
Technology and Innovation: Tools to
help close the Protection Gap in
Microinsurance Markets

Contributors

Editorial Team

Nigel Brook
Partner, Clyde & Co LLP

Bill Marcoux
WCM Advisory, LLC

Wynne Lawrence
Senior Associate, Clyde & Co LLP

A2ii
Hannah Grant, Head of the Secretariat
Hui Lin Chiew, Advisor

Agritask
Roderick Panchaud, Insurance Business Lead

AIG
Edward Barron, Head of International Government
Affairs
Gisele Sirot, Director of Business Intelligence,
Innovation & Sharing Economy

Allianz Climate Solutions
Simone Ruiz-Vergote, Managing Director

AXA
Francois Vannesson, General Counsel - Head of
Legal & Tax
Garance Wattez-Richard, Head of AXA Emerging
Customers
Quentin Gisserot, Project Manager at AXA Emerging
Customers
Mark Carpenter, Head of IT at AXA Emerging
Customers

**Centre for Financial Regulation and Inclusion
(Cenfri)**
Mia Thom, Technical Director
Kate Rinehart-Smit, Senior Associate
Jana de Waal, Research Analyst
Antonia Esser, Senior Associate
Jeremy Gray, Senior Engagement Manager

Clyde & Co LLP
Avryl Lattin, Partner
Caroline Hedley, Solicitor
Dino Wilkinson, Partner
Ernie van der Vyver, Partner
James Newton, Associate
Katharina Wigger, Student Assistant

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Max Braslavsky
Associate, Clyde & Co LLP

Edward Langelier
Associate, Clyde & Co LLP

Lukas Wagner
Associate, Clyde & Co LLP

Marlene McConway, Head of Insurance Sector
Research & Development
Masha Ooijevaar, Associate
Phoebe Whitelaw, Trainee Solicitor
Rod Smith, Consultant
Sumeet Lall, Partner

Geneva Association
Dr Kai-Uwe Schanz, Senior Advisor & Director
Socio-Economic Resilience
Dennis Noordhoek, Director Public Policy &
Regulation

**International Cooperative and Mutual Insurance
Federation (ICMIF)**
Sabbir Patel, Senior Vice-President, Emerging
Markets

InsuResilience Secretariat
Daniel Stadtmüller, Advisor

Market Minds
Sebastian de Zulueta, Founder

MicroEnsure
Richard Leftley, Chief Executive Officer

Microinsurance Network
Katharine Pulvermacher, Executive Director

Munich Re
Michael Roth, Senior Manager Public Sector
Business Development

UK Department for International Trade
Tom Herbstein, Insurance Prosperity Specialist

Swiss Re
Ivo Menzinger, Head EMEA & Product Management
Mangesh Niranjana Patankar, Head Agriculture
Reinsurance, India

Technology and Innovation: Tools to help close the Protection Gap in Microinsurance Markets

Forewords

There are great social, economic, and humanitarian benefits in increasing access to insurance at the micro-level – particularly in developing countries. Many within the insurance industry, the global regulatory community and non-government organisations (NGOs), are motivated to develop these markets, and yet the protection gap at the micro-level remains immense, and progress in closing it has only been incremental.

This paper discusses how technology and innovation can be powerful tools in building more resilient communities. This is true across the insurance marketplace, but there are some particularly exciting opportunities for progress at the micro-level. Technology can extend the reach of insurers; it can enable better product design, more accurate pricing of risk, reduce distribution costs, increase the speed and ease of claims settlements, and assist in fraud detection among other benefits.

Technology is a tool which should be used in the difficult job of addressing the insurance requirements of those who require greater protection and support from the insurance sector. It does not, however, obviate the need for continued investment in customer education and financial literacy, researching market specific consumer needs, building regulatory capacity, or establishing trusted working relationships among all insurance sector stakeholders.

I want to thank Clyde & Co for their great effort in leading the development and publication of this paper, especially Nigel Brook as lead partner, and Edward Langelier, who, along with the support of a strong team of Clyde & Co lawyers and assistants, took primary

responsibility for the research and interviews that formed the foundation of this paper. We also benefited from the valuable input from the Insurance Development Forum (IDF) Inclusive Insurance Working Group, and more than 15 organisations who provided us with information, views and ideas, which added greatly to the paper. These organisations are listed on the inside cover, which is modest recognition for such great service to the IDF, but it comes with our sincere thanks for their contributions.

We hope you find the discussion and findings in this paper of interest and of help in addressing this urgent need for action.

Bill Marcoux

Chair, IDF Law, Regulation and Resilient Policies Working Group

While researching this paper, we were struck time and again during conversations with our contributors, by the sheer amount of energy and innovation in the microinsurance field; much of it enabled by both established and cutting edge technology. Insurance that meets the needs of consumers in developing and emerging markets can be truly life-changing, and we witnessed how insurers, intermediaries and innovators are rising to the challenge of designing and distributing affordable cover.

Regulation and supervisors have an important role to play. Encouraging innovation while protecting consumers is a delicate balance, and we heard stories of both under- and over-regulation, as well as heartening accounts of imaginative insurance, and supervisors collaborating with their counterparts in other government departments: A2ii and others are achieving great work in identifying and publicising best practice in this area.

Technology by itself will not bridge the protection gap, but technology is spurring and enabling a range of innovations which could ultimately be transformative.

We are grateful to all of the contributors for giving their time and input so generously, and also to Bill Marcoux and other members of the IDF Law, Regulation and Resilient Policies Working Group for their astute observations.

Nigel Brook

Partner, Clyde & Co LLP

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Introduction

Technology continues to transform insurance in developed and emerging markets alike. The dramatic increase in the volume, granularity and timeliness of data – plus the ability to share and analyse it – have opened up opportunities for the insurance sector to serve its customers better, faster and more comprehensively.

As examples, the use of satellite data and other platforms to facilitate parametric (index-based) insurance is transforming the mechanics, deployment and risk-management role of insurance globally. Satellite technology allows for a more effective means of gathering data on certain types of risks that affect individuals in both emerging and developed markets. In addition, the proliferation of mobile phones allows insurers to connect directly with a greater number of new market participants, reaching previously uninsured or under-insured populations, and thereby enhancing resilience.

But technology is only a tool. It does not transform unaffordable or ill-suited insurance products into attractive, highly sort-after insurance products. And technology can only be used where it is available; where customers have the means, knowledge and confidence to use it, and where its use is compatible with existing laws and regulations.

For those most at risk in emerging markets, technology can help develop and deliver insurance solutions to close the global protection gap. This paper follows the publication of a similar paper last year by the IDF on the use of technology in connection with sovereign and sub-sovereign risks¹. In the preparation of that paper, we recognised that there were some unique issues surrounding the use of technology and micro-insurance which deserved separate examination.

By micro-insurance, we mean insurance products which are suitable for individuals or households making between USD\$2.00-\$20.00 per day on a purchasing power parity basis².

Accordingly, this paper seeks to address this market segment, i.e., the lower end of the economic spectrum, while also including the important emerging middle class in many markets. It also seeks to highlight and discuss the issues that will help determine success or failure in addressing this market, including the role of the public sector and of laws and regulations in supporting the development of tech-enabled solutions. Throughout this document, we will illustrate various challenges faced in adopting existing law and regulation, or regulatory architecture to emergent technologies, while including examples of innovative regulatory responses.

The urgency to close the protection gap has increased with the proliferation of risks associated with climate change. The COVID-19 pandemic has only added to the urgency for societies and economies to understand, mitigate and protect against the threats we all face, particularly those faced by the most vulnerable.³

The role of insurance in driving sustainable development is incontrovertible, but not universally accepted or understood by critical stakeholders, including many relevant government entities. Enhanced access to insurance services helps reduce poverty, improve social and economic development and resilience, and supports major public policy objectives; such as improving health preventing short-term setbacks from undermining broader development gains and goals by providing protection and security for families and livelihoods. As a result, insurance is now understood to be a condition for – and not a consequence of – sustainable economic development.

Currently, more than half of the world's population does not have, or has very limited access to insurance as a means of managing and transferring risk. With a lack of access to such supportive financial infrastructure, those with little disposable income may be one crop failure or one family illness away from slipping back into poverty. Such populations may then have to resort to coping mechanisms in the face of adverse events, such as selling assets, relying on local community, reducing food consumption, taking children out of school so they can work, or resorting to predatory payday loans. Without the extra formal protection of financial risk transfer, it can be harder for individuals and communities to recover from adverse events, impacting the long-term economic growth, development and social cohesion.

This is an issue that has been recognised by the Vulnerable Twenty (V20) group of economies, which in September 2018 rolled out its Sustainable Insurance Facility (SIF). The aim of the SIF was to provide insurance protection for micro-, small- and medium-sized enterprises (MSMEs) which account for 29% of GDP and 78% of jobs in the V20 economies. The SIF aims to enhance resilience in vulnerable economies and provide increased protection and reduced pressure on public spending following natural disasters.⁵

Climate change is a risk multiplier and its effects are already being felt worldwide. Since the 1980s, the number of weather-related loss events has tripled, and inflation-adjusted insurance losses in the same period have increased fivefold to an annual average of USD\$50 billion. The effects of natural disasters on lives, livelihoods and assets are not evenly distributed, and as losses from adverse

weather events increase, those most at risk are people living in emerging markets, many of whom do not have access to insurance.

In the last 10 years, approximately only 30% of losses from natural catastrophes have been covered by insurance. In middle or low-income countries, the uninsured proportion of economic losses often exceeds 90%. Natural disasters already force 26 million people into poverty each year, and as climate change continues, so too will the frequency and intensity of extreme weather events, further threatening global efforts to sustainably reduce poverty.

In recognition of the value of insurance to global society, the international community has sought to improve its deployment and uptake; particularly in emerging markets. For example:

- In 2005, the Hyogo Framework for Action 2005-2015 (the first global plan to reduce disaster losses to 2015), included a recommendation to states and international organisations to implement schemes that spread out risks, reduced insurance premiums, expanded insurance coverage, increased financing for post-disaster reconstruction and promoted an environment that encourages a culture of insurance in emerging markets
- In 2012, at the Conference on Sustainable Development, insurance leaders and the United Nations Environment Programme Finance Initiative (UNEP FI) launched the UNEP FI Principles for Sustainable Insurance (PSI), a framework for the insurance industry to address environmental, social and governance risks and opportunities

¹ Insurance Development Forum, *How Technology Can Help Bridge The Protection Gap* (November 2019) [insdevforum.org https://www.insdevforum.org/sites/default/files/Final%20How%20technology%20can%20help%20bridge%20the%20protection%20gap%20report%20.pdf](https://www.insdevforum.org/sites/default/files/Final%20How%20technology%20can%20help%20bridge%20the%20protection%20gap%20report%20.pdf)

² Rakesh Kochhar, *A Global Middle Class Is More Promise than Reality* (July 2015) [pewresearch.org https://www.pewresearch.org/global/2015/07/08/a-global-middle-class-is-more-promise-than-reality/](https://www.pewresearch.org/global/2015/07/08/a-global-middle-class-is-more-promise-than-reality/)

³ **NOTE:** While this paper was prepared to address issues related to climate change, many of the topics we discuss are also applicable to pandemics and other risks.

⁴ International Association of Insurance Supervisors, *Application Paper on the Use of Digital Technology in Inclusive Insurance* (November 2018) p. 5, [iaisweb.org https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance](https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance)

⁵ Butch Bacani, *Vulnerable Countries to Insure MSMEs Amid Worsening Climate Disasters*, LinkedIn (September 2019) [linkedin.com https://www.linkedin.com/pulse/vulnerable-countries-insure-msmes-amid-worsening-climate-butch-bacani/](https://www.linkedin.com/pulse/vulnerable-countries-insure-msmes-amid-worsening-climate-butch-bacani/)

- In 2015, at the G7 Summit in Schloss Elmau, Germany, the G7 Leaders' Declaration issued an aim to increase (by up to 400 million) the number of people in the most vulnerable developing countries who have access to direct or indirect insurance coverage against the negative impact of climate change related hazards by 2020
- In 2016, the insurance industry – in partnership with the World Bank, the United Nations and other public and private institutions – established the Insurance Development Forum, seeking to optimise and extend the use of insurance and related risk management capabilities to close the protection gap and build greater global resilience to natural catastrophes and the increasing risks posed by climate change
- In 2017, the InsuResilience Global Partnership for Climate and Disaster Risk Finance and Insurance Solutions was launched at the UN Climate Conference COP23 in Bonn, Germany. It brought together the G20 countries and those countries most vulnerable to climate change (V20 nations), as well as international organisations, the private sector and academics, in an attempt to strengthen the resilience of developing countries and protect the lives and livelihoods of poor and vulnerable people against the impacts of climate change.

Improving access to insurance in emerging markets is not straightforward. Although harnessing innovative insurance technology (alongside other factors) may aid in combating some of the challenges that need to be faced, there is a need for the insurance sector to think hard about the products it offers to relevant markets. This includes how it could better serve and interact with its customers (or would be customers), and how it establishes and maintains a trusted relationship with key stakeholders. As noted above, technology is a tool – and it can be a

powerful tool too – but its true value and power will be in how it is used by the industry.

There are various means by which access to insurance protections to close the protection gap may be improved, including:

- Facilitating access to insurance for poor and vulnerable populations through market building measures, government intervention, donor schemes or premium subsidies
- Increasing uptake of insurance protections in emerging markets through development of locally-tailored products that better respond to local needs; as well as other measures to increase understanding of insurance and which foster greater penetration of inclusive insurance products.

These other measures may include direct engagement and communication with customers aiding in improving the tangibility of the product and service, and increasing trust and the perceived value in insurance. The emerging middle class can also be a powerful market development enabler, and therefore greater attention to this market segment is needed.

According to the Centre for Financial Regulation and Inclusion (Cenfri), a think-tank focussed on financial-sector development in emerging markets, these are a few of the key challenges:

- Reliable information on asset ownership, health, and claims behaviour for insurance purposes is vital for adequate risk profiling, product design, sales, servicing, payment collection and claims assessment. Low-income consumers engage less often with the formal sector than traditional, higher-income insurance consumers. Coupled with lower official documentation of ownership and lower formal employment observed in the low-income space, this affects the amount and quality of consumer data that insurers can obtain to design and deliver client-relevant products.

- The lack of current or historical data regarding local weather conditions in emerging markets also makes pricing and managing weather-related products unwieldy. There has been recent progress in this sphere, but there is still more to be done. Lack of historical data for events such as flooding, for example, presents challenges to insurers when pricing risks. At the same time, customers who have little to no experience with formal financial services, and insurance in particular, often lack the understanding of (and information about) their cover, creating distrust in the product as a whole.
- Data gathered through mobile phones can help create digital footprints for low-income customers. Advances in technology can also help reduce the costs of remote sensing, thereby enabling the tracking of weather data and natural hazards even in remote areas for insurers to price the respective risks. The reach created through mobile phones and other new technology-enabled distribution channels helps to inform new groups of customers about their cover, often in real time, thereby creating trust in the product.
- Traditional insurance generally relies on branches, brokers, agent networks and aggregators, such as employers, for insurance distribution. Physical touchpoints and aggregators are largely concentrated in urban areas or areas with a large number of high-income individuals or commercial enterprises. The reality, however, is that a high proportion of the

microinsurance target market is unbanked (more than two billion adults worldwide), are self or informally employed, and/or engaged in farming and living in rural areas. This makes it difficult to reach this target market to sell policies, provide post-sale services, collect premiums, and pay out claims. Therefore, the use of alternative distribution channels, which are properly incentivized to market suitable products, is needed.

- Much has been written about cooperation with mobile network operators (MNOs) to reach customers that are unbanked. There is potential here, but also limitations and issues, such as lack of access to a mobile phone by many women, and the lack of competition in the provision of mobile phone services – which can adversely impact service and price. As a result, other partners must be considered as well.
- Products designed and priced for mainstream insurance markets often do not meet the specific needs of low-income consumers (Churchill, 2007). Designing products and processes to meet these needs requires a tailored approach, informed by careful market research. This includes consideration of the risk events that will be most appropriate to cover (i.e. cover for assets not traditionally covered by insurance, such as individual livestock), the manner and timing of premium collection (seasonal versus monthly), and what documentation is needed to verify claims.



