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Blockchain for Growth: Applying DLTs to the UN Sustainable Development Goals

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Introduction

The Sustainable Development Goals (SDGs) galvanized the global community behind efforts to make the world a better place for all its people by 2030. It is an ambitious agenda, and one that will not be reached without harnessing the potential of technology. Among frontier technologies, Blockchain—deployed at scale—could accelerate SDG progress and alleviate challenges faced by the poor and marginalized.

Most people associate blockchain with the early anarchic days of Bitcoin, launched by Satoshi Nakamoto in 2007, and the heady days of Initial Coin Offerings (ICOs), where millions and billions were raised; some based on insubstantial whitepapers, which undermined blockchains' credibility as a technology capable of driving unprecedented industrial change. Bitcoin has since come far, with a market cap of over US$303.1 billion (at the time of writing) and used as a method of payment by millions of people.

Beyond cryptocurrency, there is a growing appreciation for blockchain, Bitcoins's underlying technology, for numerous use cases. Globally, 200 banks and over 40 central banks are experimenting with blockchains in financial efficiency, data management and information-sharing, for example (World Economic Forum 2019). The banks in question consider the benefits of

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Blockchain technology to include; oversight of trades end-to-end, reduced risk of discrepancy and delayed settlement, real-time access to a shared ledger for sighting by multiple stakeholders, automation of manual processes, reduced reliance on external settlement networks, efficiency gains in capital velocity, reduced counterparty, market and credit risk (Del Rio 2019; World Economic Forum, 2019).

Digital is the future. For countries to remain competitive, it is imperative that governments look towards innovation and digital technologies to provide the basis for growth in the twenty-first century. Job creation will inevitably come from the digital economies. Blockchain enables new forms of finance to address global poverty problems. Governments and donors need to be at the forefront of understanding, preparing for, and accelerating the uptake to scale, to achieve impact.

This chapter summarizes the many applications of blockchain in contributing to widespread social transformation and enabling traction against the SDGs, focusing on emerging economies. It also discusses barriers and enabling factors to achieve such a transformation.

Blockchain and the SDGs

As the hype surrounding blockchains subsides, we can contemplate a more sober reflection of the technology and its use cases. It is becoming clear that blockchain offers the potential to build a better world; one where the poor have their identity secured on a blockchain, which they can use to access essential services or the financial system through a mobile phone and digital currencies. People living on customary land can have it titled on a blockchain and can use that title to access finance. For governments, blockchain is an opportunity to leapfrog traditional systems and achieve greater financial inclusion and transparency. For business, blockchain offers easier access to capital and significantly lower transaction costs. For donors and philanthropists, blockchain can also ensure that aid goes directly to targeted beneficiaries using a smart contract. For the ambitious, there is potential to use blockchain to create Distributed Autonomous Organisations to address global commons issues. The following section outlines some of the key use cases by SDG.

SDG 1—No Poverty

Blockchain can help leapfrog a number of challenges faced by the poor and has tremendous potential to provide scalable solutions to address issues of poverty and inequality. This includes: the potential to confer a permanent, immutable record of identity in the blockchain owned by individuals could be game-changing; using smart contracts, blockchain can be used to ensure that donor funds reach intended recipients in a transparent way without middlemen and leakage along the way. Aid delivery can be tracked with transparently recorded "way-stations" showing location in supply chain and ultimate delivery as well as financial inclusion.

Digital Identity

The World Bank (Desai et al. 2018) estimate that over one billion people globally cannot prove who they are. The window to global inclusion and economic participation is identity. The importance of trusted legal identity is recognized by the UN ID2020 agenda (www.id2020.org) to be a fundamental prerequisite for poverty reduction. Having an established identity underlies a citizen's access to a plethora of services: financial inclusion, government services, voting, employment, to name but a few. There is an opportunity to rapidly establish and scale an advanced digital identity system leveraging blockchain which will unlock many barriers faced by the poor, as well as facilitate greater economic growth through ease of transactions. The potential to confer a permanent immutable record of identity in the blockchain owned by individuals could be game-changing. Once a person has an identity, they can potentially have access to a range of services; the roll out of digital money systems could fuel rapid widespread access to financial services that was not available before. This could have a significant impact on the economic livelihoods of the large segments of rural populations that are unbanked.

