

# How Technology Can Make Insurance More Inclusive



**FINANCE, COMPETITIVENESS  
& INNOVATION  
GLOBAL PRACTICE**

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# Table of Contents



<b>Acknowledgements</b>	<b>III</b>
<b>Introduction</b>	<b>V</b>
<b>1. The Potential of Technology in Insurance</b>	<b>1</b>
<b>2. Why So Many People are Currently Not Served by Insurance</b>	<b>3</b>
<b>3. InsureTech Overview</b>	<b>7</b>
Section 3.1 – Peer-to-Peer insurance	8
Section 3.2 – Blockchain technology	11
Section 3.3 – Concierge Distribution and robo-advice	13
Section 3.4 – Insurance on Demand	15
Section 3.5 – Machine learning, artificial intelligence and big data	17
Section 3.6 – Wholehearted digitization, and the “digitally born insurer”	21
<b>4. Risks</b>	<b>25</b>
<b>5. Recommendations</b>	<b>29</b>
<b>Endnotes</b>	<b>43</b>





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# Introduction



New technologies have influenced everyone's lives since the iPhone came to the market in 2007. Much more than a telephone, the smartphone immediately offered the possibility for remote but connected capture and transformation of data. Capture and transformation of data is at the core of insurance, so the growing community of microinsurance practitioners was excited about the possibilities to overcome administrative obstacles that contributed to exclude the most vulnerable populations from functioning insurance markets. These hopes were generally disappointed in the following years. Smartphones were still rare and expensive, mobile network operators were only just starting to widen their footprint, and attempts to creatively harness the new technology were constrained by limited budgets and expertise of projects often run by people with more experience in poverty alleviation than in insurance or IT.

A lot has changed since 2007. Smartphones have become affordable for taxi drivers, rural doctors and informal street vendors, and are ubiquitous in developed countries<sup>1</sup>. There are apps for everything, and creating a new one does not require large budgets. Mobile banking (on smartphones or feature phones) is providing a reliable and cost effective channel to transact payments with 500 million people, most of them excluded from conventional banking; this matters because transacting payments is the other core pillar of insurance. Furthermore, the growing use of smartphones is generating new types and amounts of data even from people who have scant data trails in formal systems of national identification or credit rating schemes. In parallel, tools to make sense from these overwhelming amounts of unstructured "big" data have emerged, for example in the form of machine learning. This is just one field of artificial intelligence, which is increasingly used in insurance.

On microinsurance ventures and the general effort to make insurance more inclusive where it is most needed, the impact of the technological changes that are transforming insurance has not yet been very noticeable beyond insurance transacted via mobile network operators. Projects and practitioners of inclusive insurance still find it hard to justify large budgets for innovative technology and cutting edge expertise. But as FinTech reached the insurance industry to give birth to "InsureTech", it is insurance companies in the most mature markets who have embarked in the journey to harness new technology in order to provide better products, services and experience to more and new clients. The considerable potential of this endeavor attracts growing numbers of startups and venture capital dollar millions. These efforts are not primarily directed

towards low income households and businesses in emerging countries. But, as will be argued on the following pages, they hold the potential to overcome barriers to inclusive insurance when suitably transferred to emerging countries.

This time it will be different. Attempts in the first post-iPhone decade to use technology to make insurance more inclusive had the vision and objective but lacked funding and expertise. There is no shortage of funding and expertise in InsureTech, but the focus is mostly on mature markets and on people not actually excluded from existing markets. Expanding this focus to also embrace inclusive insurance in developing countries can be transformative for financial inclusion and the reduction of vulnerability required to escape poverty.