The 'build it and they will come' mentality doesn't work here. It's key to establish trust and understanding first, so that individuals feel empowered rather than discouraged. We do this by using plain language to explain what they gain from participating today, tomorrow, and in the future.

Katherine Li, Co-Founder of Butterfly FX



- Once technology has enabled new data sources and distribution channels, insurers should be able to understand the differing needs of their new customers – in order to then come up with new products tailored to those needs.
- Low-income consumers often have lower literacy levels and are generally less familiar with the formal insurance concept; they can also become discouraged by the jargon used by many financial services providers. This poses a challenge at multiple interaction points along the product lifecycle, given that the information provided to the consumer needs to be adequately packaged.
- Once new ways of communication, such as short message service (SMS), are established, these can then be used to package adequate information regarding the cover into short snippets delivered in real time, thereby approaching these new customers in a way that is familiar to them.
- Nominal and unpredictable premium income may discourage insurance companies from offering low-value, high-volume products to emerging consumers. Low-income consumers have by definition limited incomes, and therefore struggle to afford expensive insurance premiums. This is often compounded by unpredictability of this target market's income streams. Insurance premiums therefore need to be adequately priced to be affordable and attractive to this consumer segment.
- The traditional approach to insurance delivery, however, involves costly infrastructure (both front- and back-end). A low-premium environment constrains business models for insurers, requiring low costs and high volumes for the business case to be viable. Simple products like parametric covers that do not require bespoke underwriting and claims handling (and which are also easier to price) can help reduce administrative costs, and thereby the affordability of the cover and its delivery. As the triggers for pay-outs are clearly defined in advance and easy to determine, customers can also be informed in real time about a trigger being met and the respective pay-out being made.
- Technology can be, and has been, used to overcome some of these challenges by making insurance more transparent, accessible, affordable and appealing, by driving the incremental cost down.



Technology, particularly mobile phones, has been a game changer as it has reduced administrative overheads

Hannah Grant, A2ii (Access to Insurance Initiative)



Technology & Innovation Transforming Insurance

1

Technology & Innovation Transforming Insurance

Technology is transforming and will continue to transform almost every aspect of the insurance sector; from customer due diligence and gathering premiums, to paying claims and loss adjustment processes, even the types of products available will be transformed. The global growth in mobile phone use in particular, means that financial services – including insurance – can be delivered ever more cost-effectively to a greater number of people.⁶

Technology in insurance

InsurTech has a number of different types of technology at its core. The following are examples of new technologies that have found applications or ‘use cases’ in insurance:

Digital/mobile platforms

Digital and mobile platforms (through the internet or smartphones) can replace one or several face-to-face or human-based elements of the traditional insurance value chain with an online service. This service can be either consumer-facing or provider-facing, i.e. the platform is built to be accessed by insurance consumers directly, or as a support for the back- or front-end operations of an insurance provider. This has particular applications for inclusive insurance, where ‘high-touch’ interaction with customers or administration can be overly costly as a proportion of the premium value.

Digital platforms also provide the baseline digitisation required to facilitate more technical applications. The introduction of such technology makes it possible to include retailers, MNOs, banks and others in new partnerships with insurance capital providers and intermediaries, allowing those parties to leverage existing infrastructure, payment systems or consumer bases. In particular, access to embedded payment mechanisms offered by MNOs that can be used to collect premium from potential policyholders (which might otherwise be difficult or time intensive to collect), make them an attractive choice of partner in emerging markets for insurance actors.⁷



We see technology impacting all areas of the insurance value chain, from the use of data and analytics, to better pricing of risk, all the way to automated claims assessment and processing

Cenfri



Digital or mobile platforms used in this way are not usually separate insurance-specific platforms, but more often enable insurance sales as an add-on to existing financial products, services or e-commerce, with partners finding opportune moments to offer insurance to the consumer. These may be more demand-based or short-term products tied to the specific product or service, so may not provide more general cover, but they are more affordable to customers and socialise the use of insurance.

In Africa, for example, there is now a proliferation of online platforms offering price comparison between insurance providers. Hippo is one example.⁸ Another example is Africar Group⁹, a platform used to buy and sell second-hand vehicles. Africar Group operates in more than 20 African countries, and upon completion of the purchase, the purchaser is offered insurance.

Distributed Ledger Technology (DLT)

In a nutshell, the defining feature of Blockchain and Distributed Ledger Technology (DLT) systems is the exchange of data using a common ledger or another form of ‘single source of truth’ which is secured against forgery through cryptography. It is therefore essentially an information coordination tool between many parties. Another frequent feature of such systems is the concept of smart contracts, computer programs that enable automated (standardised) transactions, which are particularly well-suited for parametric covers. In the case of public blockchains like Ethereum, the information coordination tool can become a financial coordination tool. This is fundamentally also what insurance is: financial coordination between many parties to address risks.

The use of blockchain/DLT in emerging economies is still in its infancy and presents some significant challenges. Blockchain applications for insurance (particularly in emerging markets), may be over-engineered for current requirements. Nonetheless, the World Economic Forum’s research¹⁰ suggests the use of DLT will increase significantly in the next decade, as banks, insurers and tech firms see the technology as a way to speed up settlements and cut costs. Some are already using it in an insurance context.

A prominent example has been a joint project between Aon, the Blockchain start-up Etherisc, Oxfam and local insurer Sanasa, offering parametric insurance to farmers in Sri Lanka based on Etherisc’s Decentralised Insurance Platform on the Ethereum Blockchain.¹¹ Based on the same platform, Raincoat is also developing HurricaneGuard,¹² a parametric hurricane insurance,¹³ while Sprout Insure, together with ACRE Africa, is developing the Blockchain Climate Risk Crop Insurance for Sub-Saharan Africa, South and Southeast Asia.¹⁴

These applications show that DLT solutions can add value, in particular where they fill in for currently non-existent or insufficient infrastructure, such as payment or distribution systems. While payments through public blockchains – such as the Bitcoin network – have traditionally suffered from the high volatility of Cryptocurrencies, so-called Stable Coins (such as DAI which are pegged to fiat money like USD), erase that issue.

In addition, an increasing number of central banks are launching their own digital currencies (so-called Central Bank Digital Currency, or CBDC) on a DLT basis. The People’s Bank of China, for example, launched a first pilot in four large cities in April.¹⁵ Furthermore, the automation enabled through smart contracts can create greater certainty and speed in the loss adjustment process, thereby reducing mistrust in the insurer’s claims handling.

⁶ Global Partnership for Financial Inclusion, *G20 Principles for Innovative Financial Inclusion* (May 2010) <https://www.gpfi.org/sites/gpfi/files/documents/G20%20Principles%20for%20Innovative%20Financial%20Inclusion%20-%20AFI%20brochure.pdf>

⁷ For more information visit <https://microinsurancenet.org/groups/insights-mobile-network-operators-distribution-channel-microinsurance-asia>

⁸ For more information visit [hippo.co.za](https://www.hippo.co.za/) <https://www.hippo.co.za/>

⁹ For more information visit [africargroup.com](http://www.africargroup.com) <http://www.africargroup.com/>

¹⁰ World Economic Forum, *White Paper – Blockchain Beyond the Hype: A Practical Framework for Business Leaders* (April 2018) [weforum.org http://www3.weforum.org/docs/48423_Whether_Blockchain_WP.pdf](http://www3.weforum.org/docs/48423_Whether_Blockchain_WP.pdf)

¹¹ Etherisc, Oxfam, Etherisc, and Aon Deliver Pay-Outs with First Blockchain-Based Agricultural Insurance Policies for Smallholder Farmers in Sri Lanka (November 2019) [prnewswire.com https://www.prnewswire.com/news-releases/oxfam-etherisc-and-aon-deliver-pay-outs-with-first-blockchain-based-agricultural-insurance-policies-for-smallholder-farmers-in-sri-lanka-300949728.html](https://www.prnewswire.com/news-releases/oxfam-etherisc-and-aon-deliver-pay-outs-with-first-blockchain-based-agricultural-insurance-policies-for-smallholder-farmers-in-sri-lanka-300949728.html)

¹² For more information visit hurricaneguard.io <https://hurricaneguard.io/>

¹³ For more information visit [teamraincoat.com](https://www.teamraincoat.com) <https://www.teamraincoat.com/>

¹⁴ Climate Finance Lab, Project: Climate Risk Crop Insurance, [climatefinancelab.org https://www.climatefinancelab.org/project/climate-risk-crop-insurance/](https://www.climatefinancelab.org/project/climate-risk-crop-insurance/)

¹⁵ WSJ, China rolls out pilot test of digital currency, [wsj.com https://www.wsj.com/articles/china-rolls-out-pilot-test-of-digital-currency-11587385339](https://www.wsj.com/articles/china-rolls-out-pilot-test-of-digital-currency-11587385339)

Even in existing structures, DLT can lead to drastic reductions in transaction costs, which in turn, can increase the deliverability of insurance products to underinsured populations. The advent of this technology thereby effectively democratizes the provision of insurance, as, from a technical point of view, large parts of the administrative infrastructure of traditional insurers could be rendered redundant, with new players relying on low-cost infrastructure – which is often digital and Open Source. Such new players could even come up with new forms of risk-pooling, like tokenised ILS traded in a DLT system, thereby making risk transfers into capital markets more inclusive.¹⁶

Although there may not yet be many applications of this technology in emerging economies, given its potential – particularly in light of the rise of CBDC¹⁷ – there is a need for insurance regulators to understand this technology and its applications within the framework of legislation and regulation.

That being said, there are significant hurdles that must be overcome in order for DLT/smart contract products to be rolled out widely. In order for such products to be cost effective, simplicity and uniformity (in comparison to their current form) is required of the underlying contracts that are encoded into the DLT. This may require the foregoing of more bespoke-type contracts and/or provisions that may have been included previously for tactical or other reasons.

Another concern regarding the cost-effectiveness of DLT being used in emerging markets is the energy cost associated with proof-of-work consensus algorithms, which are required to add transactions to a blockchain. To date, on blockchains such as Bitcoin and Ethereum, competitor cooperation and the formation of consortia have been necessary to address the costs of investing in the DLT infrastructure. Further technological advances are likely to be required before products are financially suitable to emerging markets and/or attractive to single private investors.

AI/Big Data

Leaps in computing power and the increase in the amount of data available has given rise to the use of Artificial Intelligence (AI), Big Data and Data Analytics. Sub-categories of these technologies range from Machine Learning and the more sophisticated Deep Learning, to specific applications such as Natural Language Processing, in forms like Named Entity Recognition or Sentiment Analysis.

Another application of machine learning is Robotic Process Automation. This software automates unsophisticated, repetitive tasks, leaving employees more time to focus on jobs that actually require human input. Aspects of Big Data, like data mining and data harvesting, enable predictive analytics which open new horizons in risk modelling, in particular in combination with new data sources.

In the insurance market, Big Data and Data Analytics are being used in processes such as product offerings, risk selection, pricing, cross selling, claims prediction and fraud detection to offer customised products, or to automate or improve claims handling or customer service, and allow automated or more granular underwriting.¹⁸ Cenfri sees machine learning and AI as an “emerging trend”, noting that these technologies are often used in conjunction with other technologies (such as chatbots).

Despite the progression in the technology available to insurers to process data more effectively, in emerging markets it may be difficult to access accurate and reliable data, or indeed obtain data on certain parts of the population at all. This is because individuals may not possess official identification documents (passports etc.), official documentation of ownership of assets, or even hold bank accounts or other such facilities that might require or present a good source of data.

To address this issue, insurers might need to work with local governmental or quasi-governmental partners who may hold certain data on their citizens. Another option would be to develop new technologies to obtain and subsequently verify data directly from potential consumers outside of traditional norms. Issues such as privacy debates or legislation, however, will always need to be considered in this context.¹⁹

While technology may be viewed as a ‘net positive’, one should be mindful of financial exclusion and the need for consumer protection. In particular, concerns over privacy and the need to ensure that customers are not unfairly discriminated against as a result of applying new technologies, must be borne in mind. As noted herein, improvements and a potential reduction in cost in satellite technology might also be a means to improve the quality of data on various types of risks affecting people.



¹⁶ Etherisc DIP Whitepaper <https://etherisc.com>

¹⁷ Regarding the associated risks and wider implications of CBDC, see the BIS' assessment of CBDC: [bis.org https://www.bis.org/cpmi/publ/d174.htm](https://www.bis.org/cpmi/publ/d174.htm)

¹⁸ International Association of Insurance Supervisors, *Application Paper on the Use of Digital Technology in Inclusive Insurance* (November 2018) p.10 [iaisweb.org https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#](https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#)

¹⁹ For Digital Identity initiatives in Africa, visit [yoti.com https://www.yoti.com/blog/digital-identity-in-the-last-mile-lessons-from-africa/](https://www.yoti.com/blog/digital-identity-in-the-last-mile-lessons-from-africa/)

Satellites and remote sensing

Following the recent proliferation and advances in satellite technology, remote sensing and other earth observation data sources (weather stations, drones or aircraft) are increasingly being used in insurance to gather risk data and assess loss.²⁰ Nanosatellites are more affordable and easier to launch than traditional satellites, and can provide much more detailed and granular information about risk or loss. A flock of these nanosats in low Earth orbit can provide high-resolution images of the planet on a daily basis.

The WINnERS Project in Tanzania integrates remote sensing and field observations to model agricultural losses for maize farms based on weather-related risk, such as rainfall deficit or heat stress.²¹ In India, agricultural index insurance will usually include provision for an Area Correction Factor (ACF), which is crucial from a regulatory standpoint. Satellite technology is used to establish whether all or some of the declared crop subject to Yield Index cover has been planted, or whether an ACF need apply. This is a way of checking whether over-insurance has taken place.

Governmental agricultural insurance schemes in India also involve some physical crop-cutting experiments to assist measuring and predicting loss in an effort to reduce basis risk. While technology develops, the implementation of more traditional and physical processes alongside technology may be necessary and useful.

The value of technology in insurance

It is clear that the development and deployment of these new technologies has the potential to transform insurance provision and risk management in developed markets, while addressing some of the issues insurers face when entering emerging markets. Technology, such as adequate IT



Advances in satellite technology and data analysis help avoid the pitfalls of high transaction costs and therefore expand the potential reach of insurance policies to rural areas previously considered uninsurable²²

The Research Programme on Climate Change, Agriculture and Food Security



infrastructure, however, must be available to be utilised.

For example, while 4G may be available in cities, rural areas might only have 2G – if any – cellular service. Moreover, not all customers have access to mobile phones and laptops, or the knowledge to use them. Technology, therefore, needs to be deployed along with better human interaction and service, which is expected by customers in emerging economies as it builds trust.

Studies have shown that in financial services success comes from a combination of “tech and touch”²³. For emerging economies in particular, this often means having trusted “feet on the ground”, i.e., intermediaries or other contact points that the insured knows and trusts.

Technological advancements can therefore help facilitate insurance market transactions, fill knowledge gaps, foster trust, enable bundling of products and services, increase consumer engagement, and encourage uptake of insurance protections. These issues, however, aren’t magically overcome: it is the responsible and imaginative use of technology that will lead to success in closing the protection gaps that exist globally.

To provide some greater detail, below are some examples of the ways in which technology may help bridge the protection gap:

Enabling new distribution channels

Partnerships for insurance delivery are not new, but the introduction of technology (particularly mobile phones) makes it possible to include retailers, MNOs, banks, digital platforms and others in partnership for more effective distribution, therefore reaching new policyholders, often as part of a bundled service/product offering, or with insurance offered as an add-on to existing services (where suitable).

MNOs are able to offer wide distribution channels owing to large customer bases, which insurers could find difficult to engage with in the absence of such a partnership. Furthermore, MNOs will hold certain levels of Know Your Customer checks (KYC) on their consumers that (subject to local regulation) can be utilised to decrease the administrative burden on the consumer (or insurer) when signing up to an insurance policy. However, Cenfri’s update to its InsurTech²⁴ tracker (report forthcoming), suggests that InsurTechs have shifted from a focus on MNO partnerships to a focus on digital delivery or online platforms.

There can be a power imbalance for insurers working with MNOs; firstly because MNOs control both the customer base and access to those customers, and also because MNOs will not always have insurance as priority. MNOs can also ask for high levels of commission

upon the sale of insurance products through their platforms in return for offering access to their customers in emerging markets. This clearly has the potential to artificially increase the transaction costs on insurers, which in turn can strongly impact upon value and affordability to potential customers.