There are many blockchain projects established for providing digital identity, including Bitnation, uPort, Exsulcoin, the Shyft Network and Block-stack, which can help refugees or humanitarian agencies to obtain digital ID documents and host governments can then use to verify their identity (Thomason et al. 2019).

Land and Assets Registration

Hernando de Soto, the Peruvian economist and anti-poverty campaigner, believes that the absence of formal title to property means there is $10 trillion in "dead capital" in the world economy (Casey 2016). Many people own land and assets, but due to insufficient and unverifiable records, are not able to access the value of their assets. Through digitization of assets, people would be able to borrow to improve their livelihoods and an immutable digital record (once established) means that ownership is confirmed. There are two opportunities to unlock land value. The first is to build a trusted and incorruptible system for ordinary citizens to lease their land and generate income. The second is to establish a formal registry system, tied to individual digital identities, for land to be used as collateral for citizens to borrow money and become more financially mobile. Building a formal registry scheme, based on individual digital identities, can provide the collateral necessary for larger investments and financial progression. Such capital can be used to invest in improving living standards, starting or scaling businesses, and growing the economy.

Existing technology providers actively piloting blockchain solutions for land registry schemes, include Chromaway (www.chromaway.com), a technology provider working with Sweden's land titling project (www.lantmater iet.se), and Factom (www.factom.com), a provider working on Honduras' land registry project and SESO in Nigeria (app.seso.global).

Humanitarian Settings

Mass and forced migration is a major—and growing—challenge. The UN Refugee Agency's annual Global Trends study (2018) report that 68.5 million people had been forced from their homes across the world in 2017. When refugees are forced to abandon their homes, many leave behind important documents such as birth certificates, marriage licences, passports and ID cards. These are nearly impossible to retrieve after leaving the country, assuming they have not already been destroyed (UNHCR 2018).

Blockchain has potential to help solve humanitarian problems, including identity, migration, asylum-seeking, camp management, food and remittance distribution (Ardittis 2018). Humanitarian organizations are deploying blockchain in camps to address digital identity, supply chains, cash transfers and remittances, integrity of donor funds flows, property registry, employment rights, human trafficking, education and asylum processing. This is

often in conjunction with other frontier technologies such as AI, IoT, big data, drones and 3D printing.

Save The Children have been investigating a humanitarian passport (Shah 2017), the Red Cross piloted blockchain in early 2018 to test the traceability and transparency of Islamic Social Finance (The Development Circle 2018) and the World Food Programme's Building Blocks program was one of the first of its kind to facilitate cash transfers to refugees on the blockchain. To ensure these services were possible, however, fundamentals regarding satisfying identity claims were first necessary. Indeed, a task force has been established by the European Parliament to look at how blockchain technology could be used to provide digital identities to refugees (Ardittis 2018).

Financial Inclusion

There is a direct correlation between financial exclusion and poverty (World Bank 2017). An estimated two billion—or 38% of working-age adults—globally have no access to financial services delivered by regulated financial institutions, with 73% of poor people unbanked (World Bank Group 2017).

Digital currencies and mobile money systems could address this by providing widespread access to financial services, providing traceability and efficiency in disbursement which would have a tremendous impact on the economic livelihoods of the large segments of rural populations that are unbanked.

Among the financially excluded are migrant workers and their families in their home countries. In 2015, these workers sent USD500 billion home, representing a key international flow of funds. Current remittance processes are slow and expensive, penalizing the most vulnerable and impoverished groups of people. Despite technological advancement, the costs for migrants to send money across borders to their families remains extremely expensive, with fees often surpassing 5% (Cecchetti and Schoenholtz 2018) and yet remittances reduce poverty (Pekovic 2017).

