL VS. DIGITAL MONEY**

| PHYSICAL MONEY | DIGITAL MONEY |
|---|---|
| Physical medium of exchange | Digital medium of exchange |
| Represented by bills and coins | Represented by 1 private and 1 public pieces of code |
| Unlimited supply, whereby the government can print as needed | Limited supply, whereby each cryptocurrency has a set maximum |
| Printed and issued by a government | Produced and issued by computers |
| Part of a centralised system, whereby it is issued by law and banks | Part of a decentralised system, whereby it is not controlled by any government or entity |
| Value determined by the market and regulation | Value determined by supply and demand |

***Reasons to use cryptocurrency over physical money:***

- Paper currencies can be counterfeit, whereas blockchain technology ensures that it solves the double-spending problem, whereby it cannot be spent more than once.
- Physical money can only be spent up to two decimals (e.g. $2.64 USD), however, crypto is highly divisible, which can be beneficial for micro-transactions.
- Physical money cannot be traced as openly and transparently than digital money. Cryptocurrency, on the other hand, uses strong cryptography to protect one's account, thereby making it more secure.

***Reasons to use physical money over cryptocurrency:***

- A lack of legal regulations makes it difficult for crypto-currency holders to protect themselves against crypto-theft. While no one can theoretically alter the blockchain records, it is possible for a user to steal one's crypto-key, thereby creating the risk of digital currency theft. Since there are currently no clear crypto-regulations in the legal system, the user has limited abilities to retrieve their stolen tokens and to hold the thief legally accountable.

***Tokens vs Coins:***

- Tokens are different to coins, in that they can be tailored to track more complex, non-financial exchanges of value. They help users track and trade information using non-Bitcoin platforms, such as Ethereum, to exist and operate. They provide a means by which to define a protocol, as well as to fund the operating expense required to host this as a service.

## 4.8 PANEL: REGULATORY CHALLENGES AND SANDBOX

**Panel speakers:**

- **Mr. Douveri Henao – Executive Director, *PNG Business Council***
- **Mr. Kenneth Katafono – Founder, *Traseable, Fiji***
- **Mr. Tony Morisause – GM Engineering, *DataCo***
- **Dr. Aaron Lane – Research Academic, *RMIT University Research Innovation Hub***
- **Mr. Ira Warner – Director, *Clique Consultants***

***Panel Discussion Question: What are the regulatory challenges of blockchain technology?***

Mr. Tony Morisause:

- *"One regulatory challenge regarding blockchain involves digital inclusion. In an effort to promote digital inclusion, our government is rolling out the Domestic Submarine Cable project. By the end of 2019, we aim to give fibre optic cable coverage to all of Papua New Guinea. We have currently rolled this out to several provinces, and aim to spread this to the rest of Papua New Guinea by the end of next year. As such, we need to appreciate what our government has done with respect to ICT developments. It aims to bring our people to the forefront of technology. Consequently, now that we have the bandwidth and the technological infrastructure, we are well positioned to start planning for a blockchain-based future."*

Mr. Douveri Henao:

- *"Technological space will be largely depended on the appetite of consumers. If the market sees its capability and are willing to participate, then blockchain could potentially thrive in Papua New Guinea. As such, we need active national government participation that will enable entrepreneurs to develop blockchain-based solutions."*
- *"Many of our economic problems are far more complex than we realise, and are socially systemic. As such, we need to talk about a process for social adjustment. This means providing a conducive environment, whereby there is less reliance on top-bottom implementation, and more encouragement for community-driven initiatives."*

Mr. Kenneth Katafono:

- *"Through my blockchain-work in Fiji, I noticed that there is a general lack of government regulations. I believe that the government could use its market influence to ensure our newly developed blockchain products are more widely adopted by the market. Perhaps once the market us more aware of its benefits, it will help to promote these products more heavily in the local community."*
- *"It is very difficult to regulate something you know very little about. Therefore, blockchain events such as these are highly important in informing regulators about <u>what</u> blockchain is all about, and the legal risks we might need to mitigate."*

Dr. Aaron Lane:

- *"With respect to the role of governments, I advise them to be crypto-friendly, by setting the rules of the game and being clear on how new blockchain-based business models and applications should be regulated moving forward. Additionally, I advise that they critically analyse the main legal risks, and the key identifiable reasons as to <u>why</u> they need to regulate the crypto-environment. For this reason, I do not believe that governments will be made redundant, merely that they will alter their activities to work alongside the blockchain in governing civil society."*
- *"I recommend that we use a sandbox, whereby entrepreneurs are given the freedom to trial and test their ICT-based ideas in a safe, secure environment, so that those that prove to be viable solutions can be later implemented."*
- *"I advise that we carefully think about the design of a sandbox. In Australia, we used this for our FinTech industry, for applications such as peer-to-peer lending and crowdsourced funding. However, due to over-regulation, it limited the number and*

*types of businesses who could enter this sandbox, with only 10 different experiments utilising this over 3 years. Consequently, while these are great places to test innovative solutions, we need to be careful from a regulatory perspective not to over-regulate, but rather to give enough room for entrepreneurs to experiment with their creative ideas."*

Mr. Ira Warner:

- *"I advise that we provide a safe playground, whereby we enable the legal and political systems to more effectively protect crypto-users. Currently, there is no assistance for crypto-users if their identity is leaked. As such, there needs to be more conversation between the people who are actually developing the technology and the policy makers themselves. The developers have expert knowledge of the key risks that need to be legally mitigated – as such, it is important to connect these two parties together."*

Audience comment:

- *"I strongly recommend that we address our existing regulations before we try to plan for the future. Otherwise, when our entrepreneurs try to implement solutions, they will quickly find that the current regulations in place prohibit them from carrying these out. As such, we need to review these before we even begin to develop a sandbox and test out our ideas."*

## 4.9 THE COIN-SURE STORY

**Presenter: Mr. Nou Vada**
***Co-Founder – Coin Sure Ltd***

- Coin-sure is a blockchain start-up initiative that protects against the volatile fluctuations in crypto-currency. It was born in the aftermath of the Bitcoin bubble burst, which forced people to review the risks of crypto-currencies. As such, Coin-sure has since partnered with various Blockchain Pasifik partners to help protect against crypto-based risks – more specifically, protecting crypto-holders' underlying wallet value against volatile movements.
- When someone fails, they need to either "pivot up" (i.e. be more ambitious) or "pivot in" (ie. connect more with the community, to find out *why* they failed, and *how* they can address this for future endeavours).
- Promoting student mentorship is key to Papua New Guinea's future. One of the country's biggest problem is that no one spends the time to adequately reflect on the problem, deconstruct it and try to solve it one section at a time. As such, it is important to teach students how to effectively use ICT to research viable solutions.

## 4.10 AUDIENCE REFLECTIONS

***Audience Question: What are the primary learnings from Blockchain Pasifik event?***

- *"This event was invaluable in providing me with real-case applications of how the community can benefit from blockchain implementation."*
- *"Thanks to this event, I have a greater appreciation and understanding of the concept of blockchain, the benefits it can provide, the difference between crypto-currency and blockchain, as well as the importance of governance."*
- *"Before this presentation, I was worried that implementing blockchain in rural areas would be unrealistic, since internet is still a problem. However, the presentation from DataCorp gave me hope that Papua New Guinea can start making blockchain-based solutions more viable."*
- *"I was excited to hear about how blockchain can help us improve the way in which my province can trade natural resources, in particular coffee beans. I am hoping that this will help promote equity and prosperity for small communities such as mine."*
- *"This event has given me ideas for my own business, regarding how I can incorporate blockchain into my business initiatives. Since yesterday's presentations, we have already started talking about these exciting solutions, so thank-you for giving us this event."*
- *"The slides were very clear and simple, and there was a lot for us to take away."*
- *"Thank-you to our local and overseas presenters and sponsors for starting these productive discussions."*

***Audience Question: How should we go forward?***

- *"I would like greater participation at a political level, since we need to get the political wheel moving to push legislation through. Blockchain can help solve our issues of corruption in Papua New Guinea, but it would have made more of a difference if we had seen more government members at this event to demonstrate their support for blockchain-based solutions."*
- *"We need more community education initiatives to teach them about how they can benefit from blockchain implementation."*
- *"I believe that regulation is a critical challenge in moving forwards. We need to look at if we had adequate infrastructure to run the blockchain, since it is based so heavily on the internet."*
- *"We are currently relying on expertise and capital from other countries, however, we need to get more local knowledge on what is happening here. I feel that when people present information on their own countries, it does not necessarily apply to what is happening in Papua New Guinea, and so I can't relate to what they are saying, nor see its relevance in my own province. Therefore, I suggest we place our efforts in gathering more local knowledge so we can create more targeted community solutions."*
- *"Teaching blockchain in classes is the way forward."*
- *"On behalf of members from remote communities, I can say we are generally confused about the concept of blockchain technology. That's why I think we need more education initiatives targeted at promoting awareness of blockchain in rural areas."*