At the same time, MNOs can be used in a more limited role. While Etherisc is piloting the use of MNOs for SMS onboarding onto their blockchain-based crop insurance in Sri Lanka, the KYC process itself is done by linking the farmers to their profiles with their farmers’ organisations, which they have to confirm in the onboarding process.²⁵ Paycasso is an example of a company which has developed products that allows verification and KYC to be undertaken through mobile phones in a quick, secure and trusted format that has already been approved or validated by various companies or governments²⁶.

While MNOs are able to offer wide distribution channels, they may not be the best-suited or positioned intermediary for particular types of insurance. For example, an agricultural cooperative might already be the trusted intermediary for farmers and may be best placed to make crop insurance available to them. While MNOs often have the technological infrastructure, they may not be the best placed distribution channel available to disseminate new insurance products. A fully “open” digital ecosystem should in theory allow such an agricultural cooperative to partner with and provide services through the platform (as permitted by local regulations).

²⁰ International Fund of Agricultural Development (IFAD), *Remote Sensing for Index Insurance: Findings and Lessons Learned for Smallholder Agriculture* (January 2018) http://www.ifad.org/documents/38714170/40239486/RemoteSensing_LongGuide_2017.pdf/?d22adb-c3b0-4fe3-9cbb-c25054d756fe

²¹ <https://www.climate-kic.org/success-stories/winners/>

²² CGIAR, *Climate Change, Agriculture and Food Security Research Program, Climate Services and Safety Nets*, [ccafs.cgiar.org](https://ccafs.cgiar.org/themes/index-based-insurance)

²³ ACCION Insights, *The Tech Touch Balance: How the Best Fintech Startups Integrate Digital and Human Interaction to Accelerate Financial Inclusion* (October 2018) [content.accion.org](https://content.accion.org/wp-content/uploads/2018/10/1122_TechTouch-RO6-Singles.pdf)

²⁴ <https://cenfri.org/databases/insurtech-tracker/>

²⁵ <https://aon.mediaroom.com/2019-07-01-Aon-Oxfam-and-Etherisc-launch-first-blockchain-based-agricultural-insurance-policies-for-smallholder-farmers-in-Sri-Lanka>

²⁶ For more information visit paycasso.com <https://paycasso.com/product/>

With the emergence of digital super platforms, we are witnessing a move away from the MNO-centric model in emerging markets towards digital ecosystems. This is particularly evident in Asia; for example, Zhong An in China.

In India, agricultural insurance is often distributed via banks, where the product is sold in support of loans to farmers (much like a home policy in conjunction with a mortgage application, i.e., where the loan/mortgage is conditional upon a valid insurance policy). This is supported or subsidized by the Indian government, however, this distribution model is limited as not every farmer will have access to loans.

In South Africa, fire insurance for informal settlement or township homes is being provided along with fire detectors. Lumkani, for example, is addressing the risk of fires and the widespread damage they can cause, by providing a fire detector along with fire and/or funeral cover for a monthly fee. Fire detectors in a particular area are connected via a network so that the spread of fires can be limited. As well as mitigating the risk of fires itself, Lumkani's product provides cover for homes, business, belongings and stock up to R40,000 for when fires do break out. The product targets those in informal, small or low-cost homes and businesses, which would otherwise be excluded from the provision of traditional insurance products.²⁷

Initiatives can include an insurer, distribution partner and technical service provider (TSP). TSPs are increasingly key to connect insurers with emerging market distribution partners.

Innovative InsurTech firms are able to use digital platforms and technology-enabled partnerships to design bundled products that combine insurance cover with other services; this better enables consumers to meet their financial and non-financial needs, increasing the attractiveness and uptake of insurance as part of a suite of products/services.



Stonestep²⁸, MicroEnsure and Zingsure²⁹ facilitate partnerships with other actors to include insurance as an add-on to another offering, rather than selling insurance on its own. Technology enables this to be done at scale by tying insurance offerings on to existing systems and networks. This scale makes otherwise unviable products financially viable.³⁰

Digital platforms which match buyers and sellers of goods and services can enable the distribution of insurance products to individuals and small and medium businesses that were traditionally outside the reach of formal financial services. For example, SweepSouth³¹, a platform in South Africa that allows users to book cleaning services within seconds, has recently partnered with Simply³² to provide basic accidental death and disability cover at no cost to SweepSouth's domestic cleaners. Similarly, insurance partnerships with e-hailing or other online platforms fulfil a similar role.³³

In Nigeria, Kobo360³⁴, a logistics and courier platform that connects drivers and owners of trucks with companies who want to transport their goods, has an embedded insurance product which covers goods from point of

pick-up to point of drop-off. Another logistics on-demand service in Nigeria is ShapShap³⁵, which provides platform users the choice to insure the goods that they are having delivered. There is also Jumia³⁶, one of Africa's biggest online shopping platforms, which partnered with insurance company AXA Mansard to offer device protection, health, and life insurance products in Nigeria. These insurance products are sold as add-on's and can be simply added to a consumer's online shopping basket and paid for either online or in cash.

These examples show that insurers are often highly dependent on cooperation with other local service providers. This not only facilitates entrance to a particular market, but creates trust within the local community, which many market participants will cite as being one of the central issues relevant to inclusive insurance. Therefore, it is often more important for insurers to concentrate on the business relation with these local providers, rather than on a direct marketing to the insured person³⁷.

²⁷ For more information visit lumkani.com <https://lumkani.com/>

²⁸ For more information visit stonestep.com <https://stonestep.com/mm/>

²⁹ For more information visit zingsure.com <https://zingsure.com/>

³⁰ Cenfri interview

³¹ For more information visit sweepsouth.com <https://sweepsouth.com/>

³² For more information visit [simply.co.za](https://www.simply.co.za) <https://www.simply.co.za/>

³³ <https://www.allianz.com.my/e-hailing-add-on>

³⁴ For more information visit [kobo360.com](https://www.kobo360.com/) <https://www.kobo360.com/>

³⁵ For more information visit [shapshap.com](http://www.shapshap.com/) <http://www.shapshap.com/>

³⁶ For more information visit [jumia.com](https://www.jumia.com.ng/) <https://www.jumia.com.ng/>

³⁷ Munich Re, M. Roth interview

Reducing cost of sales

Transaction costs in mobile insurance are minimised if marketing, distribution, claims and policy management are conducted through the mobile channel only.³⁸ Such lower costs help support scalability, and ultimately enable development and distribution of more affordable and accessible products.³⁹

For example, MicroEnsure, a TSP operating through partnerships in six countries across Africa and Asia, offers policies which cover low-cost health, life, property and political risk insurance. It uses the mobile network provider Airtel to allow access to its platform by dialling an Unstructured Supplementary Service Data (USSD) code on their mobile, and then sends the policy to the customer by text. MicroEnsure has been able to provide up to 42 million people with insurance cover through its network.⁴¹ In time, DLT solutions may further reduce transaction costs.



The main conclusion to be drawn from the analysis is that reducing transaction costs is one of the major challenges facing microinsurance. Making progress on this front will reduce administrative overheads, with direct impact on customers' premiums

International Labour Organisation⁴⁰



Improving customer on-boarding

A regular impediment for many insurance providers in underinsured markets is the inability to undertake customer due diligence and verification. Customer on-boarding can be difficult or costly. In addition, the requirement for an individual consumer to provide personal information to an insurer in advance of signing up to an insurance policy – even if this information is fairly minimal – can lead to significant drop-off rates in the number of consumers who ultimately decide to purchase the product⁴².

The process can require collection, validation, plus verification of proof of identity, address and birth. Collecting even such basic information may pose a considerable obstacle if the person does not know their birthday, does not have a proper address or is illiterate. Issues such as these can be a massive barrier to sales, in that traditional on-boarding models, such as using call centres, can be rendered ineffective as sales cannot be completed over the telephone; instead, they require a customer to physically go into a branch to complete the on-boarding process.

Technology may assist in overcoming this challenge by developing efficiencies in these processes, and excluding potential customers due to the lack of KYC documentation may be negated by the rise in e-KYC, like biometrics, for example.

Digital technologies may also assist with client identification and claims validation. A customer can use a smartphone, for example, to establish their identity through facial recognition, or by reading out on-screen text.⁴³ Such data can then be stored on blockchain platforms or elsewhere and accessed later by anyone who needs to check that person's identity.⁴⁴ The CIC Insurance Group, for example, has linked up with the Kenyan Integrated Population Registration System (IPRS) to facilitate such rapid cross-referencing of individuals' sign-up data. This has greatly reduced the time involved in completing a sign-up process and provides the insurer with greater confidence in the identification of clients, which means fewer clients are rejected due to identification issues.

Understanding client needs

Through technology such as the Internet of Things (IoT), or remote sensing in combination with Big Data or AI, insurers can also use client data to better understand client needs and improve product development and sales; this helps solve difficulties faced in emerging markets in affordably identifying clients and their needs. Big Data, for example, allows for a more consumer-centred approach, both in terms of product development and selecting the types of consumers to approach about the concerned product.

³⁸ Cenfri interview

³⁹ Institute of International Finance, *Insurance Inclusion: Reaching Underserved Populations With Tech* (September 2016) p.2, [iif.com https://www.iif.com/Publications/ID/1248/Insurance-Inclusion--Reaching-Underserved-Populations-with-Tech](https://www.iif.com/Publications/ID/1248/Insurance-Inclusion--Reaching-Underserved-Populations-with-Tech)

⁴⁰ *Technology for microinsurance scoping study*, Author: Eric Gerelle and Michiel Berende: International Labour Office - Geneva: ILO (2008) [microinsurancenet.org https://microinsurancenet.org/sites/default/files/MIP2_technology_and_microinsurance.pdf](https://microinsurancenet.org/sites/default/files/MIP2_technology_and_microinsurance.pdf) p.21

⁴¹ CENFRI, *InsurTech for Development: A review of insurance technologies and applications in Africa, Asia and Latin America* (March 2017) p. 22

⁴² MicroEnsure Richard Leftley interview

⁴³ David Shrier, *Frontiers of Financial Technology: Expeditions in future commerce, from blockchain and digital banking to prediction markets and beyond* (September 2016)

⁴⁴ *How Blockchain Technology Can Help Poor People Around the World*, Nir Kshetri, (2017) [observer.com http://observer.com/2017/05/how-blockchain-technology-can-help-poor-people-around-the-world-banking-emerging-markets/](http://observer.com/2017/05/how-blockchain-technology-can-help-poor-people-around-the-world-banking-emerging-markets/)

Underwriting

Insurers may use “non-traditional” data, such as phone call logs or social media profiles, to tailor both insurance premiums and cover. These can make purchasing insurance more convenient for the consumer, while raising awareness of the customer’s needs at a specific time; this can create efficiencies in product design, risk selection and premium pricing.

Behavioural data can also improve sales and distribution, resulting in lower costs and reduced churn.⁴⁵ One example of this is PICTURE⁴⁶, which uses pictures to automatically calculate premiums of residential properties. In Sri Lanka, mobile phones are being used for the same purpose, combining pictures of the insured object with the respective family, a geocode and bank account data. Start-ups such as Docudiet⁴⁷ are developing AI-driven assistants that support underwriters to better determine premiums by making past premium decisions in similar cases easily available. Agricultural insurers (such as Pula⁴⁸ or Acre⁴⁹) use Geographic Information Systems (GIS) and satellite data to identify the crops farmed by customers, helping them understand the associated risks they are exposed to. In India, many states have digitized land records which are also used to check land use.

Product Development

Etherisc offers ‘request new product’ and ‘build your own product’ dialogues on their Decentralised Insurance Platform which, to some extent, democratizes a previously internal and time-consuming process. Predictive analytics can be leveraged to better tailor products to insured’s needs; however, one of the hardships of this developing technology is actually determining what the needs of the vulnerable populations are.

Gathering premiums and paying claims

Technology-enabled partnerships can facilitate premium collection – a challenge traditionally faced by insurers in emerging markets, particularly for unbanked customers. MNOs can facilitate payment of premiums and claims as they can deploy existing payment methods in the form of prepaid airtime or direct billing (if such methods are commonly used in the relevant jurisdiction and/or permitted). Insurance can be offered by MNOs as a loyalty product with no direct cost to the consumer, or payments can take the form of airtime deductions. With “freemium” models, customers can upgrade from a free product to a higher value paid product. As noted above, Cenfri considers that such MNO models are decreasing in popularity, but the use of mobiles to expand insurance reach remains important.⁵¹

Insurers may work closely with MNOs by collecting premiums using mobile phone airtime, or paying claims via digital payment channels or mobile wallets. Remedinet in India, for example, has pioneered cashless health insurance through a cloud-based platform connecting hospitals directly to insurers.⁵² Another example is Tigo Family Care Insurance in Ghana. Tigo provides this cover to its customers without charge as a loyalty product for Tigo’s prepaid airtime package. Customers can even double their insurance coverage by paying a premium using the company’s airtime.⁵³

Technology can also be used to support the filing and processing of claims, with insureds able to upload supporting documentation and proof of loss onto digital platforms, ultimately reducing the time involved in such processes. Big Data can also assist with identifying fraudulent claims and therefore speed up verification.

Additionally, IoT and sensor data can be used to verify conditions such as motion, sound, temperature or humidity, and assist with claim verification, thereby reducing cost.⁵⁴ In

parametric insurance, this can lead to fully automated pay-outs without a need for the insured to even file a claim.

In India, yield index claims adjustment is manual and can be slow, with a person being sent to assess yield in that area. A state inspector may record the information on an android app while they are in the area being assessed, with the information then assimilated on a database; this reduces the time significantly. Eventually, satellite technology may also assist in this process, speeding up claim administration and payments.⁵⁵

Building trust, knowledge and engagement

As explored above, MNOs are considered one of the key potential partners in emerging markets for a number of reasons. Of particular importance is the fact that MNOs are often trusted by their users – an opportunity spotted early on, partly owing to the fact that they offer technology that is regularly used by the consumer. This intrinsically develops trust in that service and/or brand, which would also be true of other technology, such as Google or online banking.

⁴⁵ International Association of Insurance Supervisors, *Application Paper on the Use of Digital Technology in Inclusive Insurance* (November 2018) p.16 [iaisweb.org https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#](https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#)

⁴⁶ For more information visit [picture.ai https://picture.ai/picture-object-recognition/](https://picture.ai/picture-object-recognition/)

⁴⁷ For more information visit [docudiet.com https://www.docudiet.com](https://www.docudiet.com)

⁴⁸ For more information visit [pula-advisors.com https://www.pula-advisors.com](https://www.pula-advisors.com)

⁴⁹ For more information visit [acreafrica.com https://acreafrica.com](https://acreafrica.com)

⁵⁰ For more information visit [etherisc.com https://etherisc.com/#products](https://etherisc.com/#products)

⁵¹ Cenfri interview

⁵² eHealth Network, *Remedinet Partners with Bajaj Allianz for Cashless Health Insurance*, ehealth.eletsonline.com/2015/09/remedinet-partners-with-bajaj-allianz-for-cashless-health-insurance/ <https://www.forbes.com/sites/abeהל/2016/07/26/why-an-indian-tech-company-is-digitizing-health-insurance->

⁵³ Millcom Media, *Tigo Insurance Passes 2.7m Active Users*, [millicom.com https://www.millicom.com/media-center/features/tigo-insurance-passes-27m-active-users/](https://www.millicom.com/media-center/features/tigo-insurance-passes-27m-active-users/)

⁵⁴ International Association of Insurance Supervisors, *Application Paper on the Use of Digital Technology in Inclusive Insurance*, (November 2018) p. 16 : [iaisweb.org https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#](https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#)

⁵⁵ Swiss Re India, Mangesh Niranjan Patankar interview

This usage is effectively the opposite of how a policyholder would utilise insurance, where contact with its insurer might be limited to once or twice a year.⁵⁶ A recent Geneva Association customer survey concluded that for 50% of participants, an increased level of trust in insurers and insurance intermediaries would encourage the purchase of more insurance.⁵⁷ Developing trust for burgeoning insurance companies in emerging economies is therefore key to increased insurance penetration.