Annual cross-border remittances are about $600 billion per year, three quarters of which flow to low- and middle-income countries. Yet, on average, the charge for sending $200—the benchmark used by authorities to evaluate cost—is $14. That is the result of the combination of fees (including charges from both the sender and recipient intermediaries) and the exchange rate margin, which typically comprises 7% of the amount sent (World Bank 2013). A Philippine company, Coins.ph, offers a good example of blockchain's potential. Situated in the country ranked third in the world for receiving remittances (totaling about USD$30 billion a year), Coins.ph

provides Filipino users a mobile, blockchain-based platform to allow them to send money at a more affordable and faster rate. Blockchain allowed Coins.ph to build an application to facilitate fund transfers without reliance on existing bank infrastructures and to be more agile in their services at a more affordable price (Global Financing Facility 2016).

Blockchain would reduce the transaction costs for remittances, giving the unbanked access to financial systems and ensuring that funds intended for the poor actually reach them.

SDG 2—Zero Hunger: Agriculture Supply Chains

The agricultural industry ensures food security—it is a major driver of economic activity, employment, social cohesion and prosperity for many parts of rural and regional countries. Global population growth means, worldwide, demand for food is projected to rise by around 75% in the first half of this century, with three quarters of this growth in Asia (Australian Government 2014).

Key challenges across agri-supply chains are:

1. Farmers are not paid for the commodities they produce when they deliver them;
2. Buyers don't have access to flexible supply chain finance to pay farmers, as financiers lack visibility and control when financing commodities; and,
3. Consumers don't really know where their food and fibres come from restricting their ability to make informed purchasing abilities.

An efficient agriculture supply chain is especially important in low-income countries whose reliance on agriculture is 28 times greater than high-income countries (World Bank 2019). More than 60% of the world's population depends on agriculture for survival and ninety per cent of this land is found in Latin America and Sub-Saharan Africa. Half of this 90% is concentrated in: Brazil, the Democratic Republic of the Congo, Angola, Sudan, Argentina, Colombia and Bolivia.

AgriDigital (https://www.agridigital.io), for example, has used blockchain-enabled technology to create globally frictionless systems for the grains and cotton industry. Launched in March 2019, Agridigital ensures farmers continue to own their commodity right up until the moment they are paid, solving the problem of matching delivery to payment and opening up flexible financing options.

SDG 3—Good Health and Well-Being

Health Supply Chains are crucially important to ensure the authenticity and quality of life-saving medicines. Poor-quality medicines are a major public health threat, particularly in settings with a weak regulatory environment. Advances in logistic chain management leverages both digital and data analytics to not only improve the tracking and authenticity of medicines, but also ensure consistency of availability and quality. When linked to a digital identity, the digitized tracking of health supply right down to individual recipients, could be a game-changer in terms of tackling health outcomes such as maternal health and child mortality.

The blockchain brings significant operational benefits to supply chains (Provenance 2015):

- Interoperable: modular and interoperable, the blockchain can eliminate the possibility of double-spending throughout a supply chain
- Auditable: a blockchain's auditable records can be inspected and used by companies, standards organizations, regulators and customers across the supply chain
- Cost-efficient: eliminating the need for "handling companies" to be audited can drastically reduce costs across supply chains
- Real time and agile: a fast and highly accessible sign-up means quick deployment across the many participants in a supply chain
- Public: the openness of the blockchain enables innovation and bottom-up transparency in supply chains instead of burdensome top-down audits
- Guaranteed continuity: the elimination of any central operator ensures inclusiveness and longevity of supply chain management

FarmaTrust (www.farmatrust.com) offers a way to trace data about medicine moving through the supply chain on blockchain, a technology originally created for the purpose of buying and selling bitcoin without going through a server belonging to a bank or government that could be hacked (Lock 2019).