- *"I am concerned about how we are going to commercialise this technology. We need to generate financial gain, even just from a sustainability perspective."*
- *"In terms of collaboration, I am concerned about how we can ensure that our people to work together and make these ideas a reality. If we don't put safety measures in place, then our time and effort will be wasted."*
- *"For next year's event, I recommend that we invite venture capitalists. This will ensure that entrepreneurs can pitch their start-up ideas to them and start making these a reality."*

## 4.11 KEYNOTE SPEECH: BLOCKCHAIN'S RELEVANCE TO EMERGING ECONOMIES

*Outlining the predictions of the global economy and how blockchain will impact developing economies.*

**Presenter: Dr. Chris Berg**
***Research Academic – RMIT University Innovation Hub***

- Over the next 10 years, it is predicted that blockchain technology will disrupt not only the economic sphere, but the legal and political spheres. This will require policy makers to radically review policies, such as securities law, consumer protection law, labour law, companies law and anti-money laundering.
- Traditionally, the economy has been governed by markets, hierarchies and governments; this implies that the economy was generally structured in hierarchical and centralised arrangements. However, with the introduction of a new governance mechanism – blockchain technology, it is predicted that it will change the way in which the economy arranges itself. This means that economic units will be disintermediated into smaller units and dispersed across economies.
- As we enter a new digital age, it is predicted that information will be the most important resource. Economic development is based on a nation's ability to allocate its scarce resources in the best possible means. However, while there are many types of resources (e.g. natural, capital and labour resources), it is predicted that information resources will drive economic change.
- Blockchain is predicted to disrupt developing economies, by helping to alleviate institutional problems of trust and information uncertainty. Traditionally, developed nations have tried to approach economic development through either the "big push" model or the "institution model". The "big push model" is a top-down approach, whereby countries push for economic change through centralised authorities. However, this lead to inflexibility, rigid prescriptions and the crowding out of entrepreneurship, whereby localised and dispersed information is not appropriately utilised to create targeted solutions. In other words, this created problems of information uncertainty. Therefore, societies tried to use the opposite approach – ie. the "institution model", whereby economic development is driven bottom-up by entrepreneurs and communities, using local knowledge to drive this change. However, this meant that there was less regulation and more corruption, thereby creating institutional problems of trust.

- As such, blockchain may provide a better solution in solving both institutional problems of trust and information uncertainty, by using institutional layering. This enables society to create a space to layer institutions onto of one another in a complex, interlinked fashion. This means that if an institution fails, one does not have to eliminate it and replace it with a new one. Instead, it is much easier to build a better institution on-top of it, thereby creating a blockchain ecosystem. It also enables alternatives to the existing institutional systems, creating a competitive dynamic between the existing institutions. If the blockchain can offer more value to society than a public or private competitor, then it will encourage competition from existing parties, thereby creating more value for society.
- Blockchain can also help with funding large scale economic infrastructure for developing nations, by offering new governance models for collective investment. Currently, we rely either on single rich investors or shared investments for raising funds. However, these are not always effective. For example, in the case of a single rich funder, these are rare to find and can be potentially monopolistic. Meanwhile, with respect to shared investment funding models, these can be hierarchical and profit-centred, with large non-profits rare to find. As such, blockchain can help to solve this funding issues, by offering crowdfunding and collective-action based solutions.
- We predict that the new blockchain ecosystem will constitute:
    - Large and small firms;
    - Entrepreneurs and established companies;
    - Non-profits, industry groups and governments;
    - Academics, hobbyists and professionals.
- In conclusion, developing economies such as Papua New Guinea not only need to develop and enforce strong policies, but promote cooperation and coordination. This event served as a revolutionary means of bringing everyone together into a single space, whereby everyone could create intellectual and entrepreneurial connections, share ideas, learn from others' successes and failures, and pave the way forward as a shared ecosystem. As such, this sets the tone for a prosperous future for Papua New Guinea as it transforms into a world-leading digital economy.