Irrespective of the size and sophistication of the concerned insurer, a new insurer to a particular jurisdiction (particularly in emerging markets) might find it difficult and/or costly to develop the trust in a brand or service that an MNO or other technology offerings have already established. As a result, the ability for an insurer to use the name of its partner MNO when contacting a consumer may greatly increase the likelihood that the consumer will ultimately decide to purchase an insurance policy; this can assist with increasing insurance penetration.⁵⁸

Technology can also be used to educate clients and potential customers about insurance products. Similar to marketing and sales, automated messages, chatbots and robo-advice are becoming more common in insurance. In Indonesia, Allianz has been applying automated telephone messages using a fictional character called Ms Ali to automate post-sales calls and educate customers about their microinsurance product. Similarly, other forms of chatbots can carry out direct conversations and provide a useful, cost-

effective way of fostering client engagement. Some insurers have developed their own chatbots as part of their service offering. Examples include Denkim Insurance⁵⁹ in Kenya, which – as an online broker – has a chatbot that integrates into messaging apps, including Facebook.

Many of these strategies will be most effective at the upper range of the micro-insurance market, targeting the emerging middle class. As noted above, at this transition point from low income to middle income, there are insureds who may be early adaptors and can play a critical role in market development and consumer acceptance.

Streamlining claims handling and verification

Traditional methods of claim verification and loss adjustment can be lengthy and deter unsophisticated users of insurance from repurchasing following a difficult claim. New technologies can assist with speeding up and increasing the effectiveness of claims verification and loss adjustment. In 2016 for example, the InsurTech company Lemonade, famously used technology to pay a claim within three seconds.⁶⁰

Technology can assist in this area by gathering evidence at an early stage of claims handling, allowing customers to more actively engage in the process. In South Africa, Discovery Insure allows its customers to upload pictures on a digital platform to support claims,⁶¹ while in India, electronic chips implanted into livestock are used by IFFCO Tokio to verify the number and location of the insured cattle.⁶²

In addition, Chat-bots can pre-filter new claims or, over time, be part of a fully automated claims process (so-called Straight Through Processing).⁶³ Remote sensing can also be used in that context for online inspections, even if sometimes still combined with concrete inspections by village officials on site.⁶⁴ Ibisa,⁶⁵ for example, uses earth observation through 'crowd-watching' and decision making on a public blockchain to reduce the costs for its parametric crop insurance in India and Nigeria.⁶⁶

Parametric insurance

Conventional insurance indemnifies the policyholder for the loss suffered in an insured event. Parametric insurance by contrast pays a fixed amount upon the occurrence of a triggering event. The amount payable can be based on a modelled forecast of the loss that the policyholder will incur. The nature of the product means that no loss adjusting need take place, and as soon as a pre-determined threshold has been met, the policy is triggered and payment is made.

A parametric trigger is often set by reference to a measure of a natural event which is deemed likely to lead to a loss or a series of losses. For example, a product designed to respond to hurricane losses could be triggered by wind speeds reaching a certain pre-agreed intensity and in a specified location, all according to a trusted and verifiable provider of weather data. While for drought and agricultural cover, the parameters might be based on satellite images of the colour of the ground, or volume and frequency of rainfall over defined periods.

The disruptors: technology-enabled products

In addition to facilitating access to insurance and reducing frictional costs associated with traditional products, technology has given rise to entirely new species of insurance products.



The overall trend seems to be the streamlining rather than disruption of the insurance sector. However, some disruptive applications are emerging

Cenfri ”

Technology is foundational to parametric insurance. Parametric products may rely on Big Data for modelling and analytics to define the trigger, or they may use satellites, remote sensing or other IoT sensors to act as the trigger for payment. They may also use bespoke software with various real-world inputs calculating satisfaction of the index trigger, or automated processes enabled through smart contracts built on DLT technology, automatically executing the contract for payment in response to the trigger being met.

Some parametric products will pay claims via mobile wallets, or provide other notifications to insureds via mobile phones. Etherisc plans to use SMS to update farmers on the current status of their parametric crop insurance policies, and to inform them once a payment has been triggered. In Senegal, PlaNet Guarantee uses satellites as a means of verifying data gathered from weather stations measuring rainfall against satellite images to assess payment through its parametric products.⁶⁸

⁵⁶ MicroEnsure Richard Leftley interview

⁵⁷ The Geneva Association, *The Role of Trust in Narrowing Protection Gaps*, (November 2019) : [genevaassociation.org https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/role_of_trust_web.pdf](https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/role_of_trust_web.pdf)

⁵⁸ MicroEnsure Richard Leftley interview

⁵⁹ For more information visit [denkiminsurance.com https://www.denkiminsurance.com/](https://www.denkiminsurance.com)

⁶⁰ Daniel Schrieber, *How A.I. Jim Broke a World Record Without Breaking a Sweat* (January 2017) [lemonade.com https://www.lemonade.com/blog/lemonade-sets-new-world-record/](https://www.lemonade.com/blog/lemonade-sets-new-world-record/)

⁶¹ <https://www.the-digital-insurer.com/dia/vitalitydrive-telematics-based-car-insurance-from-discovery/>

⁶² CENFRI's InsurTech for Development: A review of insurance technologies and applications in Africa, Asia and Latin America, March 2017, p.18

⁶³ Cenfri interview

⁶⁴ Munich Re, M. Roth interview

⁶⁵ For more information visit [ibisa.network https://www.ibisa.network/](https://www.ibisa.network/)

⁶⁶ Sinergise, *Sentinel Hub Supporting IBISA in the Crop Micro-Insurance Field* (July 2019) : [medium.com https://medium.com/sentinel-hub/sentinel-hub-supporting-ibisa-in-the-crop-micro-insurance-field-7c754499dac6](https://medium.com/sentinel-hub/sentinel-hub-supporting-ibisa-in-the-crop-micro-insurance-field-7c754499dac6)

⁶⁸ CENFRI, *InsurTech for Development: A review of insurance technologies and applications in Africa, Asia and Latin America* (March 2017) p.18

Parametric insurance, however, presents unique consumer protection issues, including “basis risk” i.e., the possibility that relevant parametric triggers – for example average rainfall over a two month period – are not triggered and payments are not made, despite some policyholders having crop failures. In addition to leaving insureds exposed, these circumstances can lead to reputational problems and a loss of trust in the insurance company. To minimise basis risk, it is necessary to have these triggering events defined as accurately as possible; however, the balance must be kept in regard to cost intensity and transparency.⁶⁹

Interestingly, some have reported that in emerging markets parametric products are being sold as insurance, whereas in developed markets such products are often sold as derivatives. In Australia, agricultural index-based products may be offered as a derivative, paying out when the weather data is triggered; this may sidestep certain regulatory requirements on insurance products or insurers, being regulated as a financial product rather than a retail product. In other jurisdictions, the insurance approach is preferred, potentially due to the way such policies are funded by international donors: the fact that insurers will generally have better distribution channels and that people and institutions may be unfamiliar with derivatives arrangements, and therefore may default to insurance approaches and the attendant consumer protections offered by insurance regulation instead.

In the face of weather shocks – usually dry seasons or excess rain – timing and speed of payment is critical, and the ability of parametric products to pay out quickly is an important and invaluable feature. Insureds need to act fast to replant, recover or rebuild.



Parametric products can cover risks that are not otherwise easily insurable, and allow for more scientific pricing of products that respond to specific isolated parameters, rather than the physical losses which might result from any number of a wide range of occurrences. Together with lower claims management costs, this may make lines of business commercially viable that were not previously.

By its nature, with swift payment mechanisms upon satisfaction of the trigger, parametric insurance also brings with it the ability to accelerate claims payments and rapid funding for relief, recovery and reconstruction efforts; as a result, it may have the greatest potential impact in countries most dramatically affected by natural perils and where the protection gap is currently large. In addition, the metrics used in parametric covers can help insureds better understand their risk exposures and therefore lead to better risk management and loss mitigation efforts. That said, there will no doubt be operational challenges in determining the most effective and safest way to channel these funds, and – in developing partnerships – to allow insurers to do so.

Parametric insurance can also facilitate the development of trust in insurers. If well designed and presented, parametric insurance can help provide customers with certainty that claims will be paid. There are a range of examples of parametrics in action, including Pula Advisors⁷⁴, Oko⁷⁵, PlaNet Guarantee and WorldCover⁷⁶.

Parametric insurance and agriculture

Parametric models have wide-ranging applications in agriculture, and agricultural insurance is an important product in many emerging economies. Crop indemnity insurance for smallholder farmers in rural

areas, for example, is costly to implement. Individual field visits for loss assessment can be time-consuming and incur high costs, thus reducing the affordability of such insurance.⁷⁷ Index-based insurance can address some of the issues in serving smallholder farmers.

Parametric products can be tailored to the unique requirements of agricultural risk where insurance may in fact only be required for key stages in the growth cycle. Insurers of agricultural products need to start with a solid understanding of the risk and partner with crop modellers to model critical times in the crop’s particular growth cycle from the moment the seed is sown.

To help small sesame growers in Paraguay mitigate risk associated with drought, the Tajy crop insurance company developed an improved weather index-based insurance product with the support from the Inter-American Development Bank (IDB) and Multilateral Investment Fund (FOMIN). This innovative index was developed by EnsoAg LLC, a start-up company that provides weather and climate-based solutions to the agricultural industry.

EnsoAg LLC developed an advanced web-based platform to provide growers, cooperatives and the Tajy technical staff with access to the Tajy weather stations network, as well as a variety of climate and weather monitoring and forecast products. Growers can also check their current index accumulation and compare to insured thresholds via weekly SMS messages.⁷⁸ In addition, applications based on crop models are being developed to evaluate alternative management practices, e.g. regarding planting dates, crops, and varieties. This combination of a service (guidance and data) and a product (parametric risk transfer) may offer a dual benefit; helping policyholders improve their crop yield, and provide a payout if the rains fail.⁷⁹

⁶⁹ M. Roth, Munich Re. interview

⁷⁰ International Association of Insurance Supervisors, *Report on FinTech Developments in the Insurance Industry* (February 2017) Section 3

⁷¹ NOTE: This product was not sold prior to the Covid-19 pandemic. For more information visit [slipcase.com](https://www.slipcase.com/view/inside-in-full-pandemic-product-saw-no-takers-before-coronavirus-marsh-broker?track=0&utm_medium=email&utm_source=slipcase) https://www.slipcase.com/view/inside-in-full-pandemic-product-saw-no-takers-before-coronavirus-marsh-broker?track=0&utm_medium=email&utm_source=slipcase

⁷² For more information visit metabiota.com <http://metabiota.com/>

⁷³ Risk Management Magazine, Andrew W. Singer, *The Evolution of Parametric Insurance* (April 2019) : [rmmagazine.com](http://www.rmmagazine.com/http://www.rmmagazine.com/2019/04/01/the-evolution-of-parametric-insurance/) <http://www.rmmagazine.com/2019/04/01/the-evolution-of-parametric-insurance/>

⁷⁴ For more information visit pula-advisors.com <https://pula-advisors.com/>

⁷⁵ For more information visit [oko.finance](https://www.oko.finance/) <https://www.oko.finance/>

⁷⁶ For more information visit [worldcover.com](https://www.worldcover.com/) <https://www.worldcover.com/>

⁷⁷ Society of Actuaries, *Technology in Microinsurance: How New Development Affect the Work of Actuaries*, p. 13 (May 2019) : [soa.org](https://www.soa.org/globalassets/assets/files/resources/research-report/2019/2019-technology-microinsurance.pdf) <https://www.soa.org/globalassets/assets/files/resources/research-report/2019/2019-technology-microinsurance.pdf>

⁷⁸ IDB Lab, Dr. Clyde Fraisse, Lorena Rios and Nestor Robles, *Innovative Weather Index Insurance Help Small Growers in Paraguay Mitigate Climate Risk*, (February 2018) : [bidlab.org](https://bidlab.org/en/node/124) <https://bidlab.org/en/node/124>

⁷⁹ Engineering Solutions for Agriculture, *Crop Yield Risk* : [ensoag.com](http://ensoag.com/crop-yield-risk/) <http://ensoag.com/crop-yield-risk/>

It may also be the case that certain industries, such as agriculture or livestock, may not only benefit from insurance coverage, but will equally benefit from the services that can be provided by advances in technology and products that actively manage risk. Such offerings may not only help the overall sustainability of the industry in question, but also the affordability of the insurance offering to the consumer, by lowering pricing, renewal rates and assisting insurers in scaling up the relevant offering.

Parametric agricultural insurance, however, has yet to find a sustainable way to scale the market to ensure financial viability. Many agriculture insurance products are reliant on donor funding to reach this market, with significant subsidies by governments being paid; a necessary in developed countries. Another obstacle to the expansion of parametric insurance is the lack of awareness and understanding among prospective policyholders. Data, partnerships, distribution and basis risk are other constraints to driving adoption and scale.

More fundamentally, parametric insurance carries with it “basis risk” – the risk that the cover is not triggered when the policyholder has incurred a loss (or vice versa), or that the predetermined payment differs from the policyholder’s actual loss. This issue was covered at length in the IDF’s 2019 report on the use of technology in connection with sovereign and sub-sovereign risks.⁸⁰ Because this is an inherent feature of parametric insurance, there is enhanced risk of mis-selling the cover when offering it to individuals.



Parametric covers will not replace traditional insurance products. When used properly, they can complement existing insurance to provide comprehensive and affordable protection – in agriculture and many other branches of the insurance industry

Michael Pickel, board member of Hannover Re and CEO for E+S Re



Peer-to-peer insurance

Peer-to-peer (P2P) has been called “the mutual of the 21st century”,⁸¹ allowing risk sharing between individuals who share the same or similar risks. Peer groups, such as owners of houses or cars, families or friends, team up to absorb each other’s risks, with everyone contributing premiums to insure each other’s losses. This system relies on digital technology to connect the individuals with each other on a digital platform or marketplace, independent of location.

Early attempts at P2P insurance were often arranged by intermediaries of traditional insurers that sold products with a deductible, where part of the premium paid by the group was kept aside by the intermediary to pay the deductible on behalf of a group member having a claim, thereby sharing part of the overall risk (in the amount of the deductible) with the group. More recently, however, and powered by infrastructure-replicating technologies like DLT, there are more and more P2P risk sharing initiatives where no traditional risk carrier is involved. Nexus Mutual⁸² is one such example.

P2P can deploy social networks to limit fraud, and funds from the risk pool that were not spent can be returned to users (after the platform has deducted a management fee). To ensure risk-pools are not exhausted, P2P networks will reinsure to ensure that policyholders are not themselves liable. Examples include Pineapple⁸³ and Granadilla,⁸⁴ both based in South Africa.

The use of P2P insurance in emerging markets may be some time off, but there are elements of it that could be beneficial, including building trust in coverage and facilitating a community sense of responsibility for managing risk; similar to rotating savings groups or group loans in microfinance.

Technology’s limitations

New technology is not a panacea to solving the problem of the protection gap.⁸⁵ Its greatest potential is where innovative use of technology is combined with greater focus and effort by insurers to develop and deliver products that are suitable and responsive to their customer needs. This means adapting products and practices to local requirements and being responsive to the market.

Good conceptual ideas for technology may still fail in practice if there is inadequate market research. Most importantly, technology cannot build trust where there is none to begin with. It also risks excluding the most vulnerable of all, can only reduce costs and limit damage to some extent, and it may still fail when the overall exposure is just too high. The savings through the use of technology are therefore not sufficient to make the risk insurable.⁸⁶

As evidence of this, despite the array of cost-effective technology solutions, some insurers still choose to deploy traditional high-touch approaches in emerging markets – such as

local agents – to support consumer understanding and build trust. Distribution via agents, for example, is one of the key components of the BIMA model. With more than 3,500 salespeople across the developing world, it has signed up 24 million customers in Africa, Asia, and Latin America. Their call centre in Honduras houses more than 100 agents to support a team of 40 field agents.

Technology does not have to be cutting-edge to be of value, and can be coupled with traditional approaches to foster insurance penetration. In India, Swiss Re notes there are “village based centres” where there is direct access to insurance through a local person in a village with a computer and access to the internet; this person is able to process orders and pass on the necessary information needed to secure cover for those who are based remotely and do not have direct access to the internet. This system is not only used for agricultural insurance, but a wide range of insurance products are acquired this way.

In addition, certain technologies in isolation might not be able to gather the trust of potential consumers in emerging markets, especially when the solutions on offer are provided by non-local providers that have not previously or rarely engaged with the local market. This is also the case if the technology is still widely unknown or little understood (such as blockchain/DLT).