SDG 5—Gender Equality

The United Nations sees blockchain technology may dramatically improve the efficiency, transparency and accountability in international humanitarian, development or peacekeeping assistance, providing a chain of custody from generation-to-generation, woman-to-woman, each acting as a node in the transfer. Ownership registries recorded on the blockchain, will track property

lineage with ownership details secured privately among the involved parties. Invisible women and children with no ID, are at risk, and fall into the hands of traffickers (sex trade, illegal human organ trade), and are missed by social programs. Commenting on the need to encourage and finance innovative approaches, Karen Ellemann, Minister for Fisheries and Equal Opportunities and Minister for Nordic Cooperation, Denmark, at a four-day event at the UN Women Headquarters in New York, said "pioneering involvement in this new territory can act as an important stamp of legitimacy enabling investment in blockchain solutions designed to help women in emergencies. For refugee women on the move, blockchain technology can help store and secure identity papers, medical records and documentation of ownership of assets" (UN Women 2018).

Slavefreetrade is a Universal Supply Chain Operating System on the blockchain. Its mission "aligns with the United Nations Sustainable Development goal 8.7 along with eradicating modern slavery by enabling and motivating business to clean slavery from their supply chains". Presently, the "distance between people in …[the supply chain ecosystem] has resulted in a lack of knowledge by consumers about who and how products are made, a lack of respect for the human rights of 45 million workers, and a lack of clear sight and responsibility to the end of every supply chain" (slavefreetrade 2020). By certifying slave-free products with a consumer-facing slavefreetrade label, those along the ecosystem will track its provenance to the origin. Using a verification framework to eradicate modern-day slavery in business supply chains, it looks at the supply chain ecosystem: world's consumers, retailers, workers, employers, businesses and suppliers, to track the provenance.

SDG 6—Clean Water

Countries spend billions of dollars to develop and implement water accounting guidelines and frameworks. By using blockchain as a foundation for water accountability and the regulation of peer-to-peer transfer of water allocations, it balances competing uses ensuring the sustainability of water for the longer term.

For example, in Australia there are multiple jurisdictions sharing responsibility for water resources management, creating a complex water market that dissuades small irrigators and an opportunity for intermediaries to enter the water market. It is a widely acknowledged goal in the Murray Darling Basin Agreement to have more individual irrigators participate more effectively in the market but there are critical barriers to participation including;

the complexity of the trading process and lack of price, volume and information transparency. The blockchain could lend transparency to the information critical to enhance market participation instilling confidence and encouraging participation by irrigators in the water market.

Civic Ledger (https://civicledger.com/) analysed how a blockchain-based platform—Water Ledger—could support an effective market for irrigators, which in economics and general equilibrium theory is defined by several conditions, collectively called perfect competition. Blockchain offers the potential for countries to manage and monitor scarce water resources.

SDG 7—Affordable and Clean Energy

The price of solar panels has dropped over 80% over the last decade—it's now cheaper to produce and buy solar energy than fossil energies (Dudley 2019). Solar panels can now be connected to the blockchain in order to enable consumers in developing countries to benefit from distributed generation. With blockchain, someone from a village can buy small solar panels and plug them to an off-grid network of cables in order to produce electricity for their local community.

Smart contracts allow individuals to buy and sell solar energy using digital tokens that can be redeemed for a local cryptocurrency. For example, the British start-up Azuri (www.azuri-group.com), produces low-cost solar panel solutions for off-grid areas in rural Africa, bringing clean energy to markets where once kerosene was the only option. Simply put, transforming the lives of off-grid rural citizens making them owners of cutting-edge technology and building a healthier safer home environment.

SDG 13—Climate Action

At the UN General Assembly in 2019, The Sustainable Digital Finance Alliance and the HSBC Center of Sustainable Finance launched "*Blockchain Gateway for Sustainability Linked Bonds: Widening access to finance block by block*". This outlines how emerging technology can enable the green bond market to scale dramatically from 2% of the current trillion-dollar bond market, unlocking capital for solutions to meet the Paris Climate Agreement. The report points to a future where the current reporting burden is alleviated to make the bond market far more efficient and accurate and lead the transformation (Fintech News 2019).

SDG 17—Partnerships for Goals: Global Commons—Technology as a Global Public Good

There are three broad types of global commons resources: common heritage domains (like the oceans, the atmosphere, Antarctica and outer space regulated by international law); resources that are under national domains but ranked as global commons issues (such as rainforests, national waters, and indigenous cultures); and shared resources that justify a common effort from the community to manage and govern (such as digital resources, the world wide web infrastructure or global financial system) (UN 2013).