Technology offerings or solutions should therefore be adapted to the specific requirements and particularities of the target market; this might include various factors, such as the climate in the particular country being considered, infrastructure restrictions, socio-economic factors or consumers’ knowledge of and historical attitudes towards insurance.

⁸⁰ Insurance Development Forum, *How Technology Can Help Bridge the Protection Gap* (November 2019) p. 27 - 68 : [insdevforum.org https://www.insdevforum.org/sites/default/files/Final%20How%20technology%20can%20help%20bridge%20the%20protection%20gap%20report%20.pdf](https://www.insdevforum.org/sites/default/files/Final%20How%20technology%20can%20help%20bridge%20the%20protection%20gap%20report%20.pdf)

⁸¹ <https://www.swissre.com/institute/research/sigma-research/sigma-2016-04.html>

⁸² For more information visit [Nexus Mutual https://nexusmutual.io/](https://nexusmutual.io/)

⁸³ For more information visit [pineapple.co.za https://www.pineapple.co.za/](https://www.pineapple.co.za/)

⁸⁴ For more information visit [granadilla.ai https://granadilla.ai/](https://granadilla.ai/)

⁸⁵ Stefanie Zinsmeyer, Access to Insurance Initiative (A2ii) and Katharine Pulvermacher, Microinsurance Network (MiN), *InsurTech – Rising to the Regulatory Challenge: A Summary of IAIS-A2ii-MiN Consultative Forums 2018 for Asia, Africa and Latin America*, p.7 : [microinsurancenetowork.org https://microinsurancenetowork.org/sites/default/files/Report_ConsultativeForums_2018-en.pdf](https://microinsurancenetowork.org/sites/default/files/Report_ConsultativeForums_2018-en.pdf)

⁸⁶ Munich Re, M. Roth interview

The most innovative technology or idea might fail in practice, especially if consumers do not have the technological resources and understanding to use it. As a result, extensive and specific market research is required to ensure that the product and the delivery means will meet the needs of the potential consumer base.

MicroEnsure suggests that while some consumers in emerging markets would accept that the climate is changing and that this presents increased risks to them or their livelihoods, they would not place parametric agricultural and/or crop insurance as their most pressing risk-transfer need. In contrast, such consumers might be more interested in life insurance as a result of the threats posed by increasing volatile weather-related disasters, or health insurance for family members as a result of increased risks of illnesses, such as malaria (owing to wetter conditions). Consequently, when developing new technologies to combat the protection

gap, care should be taken to appropriately canvass and engage those most exposed to these risks, to ensure that such technologies are effectively meeting their requirements.

While technology can be used to substantially reduce the costs of providing insurance to consumers, the cost of tech-enabled solutions can still be a barrier to consumers in the poorest parts of the world who might not be able or willing to pay commercial insurance rates that cover the cost for delivery of the product.⁸⁷ Why should someone pay every month for an insured event that might only occur every five years, while other issues such as health problems or unpaid tuition fees are occurring at all times?⁸⁸ As such, government subsidies or engagement of sovereigns or sub-sovereigns, are often required to ensure that certain products, such as parametric insurance, are economically viable for the commercial insurance market to offer in emerging markets.

⁸⁷ MicroEnsure interview

⁸⁸ Munich Re, M. Roth interview

Legal and regulatory issues

Innovation by definition means something outside of the traditional. The development of innovative products, or distribution arrangements harnessing new technologies, can often fall outside traditional regulatory, legal or accounting categories. The products themselves may be novel and unfamiliar to regulatory authorities.

Regulators also have to consider the emergence of new players, with new insurance market entrants or participants ranging from FinTech/InsurTech start-ups, to TSPs or MNOs. The use of technology also affects the distribution chain with the merger of traditionally more distinct roles of broker, agent, and carrier. This poses a perceived or real threat to some market incumbents, as well as challenging existing regulatory or licensing categories.

Licensing and prudential requirements can create barriers for entry for potential participants in financial services markets. Providers who are unable to meet the regulatory entry requirements will struggle to enter into the relevant markets. “Disruptor” or innovative firms – especially start-ups – may be even less able to comply with the regulatory requirements due to limited resources or personnel. As such, InsurTech start-ups may be effectively prohibited from entry or may need to dedicate a considerable and/or disproportionate part of their resources trying to navigate the regulatory environment and to avoid overstepping the boundaries set by regulators.⁸⁹

Start-ups and new innovators may find this particularly challenging, as they often need a track record to attract investment or partnership. In fact, start-ups regularly find fundraising challenging during their first raise, regardless of regulatory challenges. If start-ups are unable to get a track record without at

least temporary entry to market to prove their product in a pilot format, they might be less likely to attract investment.⁹⁰

Additionally, new market entrants or project partners may not have the same level of familiarity with rules and requirements, or they may be operating to different timeframes and with different priorities. New technologies can also challenge existing national regulatory architecture. With tech-enabled insurance traversing boundaries of technology and insurance, while being offered as part of bundled products with other goods or services, the resulting offering may be something that is not easily defined simply as insurance, but a hybrid product with some insurance elements. If law and regulation do not keep pace with developments, it can stifle innovation, owing to the potential for regulatory uncertainties for potential new entrants or “disruptors” to the market; this may foster a more cautious approach by such actors or regulators who are not adequately equipped to supervise new and innovative market entrants providing InsurTech solutions.

There are a number of ways in which laws and regulation may prove to be a barrier to the development or deployment of InsurTech solutions. This section addresses some of the key hurdles that can arise when regulation or the regulatory architecture is not able to keep up with the pace of change.

It is important to note that many regulators understand and support the use of new technology or the innovative use of existing technology to better serve consumers. Accordingly, insurers and other innovators in the market need to engage with regulators to explain their innovations and to explore and respond to legitimate regulatory concerns.

Lack of regulation

On the other hand, inadequate regulations or a lack of regulation may result in the risk of new “disruptive” entrants enjoying degrees of freedom which incumbent players do not – compromising customer protection and trust to the detriment of all players in the market.



Many industry stakeholders stressed the fact that the need to wait for regulatory change might kill an innovation. They underlined the importance of regulatory certainty and clear signals from supervisors throughout the process⁹²

Cenfri



IAIS regulation principles

The International Association of Insurance Supervisors' (IAIS) Insurance Core Principles (ICPs)⁹¹ provides a globally accepted framework for the supervision of the insurance sector.

One of the challenges facing regulators centres on attempts to balance the adherence to the ICPs, with the provision of some flexibility to allow insurers to develop innovative products that will aid in closing the protection gap.

Ensuring trust is a key factor in addressing the protection gap in emerging markets. The risk of mis-selling parametric products and the risk of triggers failing to release funds would quickly erode trust in such products in emerging markets, and would act as a barrier to progress. At the same time, innovative new insurers or offerings may themselves benefit from the absence of overregulation or entrenched regulatory categorisation.

In some instances, lack of regulation or regulatory “gaps” can be a problem. This lack of regulation may go beyond insurance regulation. For example, there may be jurisdictions where a lack of cohesive contract law can have a detrimental effect on consumers' trust of insurance agreement or the industry more generally. Where carriers do not know what the requirements are, or these are imprecisely or inadequately defined or enshrined in written instruments, the resulting uncertainty can cause delays or difficulties for would-be innovators or new market entrants. Where there is uncertainty, it can create hesitancy amongst carriers or would-be market participants, and concerned about breaching law or falling foul of existing regulation inadvertently, they may not risk entering a new market at all.

⁸⁹ Cenfri interview

⁹⁰ Cenfri interview

⁹¹ International Association of Insurance Supervisors, *Insurance Core Principles* : [iaisweb.org https://www.iaisweb.org/page/supervisory-material/insurance-core-principles/](https://www.iaisweb.org/page/supervisory-material/insurance-core-principles/)

⁹² Stefanie Zinsmeyer and Katharine Pulvermacher, *Micro Insurance Network, InsurTech – Rising to the Regulatory Challenge: A Summary of IAIS-A2i-MIN Consultative Forums 2018 for Asia, Africa and Latin America*, p. 5 : [microinsurancenetw.org https://microinsurancenetw.org/sites/default/files/Report_ConsultativeForums_2018-en.pdf](https://microinsurancenetw.org/sites/default/files/Report_ConsultativeForums_2018-en.pdf) p.5

In some instances, such issues can be overcome by active engagement and open dialogue with regulators. Some regulators, despite lack of regulatory categorisation, will maintain a relatively open door, which enables a frank discussion of the contours of tech-enabled products and systems. This, however, depends on sufficient regulatory capacity to deal with inquiries.

Overregulation

At the other extreme is overregulation: excessive or prohibitive regulations which can easily stifle innovation and prevent progress.⁹³ Regulation can raise barriers to entry and protect existing players from competition, thereby also depriving the country of the ability to address protection gap issues due to the lack of innovative and effective insurance solutions developed locally. It may also render experimentation virtually impossible, as regulated activities usually require express permission from the regulator.

The costs of seeking approvals or ensuring compliance may mean that less funds are available to spend on research and development. Where new technologies are involved, the value chain can be significantly shortened, with a merging or blurring of lines between “traditional” roles of introducing, broking, claims administration, marketing and underwriting. Regulatory categories that are strictly defined may be maladapted to the participants in technology-enabled value chains. Furthermore, there are instances where regulators have not supported innovative models due to concern over the potential disruptive impact on the traditional insurance model. A supportive, open-minded regulatory culture is required for tech-enabled products to flourish in the market.

Some countries have restrictive Foreign Direct Investment (FDI) policies in the insurance sector to ensure that domestic insurers are

protected from being engulfed by large international brands looking to expand into new markets. Such regulation risks limiting the access to innovative and effective insurance solutions that international insurers have developed and are able to offer in order to bridge the protection gap. If a country has low insurance penetration and restrictive FDI policies protecting domestic insurers, consumers may be precluded from accessing insurance solutions suited to their needs.

Regulatory prohibitions

There may be specific requirements for outsourcing functions and specific licensing requirements for partners operating in designated regulatory roles. A thorough understanding of regulatory and licensing categories and delineation of responsibilities will be all-important. In China, insurers cannot distribute insurance products through non-admitted channels. Specifically, Chinese insurers are only permitted to distribute products through themselves or through licenced brokers or agents. In light of the development of mobile distribution, the mobile distribution of insurance products can also only be carried out by licenced Chinese insurers, brokers or agents.

Some countries will require intermediaries who arrange insurance to be licensed, so as to ensure they have the requisite knowledge and skills to advise customers. Inclusive insurance products in emerging markets, however, are often highly simplified and distributed by partners – such as MNOs or supermarket chains – who do not usually fall within the regulatory framework of insurance supervisors. Online P2P platforms (like China’s TongjuBao) may challenge the need for obtaining an insurance licence in any particular jurisdiction. Where certain types of insurance are prohibited or carriers restricted, it could mean that whole types of innovation may inadvertently be stifled.

Lack of harmonisation

For some products to be brought to scale or market-tested, carriers may wish to deploy them across jurisdictions or regionally, which means that costs of compliance are repeated, limiting potential economies of scale. This is not just an issue in emerging markets; in the US, insurance regulation is often on a state basis, meaning start-ups have reported being slowed in bringing products to market by the need to secure regulatory approvals in 50 different jurisdictions.⁹⁴

Approvals and Regulatory capacity

The age of digitalisation and rapid development presents a “moving target in a moving environment”.⁹⁵ The fast-moving environment in which InsurTech operates presents a challenge for existing regulatory frameworks and regulators that can inevitably lead to regulatory gaps that might not be filled for long periods of time, particularly in circumstances where regulators may not have the funding or capacity to keep up with the pace of change in real time. Supervising InsurTech activities requires technological literacy and a new set of supervisory skills,⁹⁶ which may take time to develop.

There are competing timescales where innovative products are concerned.⁹⁷ Start-ups may have timescales of 12 to 18 months, in which they have to bring a “use case” to proof of concept, and then scale to attract investment. Without regulatory approvals at key stages, great ideas could wither on the vine or become surpassed by competitors who are better able to leverage capital, rather than being necessarily best in class as a

technological solution. Incumbents or innovators from established economies may be at an advantage to home-grown solutions in emerging markets and seeking product approvals, given they are more readily able to access further capital and venture capital investments. Partnering insurers who provide capital or sponsorship, or are assisting on the compliance side with product approvals, may not have the same time constraints or operational timelines. Regulators, too, may be working to different timescales.

Lack of regulatory capacity can mean that regulators themselves may be stretched and under-resourced, or lack the skills, experience and knowledge to understand the contours of the new technology solutions; due to a lack of time or resources, they may also be unable to leverage contacts and resources to assist in understanding. The natural inclination in such circumstances can be to “say no first, ask questions later”, which can act as a break on innovation. The most innovative products, however, are those that require the most investment of time and resources to properly understand, and as a result, may face longer timescales for product approval.

Poor experiences with one regulator may lead innovators to move on to new markets, where regulators are both more open to working to understand and better resourced. Unfortunately, this may lead to an oversaturation of new ideas and innovation in tested markets, rather than those where innovations and market solutions may best respond to local challenges in bridging the protection gap, particularly in emerging economies.

⁹³ The Geneva Association, *Harnessing Technology to Narrow the Insurance Protection Gap* (December 2016) p.26 : [genevaassociation.org https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/harnessing-technology-to-narrow-the-insurance-protection-gap.pdf](https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/harnessing-technology-to-narrow-the-insurance-protection-gap.pdf)

⁹⁴ Christopher Munro, *Insurance Insider, US Regulation Remains a Hurdle for InsurTech* (June 2019) : [insuranceinsider.com https://www.insuranceinsider.com/articles/127060/us-regulation-remains-a-hurdle-for-insurtech](https://www.insuranceinsider.com/articles/127060/us-regulation-remains-a-hurdle-for-insurtech)

⁹⁵ Stefanie Zinsmeyer and Katharine Pulvermacher, *Micro Insurance Network, InsurTech – Rising to the Regulatory Challenge: A Summary of IAIS-A2ii-MIN Consultative Forums 2018 for Asia, Africa and Latin America*, p. 4 : [microinsurancenetw... https://microinsurancenetw.../sites/default/files/Report_ConsultativeForums_2018-en.pdf](https://microinsurancenetw...)

⁹⁶ Stefanie Zinsmeyer and Katharine Pulvermacher, *Micro Insurance Network, InsurTech – Rising to the Regulatory Challenge: A Summary of IAIS-A2ii-MIN Consultative Forums 2018 for Asia, Africa and Latin America*, p. 4 : [microinsurancenetw... https://microinsurancenetw.../sites/default/files/Report_ConsultativeForums_2018-en.pdf](https://microinsurancenetw...)

⁹⁷ Ton Herbstein, *Insurance Prosperity Specialist*, UK Department for International Trade

Regulatory duplication and arbitrage

With some transactions it may be unclear which regulator(s) have responsibility for regulatory oversight and control, as products or companies may traverse the remits of communications, banking or other regulators (or even health or other regulators where insurance is offered as an add-on part of a bundled product). There is clearly, however, the potential for new modalities, functions and roles.⁹⁸ Where innovation fundamentally changes a market, those categories – or the means by which categorisation is determined – may prove to no longer be fit for purpose, and amendment or revision may be necessary.

In Australia, agricultural index-based products are being offered as derivatives, paying out on weather triggers rather than being offered expressly as insurance products. This fine distinction would impact on whether these products are to be governed by the insurance regulator, or whether they should be regulated as a financial product as opposed to a retail product.

Innovative developments may intersect the authority of multiple sector regulatory authorities, particularly as tech-enabled insurance can cross the boundaries of technology and insurance, and many are being offered as part of bundled products with other goods or services. Accordingly, innovative products may be subject to more than one set of regulatory requirements, or may operate in a “regulatory grey area”.⁹⁹ The need for supervisory coordination and cooperation is key to combatting these potential issues.

Regulators will also need to respond to the risk associated with the bundling of products when an asset is insured a number of times under multiple policies. This may in turn erode trust in burgeoning insurance sectors attempting to develop a foothold in emerging economies. Regulators will therefore need to take a balanced approach to the introduction of InsurTech to address the protection gap and the potential regulatory relaxation or leeway that may be required to do so; however, they must ensure that the regulatory framework is rigid enough to ensure there is sufficient capital available, and there is no mis-selling to a population that may be less financially literate.

Where the various concerned regulators do not co-ordinate, or refuse to concede regulatory authority to another regulator in relation to the concerned product, there is the potential for significant regulatory uncertainty. Each of those bodies may have different priorities, requirements or timescales for approvals and, in some instances, may actively compete with, or seek to establish, jurisdiction in preference to “competitor” regulators nationally. Overlapping jurisdictions of regulators and supervisors has the potential to increase costs and significantly increase approval timeframes where these regulators seek to establish their own jurisdiction over others. This may result in innovative firms incurring substantial costs in trying to navigate the relevant environment, which in turn might affect their ability to attract investor funding.¹⁰⁰

There can also be overlapping boundaries of national jurisdictions at the supranational level, requiring cooperation between supervisory authorities internationally thinking outside of the jurisdictional “box”.¹⁰¹ International remittances are increasingly important in many countries and, similarly, an individual based in the US may wish to purchase an insurance product for a person or risk based in another jurisdiction. Reflecting this potential market, the Philippines is working on a pilot where insurance can be purchased from another jurisdiction for risks located locally. Such schemes may require collaboration between regulators and across jurisdictions, and have the potential to create tax and other issues for national regulators. However, if appropriate Memorandums of Understanding (MOU) and other agreements can be worked out between countries to protect consumers, data and provide clarity, there is no reason why in principle, such tech-enabled schemes could not be feasible in the future.¹⁰²

Legal definitions

Legal definitions for insurance can create difficulties for innovative products. For example, parametric insurance products may be subject to legal or regulatory uncertainty in jurisdictions where: 1) the insured must have an “insurable interest” at the time the policy is underwritten and/or at the time the loss occurs; and 2) the size of the insurance payout must correspond to the actual loss suffered by the insured. This “indemnity principle” can mean that in certain jurisdictions, an insurer may only restore insureds to their pre-loss financial position: such losses must be valued or assessed before claims can be paid, limiting one of the potential benefits of parametric solutions (speed of payment).

At the same time, tweaking the way the offering is structured might also offer a way out of insurance regulation, e.g. by erasing the promise or legal obligation traditionally required under insurance definitions and claiming instead that the service of a smart contract is offered which, in case of an actual loss, might only pay out once its predetermined triggers are met – with no legal remedy should such payment ultimately not occur. Using that model, Etherisc has obtained confirmation from the German regulator BaFin that such an offering does not fall within the regulatory perimeter.¹⁰³ Similarly, P2P offerings may be qualified as discretionary mutual, where the members vote on any claim made, with no legal recourse against the decision, and therefore not subject to insurance regulation.¹⁰⁴

Paper-based / anti-digital regulatory requirements

In some jurisdictions, there may be existing requirements for contract formation that hamper innovation; for example, requirements for insurers to provide proof of cover in paper format, or for insureds to physically sign the policy document. Here, the current COVID-19 crisis demonstrates how approaches from regulators can differ and often be prohibitive.

This can cause issues for tech-enabled underwriting and distribution, or the volume of transactions required, to achieve economies of scale for some inclusive products. In many countries, regulation stipulates that mobile money accounts be linked to bank accounts, which can mean that the potential for mobile payment systems to reach the unbanked are minimised. There may be specific legislative requirements governing distance selling and conclusion of contracts over the internet or mobile networks, which may not be adapted to current or nascent technologies.

⁹⁸ International Association of Insurance Supervisors, *Application Paper on the Use of Digital Technology in Inclusive Insurance*, p. 16. : <https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#>

⁹⁹ Cenfri interview

¹⁰⁰ Cenfri interview

¹⁰¹ International Association of Insurance Supervisors, *Application Paper on the Use of Digital Technology in Inclusive Insurance*, p. 16 : <https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#>

¹⁰² Cenfri interview

¹⁰³ Quote from Christoph Mussenbrock, Etherisc.

¹⁰⁴ Cf. [Nexus Mutual](https://nexusmutual.io/) <https://nexusmutual.io/>

Tax treatment

As discussed above, technology enables a greater number of bundled products, where insurance is offered as one part of a wider service or product offering, such as an adjunct to healthcare services, business services or a product purchase. In such cases, it may be challenging to delineate what element of the product offering and pricing is insurance, and what relates to the other product or services. Even between inclusive insurance products, there might be unequal treatment, with some being treated more favourably than others. In Germany, drought insurance – unlike hail, storm, heavy rain and frost insurance – was not covered by the heavily subsidised insurance tax rate of 0.3 per mile for inclusive insurance products until recently.

This presents both authorities and insurers with challenges to determine the applicable tax to any such product, because each element of the same may in theory attract different taxes, such as Insurance Premium Tax (IPT) for the “insurance element” or VAT for the “services element”. Active engagement from the tax authorities in each jurisdiction may be required in order to achieve clarity on the applicable taxes, which may also slow down the pace of innovation, as insurers will want to incorporate applicable taxes into their pricing.

Data protection regimes

A good understanding of the law surrounding data protection is essential for any insurer, due to the large amount of personal data and sensitive personal data processed by insurers operating in emerging markets; this is particularly the case where inclusive insurance products are offered to individual consumers, and where customer data is being shared between distribution partners, such as mobile network operators and insurers.

The IAIS has warned of the high degree of information asymmetry between insurers

offering inclusive insurance for their customers, and considers this a particular area of conduct risk. While overly restrictive data protection regulations may be seen as an impediment or obstacle, laws and restrictions around these issues are important to protect customers, particularly in developing countries where the end customers may be vulnerable and within communities that don't have access to the same education and resources as developed nations.

New data protection laws have emerged on a global level, particularly with the introduction of the EU General Data Protection Regulation (GDPR) in May 2018. GDPR is having a significant impact on the insurance industry, as it imposes a wide range of tight data protection requirements for businesses which handle personal data in Europe, or personal data of individuals located in Europe, as well as heavy penalties for non-compliance. Compliance with GDPR is would be relevant to European-based insurers looking to provide innovative microinsurance products in emerging economies.

GDPR is applicable to personal data processing carried out by a data controller (a company that determines the purpose and means of processing data), or a data processor (a company that processes data on behalf of a data controller) based in the European Union (EU). It also applies to personal data processed by data controllers or data processors outside the EU, where such processing involves the supply of goods or services, or the monitoring of the conduct of individuals located in the EU. Therefore, insurance brokers or non-EU companies selling policies to individuals located in the EU will be subject to GDPR. Additionally, companies that operate branches outside the EU should check whether the activities of those branches fall under GDPR (for example, if they rely on an EU establishment for data processing, or carry out any processing on behalf of their EU affiliates).

It is important to note that GDPR concerns companies of all sizes. There are generally no exclusions by sector or corporate dimension from the applicability of GDPR; therefore, GDPR is equally applicable to emerging InsurTech companies.

GDPR introduces a number of new compliance requirements. Companies have to notify data regulators or affected individuals about any personal data breaches which are likely to result in a risk (or high risk) to affected individuals. Notification significantly increases the costs of responding to a data breach, as well as the chances that affected individuals will make claims against data controllers.

A significant portion of the personal data that insurers hold about individuals is sensitive in nature: e.g. about a person's health or medical treatment. Sensitive personal data cannot be processed unless individuals have given their explicit consent to that processing or under other limited circumstances. Direct marketing has also been significantly restricted by GDPR: “opt-out” mechanisms, such as pre-ticked boxes, are no longer a valid method of obtaining consent from individuals. Moreover, cross-border transfers of personal data to branches or third parties based outside the EU, where data laws are not considered “adequate” by the European Commission, will require companies to put in place contractual safeguards, such as Binding Corporate Rules or EU Standard Contractual Clauses.

Furthermore, GDPR introduced the “right to be forgotten” which allows individuals to make applications for erasure of all of their personal data. This creates a concern regarding the use of DLT in that once customer data is added to the blockchain, it is very difficult to remove, making the fulfilment of such erasure applications challenging.

Data protection and data privacy is a growing issue on a global level, particularly in a number of emerging markets. All consumers deserve robust and adequate data protection regimes, and rules must reflect market realities and needs, and not unnecessarily restrict access to protection or inject excessive costs into the system. In the Middle East, laws are being developed that not only attach monetary fines (similarly to GDPR), but also criminal sanctions against non-compliance. Consideration must therefore be given to the various data protection regulations that may be relevant to cross-border data transfers, as there may be more than one data protection regime that is applicable.

Other Issues

This paper is not intended to be a summary of all possible regulatory issues that may arise. For example, when products are offered through or alongside connected devices and other technologies, regulators and other market actors may need to consider other regulatory requirements, such as marketing standard or intellectual property rights associated with those technologies, and how those technologies are deployed.

Another potential issue worth highlighting is that there may be a lack of understanding or resources within InsurTechs to allow navigation of significant or burdensome regulatory regimes. On some occasions, regulations can be straightforward and what InsurTechs are intending to do does not fall outside of the existing regulation. It is sometimes the case that InsurTechs perceive the navigation of the regulation as challenging, onerous and a major obstacle, when in reality it is not. Regulators should therefore make efforts to build awareness and understanding of their regimes, as well as working on breaking down this perception by welcoming open discourse.

Innovative regulatory responses **3**



Innovative regulatory responses

The ability of new technologies to penetrate previously under- or uninsured markets and address the protection gap, is dependent upon supportive regulatory regimes in which to operate.

Regulators and insurance supervisors need to have sufficient technological skills and resources themselves and they must have sufficient knowledge of the insurance needs of their consumers in order to strike a balance between fostering new insurance models, while also continuing to maintain the trust in, and proper functioning of, the insurance market and financial system as a whole.

The key theme and aim for regulators is to find a proportionate solution, creating a balance between innovation and safety;¹⁰⁵ between growing the inclusive insurance market, thus closing the protection gap, while maintaining adequate protection for consumers.¹⁰⁶ Indeed, consumer protection in a digital technology driven market raises a number of new issues for consideration, including product suitability.

On a practical level, the regulator needs to have a flexible and accommodating approach to innovation that provides regulatory certainty and transparency to existing and potential market players. There are a range of tools available to the regulator to encourage responsible innovation in its market that, when employed, can achieve the “balancing act”. These include both regulatory and non-regulatory responses available to a regulator to encourage and facilitate innovation in its market. However, not all of them will apply or be appropriate in every context.

The proportionality principle

The principle of proportionality has been implemented by financial regulators in numerous jurisdictions and is advocated by the A2ii in approaching m-insurance.¹⁰⁷ It is one of the G20 Principles for Innovative Financial Inclusion.¹⁰⁸ Insurance supervisors implementing this principle adapt specific supervisory requirements, so that they align with “the nature, scale and complexity of risks posed”.¹⁰⁹ This principle often forms the basis for tiered regulatory requirements or licences, as well as risk-based supervision.

Regulators have adopted various approaches and solutions to encourage innovation within their mandate. We examine a few of them here:

Regulatory reform

Law and regulation governing insurance may not be fit for purpose and may require adjustment or the creation of new categories or classifications. In some markets, existing insurance regulations require proof of coverage and policy signature in paper format, and regulations might need to be adjusted to accommodate digital transactions e.g. through allowing digital signatures on mobile phones and electronic receipts as confirmations. In many countries, regulation still stipulates that mobile money accounts be linked to bank accounts. In light of low levels of bank account penetration, more countries are relaxing regulations to enable customers to use mobile money (e.g. through E-wallets) without having a bank account.

Law and regulation can also act as inhibitors to innovation or insurance uptake in the same ways that such requirements can hamper other types of financial inclusion. For example, it is estimated that 200-300 million Africans do not have access to the relevant documentation required to open a bank account (such as proof of address), and yet a significant amount of people in Africa will have access to SIM connection or other such resources.¹¹⁰ Accordingly, changing legal requirements around KYC documentation, or using a more proportional or risk-based approach to anti-money laundering, may be sensible for jurisdictions wishing to build financial inclusion, including insurance markets.

Technology may assist in this, with other forms of KYC or identity verification being enabled through social media, biometrics and

blockchain. Many jurisdictions do not yet permit e-KYC and still require there to be a face-to-face sale, which can limit what online insurers can do, or prevent solely digital solutions from being offered. Regulatory reforms to enable digitisation of client data and the creation of national databases which leverage individual biometric data, for example, will be important to capturing the full potential of mobile insurance to target prospective client segments.

Legislators may also need to take more fundamental reforms and adjust the overall regulatory architecture to proportionately regulate for responsible innovation or ensure a clear delineation between the remit and priorities of various regulators (reducing the risk of regulatory arbitrage or duplication of costs, as innovators seek approvals from multiple regulators). This can take time, however, provided there is sufficient in-built flexibility, regulators may adopt other means of fostering innovation with a proportional approach to regulation.

Law and regulation can support and enable technological innovation and thereby enable greater insurance penetration. There are often no exemptions, reduced capital or compliance options offered by regulators for potential disruptors like InsurTechs or start-ups that cannot yet comply with the capital, partnership or managerial experience requirements. It may be the case that the capital or personnel requirements that an insurer or insurance stakeholder considers necessary or economical for offerings – like micro insurance – is much lower than the minimum capital or personnel requirements required by legislation in the concerned jurisdiction¹¹¹. Contrastingly, if a regulator reduces its capital or licensing requirements without careful consideration, there is also the increased potential for consumers not being adequately protected.

¹⁰⁵ Geneva Association, *Harnessing Technology to Narrow the Insurance Protection Gap* (December 2016) p. 8 : [genevaassociation.org https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/harnessing-technology-to-narrow-the-insurance-protection-gap.pdf](https://www.genevaassociation.org/sites/default/files/research-topics-document-type/pdf_public/harnessing-technology-to-narrow-the-insurance-protection-gap.pdf)

¹⁰⁶ Center for Financial Inclusion at Accion and the Institute of International Finance, *Inclusive Insurance: Closing the Protection Gap for Emerging Customers* (January 2018) p.44 : [centerforfinancialinclusion.org https://content.centerforfinancialinclusion.org/wp-content/uploads/sites/2/2018/08/Inclusive-Insurance-Final-2018.06.13.pdf](https://content.centerforfinancialinclusion.org/wp-content/uploads/sites/2/2018/08/Inclusive-Insurance-Final-2018.06.13.pdf)

¹⁰⁷ A2ii, *Regulating Mobile Insurance, Insurance business via mobile phones: regulatory challenges and emerging approaches* (April 2018) p.36 : [a2ii.org https://a2ii.org/sites/default/files/reports/2018_05_02_mobile_insurance_regulation_web.pdf](https://a2ii.org/sites/default/files/reports/2018_05_02_mobile_insurance_regulation_web.pdf)

¹⁰⁸ Global Partnership for Financial Inclusion (GPFI), *G20 Principles for Innovative Financial Inclusion - Executive Brief*, p.5, “Principle 8 – Proportionality: Build a policy and regulatory framework that is proportionate with the risks involved in such innovative products and services, and is based on an understanding of the gaps and barriers in existing regulation” : [gpfi.org https://www.gpfi.org/publications/g20-principles-innovative-financial-inclusion-executive-brief](https://www.gpfi.org/publications/g20-principles-innovative-financial-inclusion-executive-brief)

¹⁰⁹ IAIS 2012

¹¹⁰ Cenfri interview

¹¹¹ MicroEnsure interview

There are a number of countries that are starting to see some benefits after introducing regulatory reforms, such as an increased take up in microinsurance products and insurance penetration more generally. Mongolia and Ghana are two examples, where the progression of regulatory microinsurance reforms have been documented by A2ii.¹¹² In this regard, it was estimated by the Ghanaian National Insurance Commission that up to 29% of the population in Ghana had access to microinsurance cover, and up to 65% of the policies issued in Ghana in 2019 were microinsurance policies.¹¹³ Some of this success has been attributed to (amongst other things) regulatory reforms, approval times and also the enabling environment adopted by the regulator.

Case-by-case approvals

In some jurisdictions, regulators take a case-by-case approach to innovation. In those cases, close collaboration between insurers or product developers and regulators can result in impressive progress. In China, microinsurance and parametric insurance products are approved by the regulator on a case-by-case basis. Close collaboration between the innovators and the regulator has allowed for specific, highly-tailored products to enter the market. Products are being designed and sold locally with the backing of the regulator to great effect. For example, a low-temperature weather parametric insurance product is being sold locally with the support of local governments. However, the case-by-case approvals may not always be the most effective option, particularly if the regulator does not have sufficient capacity, as this has the potential to lead to significant delays in the implementation of products.