Blockchain could scale local solutions to address the global commons by supporting activities to enable the sustainable management of the global commons, through systems of governance, transparent decision-making, smart contracts and decentralized mechanisms and incentives for collaboration, cooperation, consensus and trust.

A Global Commons Partnership could be enabled by blockchain and a Global Commons Trust established to fund action for Global Commons Issues and access to Global Public Goods. This could be achieved through the establishment of an International Trust to build and develop the enabling technologies for general access at minimal (or subsidized) cost—thus ensuring access to the most marginalized persons. Trustees would have a fiduciary duty to all humanity. The cost of building and maintaining the enabling technologies would be funded by financial contributions from governments and philanthropists. This remains in the "big idea" category and no one has yet created a global commons partnership, but with the current global focus on climate action, it is worthy of exploration.

The Winds of Change

Like community token economies for global commons partnerships, blockchain is a big idea that enables a reconceptualized future, where everyone can have an identity, is connected to the economy, where farmers get fair deals for their crops, and land registration is incorruptible. Where it is conceivable that everyone is educated. Blockchains may change economies and power. New self-regulating token economies will emerge that support global collaboration on global problems like climate change, diverting power from institutions to people.

While most of the development and implementation of blockchains has taken place in Western countries, arguably its greatest potential resides in

emerging markets. Firstly, China and India alone together have five times the number of smartphone users than the USA (Thomason et al. 2019). Secondly, demography, the vast majority of people under 30 live in emerging and developing economies (Thomason et al. 2019). Thirdly, mobile penetration is growing rapidly and currently stands at more than two-thirds of the global population (Thomason et al. 2019). Fourthly, emerging markets simply have big problems to solve and this stimulates innovation. Finally, emerging market governments are agile and increasingly in many cases (e.g. Mauritius, Kenya, UAE, Bermuda) are driving the technology innovation agenda (Thomason et al. 2019).

The United Nations continues to take blockchains as a contributor to achieving the SDGs seriously. At the 2019 United Nations General Assembly in New York, The Women Political Leaders Global Forum, the Blockchain Charity Foundation (BCF), and the Finance Centre for South-South Cooperation, hosted *Blockchain for Social Good: Utilizing Blockchain to Aid Economic Development possibilities for blockchain to be a strong driver for inclusive growth*. Partnerships were formed, with BCF and the United Nations Development Program noting the importance of blockchain to construct a better society and partnering to support the work of blockchain for social good.

In our recently published book, *Blockchain Technologies for Global Social Change*, (Thomason et al., IGI, 2019), we make the case for blockchain as transformative for Global Social Impact, developing the *B4SC* (Blockchain for Social Change) model (seen in Table 6.1) which represents the chief social impact potential of the blockchain through three stages:

- *Cultural Influences and Drivers*; factors contributing to and/or driving the emerging environment, grouped by the following areas of influence: Technology, Governments and Communities.
- *Enabling Shifts*; factors required to transition to an environment that supports a world underscored by blockchain and a new economy. These are grouped into: Economics, Governments, Hyper Co-Collaboration, Sovereign Identity, Communities and Conversation areas of influence.
- *New World*; this presents a picture of the underlying factors of the envisioned environment after the transformational shift. These are grouped into: Empowerment, Global Economics and New Data Economy.

We propose that in order to accelerate technology adoption in satisfaction of the SDGs will require five enabling shifts (Thomason et al. 2019);