Test-and-learn

While regulatory frameworks can be adjusted to accommodate innovations, the pace and novelty of change mean that it may be best to test new ideas before entrenching requirements in regulation. With the test-and-learn approach, regulators observe the impact of an innovation or product adaptation (“test”) and to adjust their regulatory response to it, based on their improved knowledge of its effect (“learn”).

In close cooperation with the innovator, the regulator crafts a framework to test an innovative product or technology in a live environment, with safeguards and key performance indicators in place. Test-and-learn approaches can ensure the oversight of pilots during product approval process, better understand m-insurance models, encourage innovation within a controlled and supervised environment, and collect inputs for regulatory changes.¹¹⁴

Globally, financial regulators have applied test-and-learn approaches for several years. The Philippines Central Bank (Bangko Sentral ng Pilipinas) began applying a test-and-learn approach to regulating mobile money in the Philippines in 2001.¹¹⁵ The Central Banks of Kenya and Tanzania similarly employed a test-and-learn approach to enable innovation in retail electronic payment systems to allow telecommunication operators to launch mobile money services more than a decade ago.¹¹⁶ The test-and-learn approach has also been incorporated into the G20 Principles for Innovative Financial Inclusion.¹¹⁷ Nonetheless, official guidance on the manner in which regulators should adopt test-and-learn approaches is limited. The test-and-learn approaches encountered in many emerging markets tend to be ad hoc in nature and on a case-by-case basis, and are often not transparent to other market players.¹¹⁸

Innovation Hubs

Innovation hubs are physical locations bringing together innovators, incumbents, service providers and regulators, which offer advice, guidance, connections and a financial springboard to nascent companies with bright ideas. Innovation hubs can provide a dedicated point of contact for firms to raise enquiries with competent authorities, and to potentially seek non-binding guidance on regulatory and supervisory expectations, including licensing requirements.¹¹⁹

In the UK, the FCA’s Innovation Hub has a dedicated team that assists in preparing applications for authorisation. Lloyd’s Lab at Lloyd’s of London works with cohorts of InsurTech start-ups, providing access to technical expertise, funding and partnerships with incumbents, and facilitating knowledge-sharing to encourage familiarisation and compliance with regulation. In the Middle East, the Dubai Financial Centre (DIFC) – the region’s leading financial centre and one of the world’s top ten financial and FinTech hubs – offers a platform for InsurTech innovation through its accelerator program, FinTech Hive at DIFC. A new tech hub was also launched in March 2019 in Abu Dhabi, called Hub 71, to support start-ups in a number of industries, including insurance.

Regulatory Sandboxes

Some regulators set up a “regulatory sandbox”¹²⁰ – a term coined by the UK’s FCA in 2015¹²¹ – for firms to trial innovative technologies. Singapore’s Monetary Authority is a leader in regulating for innovation in this way, and today, more than 20 countries have adopted a financial regulatory sandbox, or are in the process of setting one up.¹²²

Regulatory sandboxes represent a more formalised approach to test-and-learn, with structured application procedures and a clear set of eligibility criteria for would-be participants.¹²³ These structures allow innovators that do not yet comply with existing regulations to test their products with regulatory safeguards applied and a plan agreed and monitored by the supervisor; this limits the extent of the risk to consumers and the market. The purpose is to create a safe environment for market participants by implementing a light-touch regime, which does not risk client money or financial stability.¹²⁴

Operating a regulatory sandbox requires adequate resources on the part of the regulatory body (staff and funding) to select proposals, provide advice to companies, and evaluate innovations. In practice, no regulatory sandbox looks the same, and sometimes less formalistic or resource-intensive approaches may be better suited.

Non-regulatory responses

There can be less resource-intensive ways to make as much – if not more – of an impact, particularly where a regulator does not have the means or ability to implement and operate a regulatory sandbox. Fostering innovation may not require any amendment or adjustment of laws or regulation, or even a formalised test-and-learn process, but simpler solutions may be a first port of call for regulators. It may take a long time to implement changes in law or regulation, and such solutions may be ill-fitting to swift moving InsurTechs. Regulators, too, may prefer a less involved process.

¹¹² Hui Lin Chiew, A2ii: 10 Years On (September 2019) : [a2ii.org https://www.a2ii.org/index.php/en/media/913/download](https://www.a2ii.org/index.php/en/media/913/download)

¹¹³ Hui Lin Chiew, A2ii: 10 Years On (September 2019) : [a2ii.org https://www.a2ii.org/index.php/en/media/913/download](https://www.a2ii.org/index.php/en/media/913/download)

¹¹⁴ International Association of Insurance Supervisors, Application Paper on the Use of Digital Technology in Inclusive Insurance, p.17 : [iaisweb.org https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#](https://www.iaisweb.org/page/supervisory-material/application-papers/file/77815/application-paper-on-the-use-of-digital-technology-in-inclusive-insurance#)

¹¹⁵ GSMA, 2012

¹¹⁶ Di Castri & Plaitakis, 2017

¹¹⁷ AFI, 2011

¹¹⁸ Cenfri interview

¹¹⁹ European Banking Authority, 2018

¹²⁰ Cenfri, Nichola Beyers, Jeremy Gray, Christine Hougaard, *Regulating for Innovation* (January 2018) p.16 : [cenfri.org https://cenfri.org/wp-content/uploads/2018/02/Regulating-for-innovation.pdf](https://cenfri.org/wp-content/uploads/2018/02/Regulating-for-innovation.pdf)

¹²¹ Jenik & Lauer (2017)

¹²² Cenfri, Nichola Beyers, Jeremy Gray, Christine Hougaard, *Regulating for Innovation* (January 2018) p. 6 : [cenfri.org https://cenfri.org/wp-content/uploads/2018/02/Regulating-for-innovation.pdf](https://cenfri.org/wp-content/uploads/2018/02/Regulating-for-innovation.pdf)

¹²³ Cenfri, Nichola Beyers, Jeremy Gray, Christine Hougaard, *Regulating for Innovation* (January 2018) p.3 : [cenfri.org https://cenfri.org/wp-content/uploads/2018/02/Regulating-for-innovation.pdf](https://cenfri.org/wp-content/uploads/2018/02/Regulating-for-innovation.pdf)

¹²⁴ Geneva Association interview

Enabling innovation may simply require communication between the regulator and innovators. The regulator (or others) can offer compliance support or convene industry participants to build awareness of regulatory requirements. The regulator will often have a great deal of convening power and can issue guidance, hold meetings, or otherwise signal to industry that they are open to innovation and willing to work with innovators.

Regulators may also be able to provide support (beyond regulation) to innovators in order to facilitate the roll-out of new InsurTech products. In Australia, flood data has been made open source, which enables the industry to better price flood risks.¹²⁵ Regulators may also undertake research and surveys themselves to better understand the demand for InsurTech solutions. In Malaysia, the United Nations Capital Development Fund (UNCDF) conducted research with low- and middle-income customers to better understand their digital and financial lives in order to better inform the production of products.¹²⁶

Sometimes, the biggest barrier to InsurTechs entering the market may be perceived regulatory challenges, rather than actual regulatory challenges. In that case, the underlying challenge is that InsurTechs are not familiar with and do not know how to (or find it daunting to) navigate the regulatory architecture. It may be of benefit for regulators to set up briefings, workshops or meetings to walk InsurTechs through the landscape of laws and regulations. That being said, the effort at dialogue has to be bilateral, and while regulators should give clarity, efforts must be made to understand the regulatory position, as well as providing regulators with explanations of business models to garner productive and collaborative relationships between the two. This is the expectation imposed by the Singapore

regulator in creating a regulatory sandbox in order to allow for the testing of innovative InsurTech products.¹²⁷ Ultimately, for regulators, the immediate threat of consumer protection may loom larger than the uncertain but possible benefit of innovative technological solutions; it is therefore imperative for industry to communicate directly with regulators in order to address their particular concerns.

Microinsurance laws and regulation

The regulatory treatment of microinsurance and its distributors is of particular relevance to m-insurance and tech-enabled provision of inclusive insurance in emerging markets. Regulators have been developing policy and regulatory and supervisory approaches to the provision of inclusive insurance for more than a decade.¹²⁸

Some jurisdictions have specific regulatory regimes for microinsurance/microinsurers based on the concept of proportionality, with reduced entry and operating requirements for insurers offering products that fall within the definition of "microinsurance". Specific microinsurance regulations have been implemented by at least six insurance supervisors in Africa, while at least another eleven African countries are in the process of developing a microinsurance regulatory framework.

Such regulations can permit lighter capital requirements or innovative distribution channels such as mobile phones, with specific consumer protections built in, or capacity for microinsurance providers to evolve with the market in time. Such regulations can lower the costs of entry or the costs of compliance for market entrants, thereby enabling innovative developments in products and business models.¹²⁹

The disadvantage of microinsurance licenses is that with low insurance penetration, they could result in the exclusion of the middle market. The top end of the market will be served by incumbents, and if new entrants want to expand insurance reach, they will be limited to lower-income and lower cover options, rather than the natural market progression to expand to the easy to reach first.¹³⁰ In order to assist the development of microinsurance markets, regulators need to prevent regulatory arbitrage between conventional and microinsurance markets. There must be clear understanding of the boundaries between the two areas so as to avoid undesired market distortions.¹³¹

Regional coordination

Some regional initiatives have sought to establish cross-border collaborations, with regulatory responses deployed across jurisdictions to streamline bringing to market tech-enabled risk transfer and management solutions within a region.¹³² In East Africa, Kenya's regulator often acts as a regional leader, such that securing approval from the Kenyan regulator can, in certain circumstances, smooth the path in approaching other regulators in the region. Mr Ravi Menon of Singapore's financial regulatory authority, has cited an integrated Association of Southeast Asian Nations (ASEAN) market as one of the "four key enablers" in narrowing the wide natural-catastrophe protection gap in the ASEAN Market.¹³³ In this regard, Singapore has also announced plans to set up a centre of excellence called the Global Asia Insurance Partnership (GAIP), whose aim is to foster collaboration between the insurance industry, regulators and academia, to deepen capabilities in risk management and insurance.¹³⁴

A formalisation of such grouping of regulatory approvals for tech-enabled insurance, or means of pooling resources in understanding new technology, sharing knowledge and know-how on a regional basis, may ensure greater transparency for insureds, reduce costs of approaching new markets, and thereby reduce costs of market entry.

Examples of regulation in action

Philippines – Stage-based approach

In the Philippines, a stage-based approach has been adopted to develop regulatory frameworks in which technological innovation in insurance can flourish. The Insurance Commission (IC) has used the three-stage approach of pilot, monitoring and adaptation to develop regulation that provides protection to consumers, while allowing for the development of innovative insurance products.

An initial circular was produced in 2006, which defined set standards of consumer protection with regards to microinsurance and created a new tier of microinsurance providers – Microinsurance Mutual Benefit Associations (MI-MBAs). Following the monitoring and adaptation stages, this was developed into the National Microinsurance Strategy 2010, which brought legislative and regulatory instruments into force. Following further monitoring and adaptation, the Enhanced Microinsurance Regulatory Framework 2015 was introduced. The organic development of regulation in this way allowed regulators to see where there were gaps in the framework which could be addressed in further regulation.¹³⁵

¹²⁵ For more information visit [ga.gov.au](https://www.ga.gov.au/scientific-topics/community-safety/flood/afrip) <https://www.ga.gov.au/scientific-topics/community-safety/flood/afrip>

¹²⁶ UN Capital Development Fund, *How Low- and Middle-Income People Experience Digital Financial Services in Malaysia* (October 2019) : [uncdf.org https://www.uncdf.org/article/4530](https://www.uncdf.org/article/4530)

¹²⁷ Monetary Authority of Singapore, *Fintech Regulatory Sandbox Guidelines* (November 2016) : [mas.gov.sg https://www.mas.gov.sg/media/MAS/Smart-Financial-Centre/Sandbox/FinTech-Regulatory-Sandbox-Guidelines-19Feb2018.pdf?la=en&hash=B1D36C055A641F580058339009448CC19A014F7](https://www.mas.gov.sg/media/MAS/Smart-Financial-Centre/Sandbox/FinTech-Regulatory-Sandbox-Guidelines-19Feb2018.pdf?la=en&hash=B1D36C055A641F580058339009448CC19A014F7)

¹²⁸ Martina Wiedmaier-Pfister and Hui Lin Chiew, *Regulatory Impacts Assessments: Microinsurance Regulations in Peru and the Philippines* (October 2017) p.4 : [impactinsurance.org http://www.impactinsurance.org/sites/default/files/MP49.pdf](http://www.impactinsurance.org/sites/default/files/MP49.pdf)

¹²⁹ Wiedmaier-Pfister, et al., 2016

¹³⁰ Cenfri interview

¹³¹ Cenfri interview

¹³² https://www.eiopa.europa.eu/content/eiopa-analyses-licencing-approaches-insurtech_en

¹³³ Claire Huang, *Business Times, Insurance can help Asia cut economic losses from disasters: MAS chief*, (August 2017) : [businesstimes.com.sg https://www.businesstimes.com.sg/banking-finance/insurance-can-help-asia-cut-economic-losses-from-disasters-mas-chief](https://www.businesstimes.com.sg/banking-finance/insurance-can-help-asia-cut-economic-losses-from-disasters-mas-chief)

¹³⁴ For more information visit [Asia Insurance Review Conference www.asiainsurancereview.com](http://www.asiainsurancereview.com) <https://www.asiainsurancereview.com/Archives/Conference-Dailies/SIRC/SIRC2018/Day2>

¹³⁵ Martina Wiedmaier-Pfister and Hui Lin Chiew, *Regulatory Impact Assessments: Microinsurance Regulations in Peru and the Philippines* (October 2017) p.29 : [impactinsurance.org http://www.impactinsurance.org/sites/default/files/MP49.pdf](http://www.impactinsurance.org/sites/default/files/MP49.pdf)

Regulators set particular requirements for inclusive insurance products, and in the Philippines, for example, premiums must be below 10.5% of the minimum wage. Initially, there was reluctance on the part of insurers in the Philippines to provide microinsurance as part of their portfolios of products. In response, an order was issued in 2012 relaxing capital requirements for insurers whose portfolios were comprised of at least 50% microinsurance products, directly incentivising insurers to provide microinsurance products.¹³⁶ By 2017, 31 million new microinsurance policies had been written in the Philippines, clearly demonstrating the effectiveness of the new regulatory framework.¹³⁷ It is clear that an impact-based adaptation of regulations within a clear overarching framework is a practice that is working in that context.

India – “Carrot and Stick” Approach

Microinsurance regulations were first issued in India in 2005 by the Insurance Regulatory and Development Authority of India (IRDAI), and the Indian Insurance Act 1938 was revised in 2015 to delegate more powers to the IRDAI to create regulations.¹³⁸ The IRDAI also issued an updated microinsurance regulation in 2015.¹³⁹ Some feedback from insurers contributing to this paper, however, has been that this regulation has implemented some additional constraints on potential entrants to the market, and that the usual framework for registration of an insurer or products is seen as more efficient.

There have been two key regulatory innovations recently implemented by IRDAI to improve access to insurance for those in need of it:

1. The Indian government has subsidised inclusive insurance for many years. Over time, the form of this subsidy has changed; whilst originally, the government subsidised claims after disasters occurred, now they subsidise premiums.¹⁴⁰
2. The government has made it mandatory for insurance companies to provide a certain percentage, as set by the IRDAI, of insurance to rural and social sectors.¹⁴¹ This is an approach favoured by many countries; for instance in Brazil, there is a bill currently awaiting congress’s final approval, which would make insurance for environmental risks mandatory.¹⁴²

The innovation in India’s approach comes from complementary regulation of those purchasing insurance products, alongside the abovementioned regulation of those providing insurance products. In this way, the IRDAI is effectively closing the protection gap from both sides (via insurers and insureds), as opposed to many other approaches which simply work top-down (via insurers only). It is softening this somewhat invasive approach by providing significant subsidies which, it is assumed, can slowly be reduced as the system stabilises.

South Africa – Legislation

In South Africa, microinsurance regulation has been recently enshrined into law. The new South African Insurance Act 2017 specifically provides for licensed microinsurance products, giving effect to the National Treasury’s Microinsurance Policy Document in an attempt “to introduce a legal framework for microinsurance to promote financial inclusion”.¹⁴³

South Africa’s innovative solution is one of simplicity – it brings microinsurance within the existing legal regime for insurance, while making specific modifications for microinsurance as necessary to ensure consumer protection and encourage companies to register as microinsurance providers. The requirements for microinsurers under the Insurance Act 2017 are less restrictive than those for regular insurers. For example, there is no requirement that microinsurers be public companies, as there is for other insurance companies. Microinsurers are also exempt from licensing restrictions and restrictions on providing both life and non-life insurance.¹⁴⁴ The Insurance Act 2017 also includes significant consumer protection measures, such as a 12-month maximum policy period, restrictions on waiting periods, and restrictions on exclusions.

Capacity-building

Although not a regulatory response *per se*, international organisations and fora can act as catalysts for enhancing regulatory responses, or sharing best practice in regulating for innovation. Such organisations can also act as convenors, providing the support to allow insurance providers and regulators to work together to foster innovation that is well-adapted to, and cognisant, of relevant regulatory frameworks. By way of example,

A2ii published a regulatory toolkit and survey to help regulators assess how enabling their legislation is for inclusive insurance and innovation.¹⁴⁶

Similarly, public entities can act as policyholders, pooling risks for certain regions or groups of individuals; such entities, however, might be subject to different regulatory treatment and may have some degree of autonomy in determining the rules that apply to them.¹⁴⁷ On the other hand, they might also be able to add much needed trust to the offering, particularly in the context of customers who have never purchased insurance before. This may be the only way to pool enough resources to follow through with a project to the point where the product is market ready, and public tender regarding the actual provision can be launched.

At the same time, however, there might be a certain bias towards private actors getting engaged with local authorities, posing a risk to the local stakeholders involved.¹⁴⁸ One key capacity-building organisation is the International Labour Organisation (ILO) through its Impact Insurance Facility. The Facility offers various training modules which address key skills gaps identified with practitioners. They provide this training through local partnerships in many emerging markets; these training modules are tailored to insurance practitioners, regulatory or supervisory authorities and other entities involved in the provision of microinsurance. One key training module option is the ‘Impact Insurance Academy’, which is a five-day module, involving training classes from the Facility’s experts in the field of microinsurance. It also provides the opportunity for microinsurance providers to present their products and gain feedback from other insurers and experts.

¹³⁶ Martina Wiedmaier-Pfister and Hui Lin Chiew, *Regulatory Impact Assessments: Microinsurance Regulations in Peru and the Philippines* (October 2017) p.35 : <http://www.impactinsurance.org/sites/default/files/MP49.pdf> / Micro Insurance Network, *The State of Microinsurance : The Insider’s Guide to Understanding the Sector*, 2015, p.20 microinsurancenet.org/sites/default/files/MiN_State%20of%20Microinsurance_0.pdf

¹³⁷ Martina Wiedmaier-Pfister and Hui Lin Chiew, *Regulatory Impact Assessments: Microinsurance Regulations in Peru and the Philippines* (October 2017) p.47 : <http://www.impactinsurance.org/sites/default/files/MP49.pdf>

¹³⁸ International Monetary Fund, *India : Technical Note on Insurance Sector Regulation and Supervision* (April 2018) p.4 : [imf.org](https://www.imf.org/-/media/Files/Publications/CR/2018/cr1886.ashx)

¹³⁹ https://www.irdai.gov.in/ADMINCMS/cms/frmGeneral_NoYearList.aspx?DF=RL&mid=26.1 Insurance Regulatory and Development Authority of India, *Microinsurance Regulations 2015* : irdai.gov.in

¹⁴⁰ <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/471931468179672837/undefined>

¹⁴¹ Insurance Regulatory and Development Authority, *Obligations of Insurers to Rural Social Sectors, Regulations* (2002)

¹⁴² ICLG, *Environment and Climate Change Laws and Regulations* (2020) : [iclg.com](https://iclg.com/practice-areas/environment-and-climate-change-laws-and-regulations/brazil)

¹⁴³ South African Government, *Insurance Act 18 of 2017* : [gov.za](http://www.gov.za/xh/node/776387)

¹⁴⁴ Republic of South Africa, *Government Gazette* (January 2018) : [gov.za](http://www.gov.za/sites/default/files/gcis_document/201801/41388gon32insuranceact2017.pdf)

¹⁴⁵ Micro Insurance Network, *The State of Microinsurance: The Insider’s Guide to Understanding the Sector* (2017) p.40 : [microinsurancenet.org](https://www.microinsurancenet.org/sites/default/files/State%20of%20Microinsurance%202017_Microinsurance%20Network.pdf)

¹⁴⁶ International Association of Insurance Supervisors, *Review on Regulation and Supervision supporting Inclusive Insurance Markets* (October 2017) : [a2ii.org](https://www.a2ii.org/index.php/en/media/156/download)

¹⁴⁷ InsuResilience Secretariat, D. Stadtmüller interview

¹⁴⁸ Munich Re, M. Roth interview

Conclusion and Key Findings 4

The Facility's 3-D Client Value Assessment Tool allows insurers to measure the value of their agricultural index insurance products. It uses a wide range of indicators provided by a combination of the Facility's PACE tool, and the Feed the Future Innovation Lab for Assets and Market Access's (AMA Innovation Lab) calculations for Minimum Quality Standards, to provide a comprehensive understanding of the value of the product. There are different versions of this tool, adapted for both existing and proposed index-based insurance products, so it can assist with either analysis of the viability of products pre-product launch, and/or improvement of products' pre-product launch already on the market. There are various tools provided by Impact Insurance alongside the 3-D Client Value Assessment

Tool, which assist with inputting data to achieve an accurate assessment, such as guidance on analysing data for each indicator.

The Facility's capacity-building self-assessment guide for microinsurance providers is a questionnaire which allows insurers to self-assess their readiness to start microinsurance activities. It consists of questions which identify further knowledge required by insurers prior to starting microinsurance activities, as well as questions which identify any weaknesses in insurers' existing microinsurance products. This enables insurers to address any gaps in their knowledge and to improve their existing microinsurance products.

4

Conclusion and Key Findings

Insurers, governments, and others who seek to better serve consumers at the micro-level, should continue to think carefully and innovatively about how technology can be a force multiplier in closing the protection gap. In doing so, we must all focus on the consumers' needs, abilities and resources.

As discussed, there are numerous technological developments that provide new opportunities, but these raise a variety of commercial, legal and regulatory issues. In the space of this paper, it is only possible to

provide a partial review of the opportunities and challenges in this area.

We urge action by all relevant stakeholders. In doing so, we believe the following key findings from this paper should be kept in mind:

- Technology is a tool, and a powerful one when used appropriately; but it is not a solution in itself.
- Insurers need to carefully consider the products and services which are needed in any given market. There will be significant differences between – and within – markets, so due consideration should be given to the different needs and interdependencies between low income and emerging middle income segments.
- The use of technology must match the technological skills and resources of the target market.
- A combination of technology and human interaction or “boots on the ground” has proven most effective in developing markets.
- Insurance regulation must evolve to accommodate and appropriately regulate InsurTech and other innovations. Regulators need appropriate technological resources and skills themselves.
- Regulatory sandboxes and regulatory dialogue at national, regional, and global levels are important; the IAIS, A2ii, and several regulatory jurisdictions, are taking important steps in this regard.
- The insurance industry needs to engage with regulators to educate them about technological developments and other innovations.
- Data collection and use raise many regulatory and legal issues that must be considered by industry and regulators.
- The global nature of data calls for a coordinated approach, where possible, to global learning and supervision.
- The insurance sector needs to build and maintain trust among consumers, regulators and other stakeholders.

There is tremendous scope for the insurance sector to help close the protection gap that exists at the micro-insurance level. Real progress in this area will depend on those

actions tailored to meet individual market needs. Technology can have a significant and positive impact in supporting this action – we hope this paper helps demonstrate how.

Glossary of terms and abbreviations

– A2ii (Access to Insurance Initiative)

A global partnership with the mission to inspire and support supervisors to promote inclusive and responsible insurance, thereby reducing vulnerability.¹⁵³

– AI (Artificial Intelligence)

The study of how to produce machines that have some of the qualities that the human mind has, such as the ability to understand language, recognise pictures, solve problems, and learn.¹⁵⁴

– Big Data

Very large sets of data that are produced by people using the internet, and that can only be stored, understood, and used with the help of special tools and methods.¹⁵⁵

– Chatbot

A computer program designed to have a conversation with a human being, especially over the internet.¹⁵⁶

– Data Analytics

The process of inspecting, cleaning, transforming, and modelling data with the goal of discovering useful information, trends and conclusions.

– Deep Learning

A type of artificial intelligence that uses algorithms (sets of mathematical instructions or rules) based on the way the human brain operates.¹⁵⁷

– FinTech (Financial Technology)

A term that refers to the companies providing software, services, and products for digital financial services: often used in reference to newer technologies.¹⁵⁸

– IAIS (The International Association of Insurance Supervisors)

A voluntary membership organisation of insurance supervisors and regulators from more than 200 jurisdictions in nearly 140 countries. The mission of the IAIS is to promote effective and globally consistent supervision of the insurance industry in order to develop and maintain fair, safe and stable insurance markets for the benefit and protection of policyholders and to contribute to global financial stability.

– IDF (Insurance Development Forum)

The IDF is a public/private partnership led by the insurance industry and supported by the United Nations, World Bank and other international organisations which aims to optimise and extend the use of insurance and its related risk management capabilities to build greater resilience and protection for people, communities, businesses, and public institutions that are vulnerable to disasters and their associated economic shocks.¹⁵⁹

– Inclusive insurance

Products designed to sell insurance to the under or uninsured but not specifically focused on a low-income target market, as with microinsurance. “Inclusive insurance” is used broadly in this Application Paper, denoting all insurance products targeted to the excluded or underserved market, rather than just those for the poor or a narrow conception of the low-income market.

– Index-based insurance

An insurance contract: (a) under which the liability of the insurer to make a payment to the policyholder is triggered by, and the amount of that payment is determined in accordance with, one or more indices, rather than on an assessment of the policyholder's actual loss; and (b) where the payment is designed to provide a level of compensation, although not necessarily an indemnity, to the policyholder in respect of either or both of the following – (i) losses, including consequential losses, that the policyholder is expected to suffer; or (ii) costs, including mitigation costs, that the policyholder is expected to incur, in the event that payment is triggered by the index.¹⁶⁰ Also see parametric insurance

– InsurTech (Insurance Technologies)

An insurance company, intermediary or insurance value chain segment specialist that utilises technology to either compete or provide valued-added benefits to the insurance industry.¹⁶¹ InsurTech is the insurance-specific branch of FinTech that refers to the variety of emerging technologies and innovative business models that have the potential to transform the insurance business.¹⁶²

– IoT (The Internet of Things)

A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.¹⁶³

– Machine Learning

The capacity of a computer to learn from experience, i.e. to modify its processing on the basis of newly acquired information.¹⁶⁴

– Microinsurance

Risk pooling products that are intentionally designed—in terms of costs, coverage, distribution, and marketing—for individuals, families, and businesses earning between \$2.00-\$20.00 a day.

– MNO (Mobile Network Operator)

An operator that manages one or more mobile networks.¹⁶⁵

– M-insurance (Mobile insurance)

Any insurance that is sold or subscribed to through a mobile phone and/or in partnership with a mobile network operator (MNO).

– Parametric (index-based) insurance

Insurance contracts in which a claim is defined with reference to a predetermined index.¹⁶⁶

¹⁵³ For more information visit a2ii.org <https://a2ii.org/>

¹⁵⁴ Definition from the Cambridge Dictionary : [dictionary.cambridge.org](https://dictionary.cambridge.org/dictionary/english/artificial-intelligence) <https://dictionary.cambridge.org/dictionary/english/artificial-intelligence>

¹⁵⁵ Definition from the Cambridge Dictionary : [dictionary.cambridge.org](https://dictionary.cambridge.org/dictionary/english/big-data) <https://dictionary.cambridge.org/dictionary/english/big-data>

¹⁵⁶ Definition from the Cambridge Dictionary : [dictionary.cambridge.org](https://dictionary.cambridge.org/dictionary/english/chatbot) <https://dictionary.cambridge.org/dictionary/english/chatbot>

¹⁵⁷ Definition from the Cambridge Dictionary : [dictionary.cambridge.org](https://dictionary.cambridge.org/dictionary/english/deep-learning) <https://dictionary.cambridge.org/dictionary/english/deep-learning>

¹⁵⁸ International Telecommunication Union, *Digital Financial Services Glossary* (2017) : [itu.int](https://www.itu.int/en/ITU-T/focusgroups/dfs/Documents/201701/ITU_FGDFS_DFS-Glossary.pdf) https://www.itu.int/en/ITU-T/focusgroups/dfs/Documents/201701/ITU_FGDFS_DFS-Glossary.pdf

¹⁵⁹ For more information visit [insdevforum.org](https://www.insdevforum.org/about) <https://www.insdevforum.org/about>

¹⁶⁰ National Council for Law Reporting Library, *Kenya Gazette Supplement* (2019) p. 589 : [kenyalaw.org](http://kenyalaw.org/kl/fileadmin/pdfdownloads/AmendmentActs/2019/Insurance_Amendment_Act_No.11of2019.PDF) http://kenyalaw.org/kl/fileadmin/pdfdownloads/AmendmentActs/2019/Insurance_Amendment_Act_No.11of2019.PDF

¹⁶¹ Sia Partners, 2016

¹⁶² International Association of Insurance Supervisors, *FinTech Developments in the Insurance Industry* (February 2017) p.4

¹⁶³ Calum McClelland, *What is IoT? A Simple Explanation of the Internet of Things* (July 2020) <https://www.iotforall.com/what-is-iot-simple-explanation/>

¹⁶⁴ Definition from the Oxford English Dictionary : [oed.com](https://www.oed.com/view/Entry/111850) <https://www.oed.com/view/Entry/111850>

¹⁶⁵ Definition from the ITU : [itu.int](https://www.itu.int/net/ITU-R/asp/terminology-definition.asp?lang=en&riink=[F571D60A-CBCE-408A-A452-8F685830B913]) [https://www.itu.int/net/ITU-R/asp/terminology-definition.asp?lang=en&riink=\[F571D60A-CBCE-408A-A452-8F685830B913\]](https://www.itu.int/net/ITU-R/asp/terminology-definition.asp?lang=en&riink=[F571D60A-CBCE-408A-A452-8F685830B913])

¹⁶⁶ International Association of Insurance Supervisors, *Issues Paper on Index Based Insurances Particularly in Inclusive Insurance Markets* (June 2018) p.12 : [iaisweb.org](https://www.iaisweb.org/page/supervisory-material/issues-papers/file/75169/issues-paper-on-index-based-insurances-particularly-in-inclusive-insurance-markets#) <https://www.iaisweb.org/page/supervisory-material/issues-papers/file/75169/issues-paper-on-index-based-insurances-particularly-in-inclusive-insurance-markets#>

Glossary of terms and abbreviations

– P2P (Peer-to-Peer) Insurance

Platforms allowing groups having common interests to negotiate coverage in "communities."¹⁶⁷

– Predictive analytics

The use of data, statistical algorithms and machine learning techniques to identify the likelihood of future outcomes based on historical data.¹⁶⁸

– Remote-sensing

The process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance from the targeted area.¹⁶⁹

– Straight Through Processing

Automated processing of a series of operations, throughout the execution chain and by a single data entry.¹⁷⁰

¹⁶⁷ International Association of Insurance Supervisors, *Report on Fintech Developments in the Insurance Industry* (February 2017) p. 15 : [iaisweb.org](https://www.iaisweb.org/file/65625/report-on-fintech-developments-in-the-insurance-industry)
<https://www.iaisweb.org/file/65625/report-on-fintech-developments-in-the-insurance-industry>

¹⁶⁸ Definition from SAS Insights : [sas.com](https://www.sas.com/en_gb/insights/analytics/predictive-analytics.html) https://www.sas.com/en_gb/insights/analytics/predictive-analytics.html

¹⁶⁹ Definition from the USGS (U.S. Geological Survey)

¹⁷⁰ Definition from FranceTerme : [culture.fr](http://www.culture.fr)

<http://www.culture.fr/franceterme/result?francetermeSearchTerme=Straight-Through+Processing>