Table 6.1 Blockchain for social change model
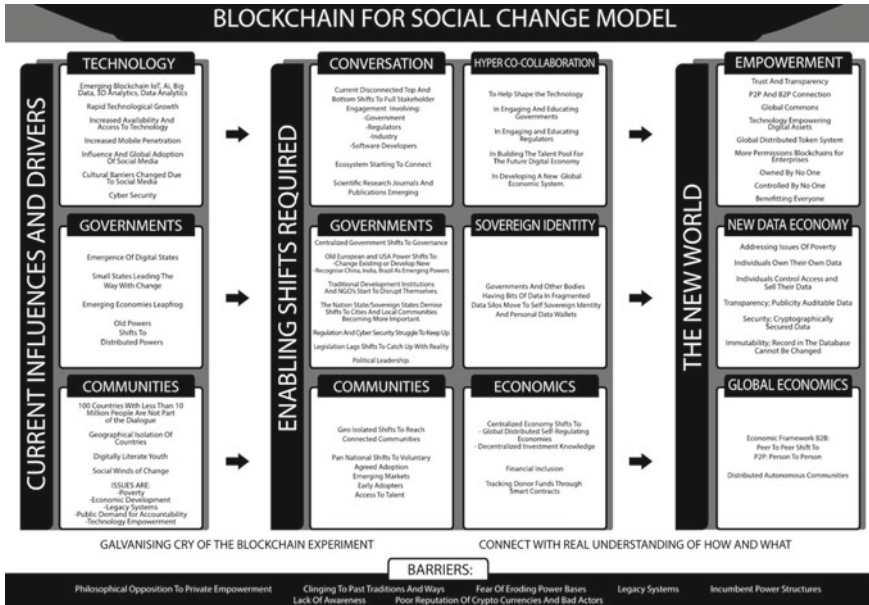
Source Thomason et al. (2019)

1. Increasing mobile and internet penetration that makes access to technology ubiquitous.
2. Perception of benefit in order to adopt the technology
3. An understanding of the move to the new data-driven economy owned and permissioned by individuals
4. A connected ecosystem with all stakeholders building hyper co-collaboration for social impact
5. International institutions support and provide models for global and national governance and enabling standards and regulations.

Global leadership for technology in general is patchy and oft ill-informed. Governments struggle to know how to approach technology, and yet the digital age is already upon them. Governments need to grapple with digital infrastructure; policy and regulation; building local ecosystems; building government capability; access to capital and reducing inequality and monitoring and benchmarks; APEC needs to look for solutions that can scale, and to unite the ecosystem which connects the blockchain systems in advanced APEC economies with those that work with the intractable problems of poverty and inequality. Yet there is a real opportunity to accelerate blockchain

adoption to improve economic inclusion and citizen services and accelerate SDG progress.

Building a Digital Ecosystem

Without a digital ecosystem, the kind of SDG innovation contemplated in this chapter, will struggle to get traction. Emerging economies need to build the ecosystem that will enable the rapid acceleration of digitization. This will mean the simultaneous conjunction of the right policy and regulatory environment, incentive structures, training and skills development, funding and connections among ecosystem actors. Governments, and businesses can play a role in catalyzing the acceleration of the start-up ecosystem. The Government of Malaysia Magic Program, the Singapore Smart Nation Strategy and Code Lagos are examples of proactive leadership by the government to build digital economies.

Government

Governments have a critical role to play in getting the policy and regulatory settings in place to catalyze digital transformation. There are four key elements to a government's role: (i) political leadership; (ii) talent access; (iii) finance and (iv) infrastructure.

(i) Political leadership—There needs to be a bold political ambition to build digital transformation and the development of policies to attract talent, investors to the country and to be at the forefront of innovation. Governments need to create policy frameworks that foster, and do not hamper, digital innovation. Government interventions that can dramatically affect growth include: developing new segments via the digital economy; enhancing public and private sector competitiveness and efficiency; job creation within new segments and greater access to global job markets; attracting foreign investment as digitized economy and diversifying trade using e-commerce and online services.

Structural policies should also facilitate innovation and entrepreneurship to foster innovation and technology diffusion, ensure that competitive conditions prevail and avoid erecting barriers to cross-border digital markets.

Government can also work with donors to look at opportunities for digital solutions in aid programs. Government can promote principles and standards for digital development throughout the aid system, to ensure that more digital products and services reach, empower and improve the lives of poor people, particularly those at risk of being left behind. In relation to inclusion, governments can increase awareness, digital and entrepreneurial literacy in rural and remote areas.

(ii) Access to talent. Talent is critical. Governments need to grow the talent needed to digitize including, entrepreneurs, programmers, designers and engineers. This will only happen through proactive government policy. The example above of CodeLagos in Nigeria (www.codelagos.org) is an initiative of the Lagos State Ministry of Education aimed at educating Lagos State residents for the future of work—by teaching how to write code and creatively solve problems. Their ambitious agenda is to train 1 million coders over the next five years. Visa policy should support entrepreneurial activity to enhance labour mobility, with a skilled visa policy to attract entrepreneurs and start-ups.

(iii) Access to Finance—Governments play a key role in attracting and developing investment instruments like government-backed bonds to provide for investment in promising tech companies, and funding for start-ups and incentivizing industry to provide accelerator programs for start-ups.

(iv) Infrastructure—Connectivity is key and affordable, secure access to the internet is a fundamental priority. Also there is a need to provide physical space for start-ups and an enabling environment to allow young tech entrepreneurs to flourish and build the ecosystem will enable the digital economy to thrive.

Governments can also digitize themselves. Digital Government is a transformation of traditional "analogue government" functions towards the utilization of digital solutions for government operations, services and policies. This includes, for example, digitalization of public service systems to improve responsiveness, capability and accountability; policies and interventions to facilitate digital economic growth; and leveraging the ability of internet, email, text and social media to improve citizen participation.

Business

If the government enables the digital economy, business must drive it. It is critical for business and economic growth that digital initiatives generate and thrive. Business needs to proactively form partnerships to develop the

ecosystem and provide opportunities for start-ups to incubate their ideas. Big companies are short on innovation, and the digital entrepreneurs have the ideas but no customers and no brand. Business can provide a launch pad for young entrepreneurs—by supporting co-working spaces and industry accelerator program. Business culture needs to realize that they need young entrepreneurs with ideas and energy. It can be a cultural challenge and as the young entrepreneurs and traditional executives—don't mix well, but we need to bring the cultures together to be effective!

UN and Global Community Action

Rising interconnectedness calls for international dialogue in the design of policies for the future world of work in areas such as taxation, competition, R&D incentives and standard setting. Global institutions can also play a role and continue to set targets and monitoring progress for things like: internet speed and minimum internet penetration; internet access and usage; rural inclusion and mobile network coverage. Regional collaboration is also needed to address standardization, to examine the regulatory fitness of legislation for the digital single market, and to support the sharing of best practices in areas like skills and jobs for the digital change.

A global platform of digital initiatives could play an essential role in the roll out of digitalization of emerging economies, where: experiences can be shared, collaboration and joint investments can be triggered, common approaches to regulatory problems be explored, and means for reskilling of the workforce be further exchanged. The platform could promote best practices, share information and strengthen capacity-building among countries on human resources development in the digital age in cooperation with relevant partners.

Digitization is the future for emerging economies and has the potential to close the gap. This is an area where small economies can play an active or leading role in tech innovation by being open to it and being boldly ambitious. Digitization brings unique opportunities to bypass the legacy issues that advanced economies confront, and help them "leapfrog". It is time for governments to have bold ambition and for the global community to marshall its experience and resources to support the smaller economies to harness the digital potential to close the gap.

Conclusion

The digital age is here. It is incumbent upon governments and the international community to explore how to marshall its benefits for the SDGs. There are close to five billion mobile phone subscriptions in the world, with over 85% of the world's population now covered by a commercial wireless signal. Blockchain offers potential benefits for poverty, hunger, health, gender inequality, clean water, affordable clean energy, climate and partnerships for the global commons.

Blockchain will likely be deployed in conjunction with artificial Intelligence, big data, the Internet of Things (IoT), drones, and virtual reality.

2019 saw the stabilizing and maturing of the blockchain industry, becoming more about what technology enables. 2020 will be the year that blockchain goes enterprise—research and development projects will bear results. The areas where major blockchain progress is taking place are as diverse as the applications they are creating. The global nature of blockchain's development can help distribute opportunities for wealth creation and economic development more widely than before. It is important for governments to develop the right policies to harness the potential benefits of this technology while mitigating its risks and potential for misuse. To do so, it is essential for countries to cooperate in order to share best practices and ensure interoperability.

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