The conception of this note precedes – but complements – documents and events that have since contributed to highlight the relationship between inclusive insurance and new uses of technology, such as the International Association of Insurance Supervisors’ Report on FinTech Developments in the Insurance Industry and upcoming application paper on the use of digital technology in inclusive insurance, various Public Private Dialogues for Inclusive Insurance organized by the Mutual Exchange Forum on Inclusive Insurance, or the Consultative Forum on InsureTech rising to

the regulatory challenge by the Access to Insurance Initiative. Various updates of InsureTech market development briefings have also been published. In 2016, InsureTech and inclusive insurance existed in ecosystems that rarely overlapped, and there was scant discussion on how one could benefit the other. The purpose of this note is to help bridge this gap, by providing a concise overview of the main lines of InsureTech considered relevant for inclusive insurance in emerging markets and developing countries, suggesting how they can contribute to inclusion there, and pointing out some of the risk that regulators and supervisors in particular should be aware of. These InsureTech themes are: (i) Peer-to-Peer insurance; (ii) Distributed Ledger Technology; (iii) “Concierge Distribution”; (iv) Insurance on Demand; (v) Machine learning, artificial intelligence and big data; and (vi) “Wholehearted Digitization”.

A concise overview of a wide and diverse topic cannot also provide in-depth exploration. That contributes to explain why this note continues to be accurate, but it also means that in several aspects it can only provide a high level overview. More detailed discussions of particular topics will be warranted in the future. Recent developments suggest that client data protection is prominent among them.



# 1.

## The Potential of Technology in Insurance



### **Insurance has long been vulnerable to glitches in manual paper-based processes.**

In July 2009, torrential monsoon rains flooded the premises of a printing business in Karachi that produced the enrolment forms for health microinsurance that provided cover to tens of thousands of low income households in Pakistan's remote north. Not being able to print the forms in time for the enrolment window, which was determined by agriculture driven cash cycles, led to a serious setback of the program's scale and sustainability. Some months later, a forgotten box of claims forms was found at the program's health care providers, distressing the financial forecasts of various players along the value chain. Some years earlier, the destruction of the World Trade Center in New York had led to litigation, still ongoing in 2009, to determine whether the two planes constituted one or two insured events. This uncertainty, which implied 3.5 billion USD difference in insurance payments, was caused in part by the various fax transmissions of policy forms shortly before the attacks. These are just some examples that highlight the vulnerabilities of paper-based processes in insurance.

### **The intangible nature of insurance suggests that it should be thoroughly digitizable, but that potential is rarely achieved today.**

The processes underlying the provision of insurance center on the transfer of information and money. Information about the risks to be insured and the conditions for their insurance are exchanged between the insurance company and its client, and eventually constitute the legal basis for the parties' rights and obligations, which notably include payment of premium and claims. But despite the potential for digitization, insurance worldwide is still dominated by paper based processes. This is because insurance is a relatively old industry, with the largest insurers dating back to the 19th century. Also much younger and smaller insurers have legacy systems and procedures that caution against radical change, and which by and large work to serve existing markets. It is difficult to imagine the provision of insurance without computers today, but their more or less extensive use coexists with manual processes based on paper. The cost this implies puts a lower limit on the size of an insurance policy that can be offered sustainably, and requires patience from customers. Apart from the early implementation of computers which now constitute legacy systems that are not easy to replace, other reasons for the limited digitization of insurance include regulatory constraints, cybersecurity and data protection, and the acceptance by some customer groups which might even face digital exclusion if paper based processes are replaced by digital ones too quickly.

**The insurance industry has variously embraced technological innovation, but the impact on the way it interacts with customers has been limited.**

For example, leading reinsurance companies in the early 90s embraced the tools of artificial intelligence available at the time to create automatic underwriting systems for life and disability insurance. Assessing the insurability of persons with adverse medical history or certain pastimes is a task done by highly specialized underwriters, and their scarcity has been a limiting factor for wider outreach of insurance especially in developing markets. “Expert System” software allowed to codify the heuristics used by these specialists into decision making algorithms, which could furthermore be deployed to the point of sale, shortcutting the traditional exchange of special questionnaires for special conditions and allowing also high sums to be insured on the spot well before the omnipresence of the internet. This technology was crucial for the spread of enhanced annuity products<sup>2</sup> but remained limited to niches. During the dot-com bubble of the late 90s, several insurance related ventures attempted primarily to bring insurance advice and distribution online. Some online comparison sites evolved from there, but few ventures survived when access to capital dried up. In 2013, research by the Boston Consulting Group and Morgan Stanley showed that consumer satisfaction with online experience of insurance lagged considerably behind that of most other industries<sup>3</sup>. Until recently, technological advances have not questioned the core business model of how insurers serve their clients. But Inga Beale, CEO of Lloyds of London, writes:

*“It is no secret that as an industry we are lagging behind the rest of financial services when it comes to digitalization and the use of new technologies. There are no more excuses. If we don’t adopt and embrace new technology, we won’t have a future.”<sup>4</sup>*

**“InsureTech” denominates a recent trend that aims to revolutionize how insurance is done.** Starting to get noticed in 2015 – that year’s InsureTech startup funding amounted to 2.65 billion USD – statements like “The insurance industry is on the brink of major technology-driven change”<sup>5</sup> and “insurance will change more in the next 5 years than in the last 100 years” are becoming more frequent. More than 1,300 global startups are focusing on technology applications to the insurance

industry<sup>6</sup>. This enthusiasm takes some momentum from the larger “FinTech” movement, to which The Economist dedicated a special report in May 2015. There is considerable expectation that FinTech will not only disrupt traditional business models but also contribute to financial inclusion; as Queen Maxima, the United Nations Secretary General’s Special Advocate for Inclusive Finance for Development, put it

*“The rise of fintech is revolutionizing finance and creating significant potential to spur financial inclusion. Fintech innovators can increase efficiency by making products and business processes cheaper, better, and faster. They can promote more customer-centric financial products. They can really improve the customer experience. They can link finance with other development areas such as access to water, electricity, and health care. Finally, they can improve the cost, transparency, and time lags of financial supervision and regulation.”<sup>7</sup>*

In fact, many InsureTech ventures, even though focused primarily on developed markets so far, could be considered to pursue an inclusion agenda, as they aim to attract people and businesses to insurance who, while not outright excluded, have not been attracted to traditional insurance markets and models.

**The importance of a more comprehensive digitization of insurance business depends on the circumstances.** Despite increasing pledges of customer centricity, insurers in mature markets can continue to serve their traditional client groups as they have done in the past. This also includes the limited segments of society that insurers mostly serve in developing countries, people who also have bank accounts, mail addresses, and familiarity with filling forms. Their discontent with current insurance practices is moderate, and so is the motivation to invest heavily in technology and risk the uncertain outcomes of possible disruption. Reaching other customer groups, however, will require a different approach. In developed markets, such groups include millennials and adherents of the “Sharing Economy”. But in developing markets they include many more potential customers, such as the poor and the wide majority of the population not fully served by insurance so far: (emerging) middle classes, non-poor rural populations, and women.

## 2. Why So Many People Are Currently Not Served By Insurance



**Most people on the planet are excluded from insurance markets today.** Although the (re)insurance sector in OECD countries alone has about \$23 trillion of assets under management (that's about a quarter of global GDP), insurance penetration<sup>8</sup> varies widely across countries, from 36% (Cayman Islands) to 0.04% (Guinea)<sup>9</sup>. But as insurance penetration often reflects primarily commercial, industrial, engineering and mining activities in developing countries, this indicator sheds little light on the use of insurance by households, and it is difficult to quantify how many people currently have access to, and use, insurance. That is because insurance companies report premium volume to investors, supervisors and the public, but not usually the number of insurance policies they have in force or underwritten during a period, much less the number of unique individuals who hold these policies (this requires consolidating multiple policies). The few examples who appear to do that include the IMF's publication of the number of "policy holders with insurance corporations" in 2015 for 22 countries<sup>10</sup>, showing that 10% of people in Bangladesh have insurance, as do 4% of people in Rwanda, 1% of people in Mongolia, and 0.7% of people in Guinea.

**The reasons why insurance is not used by more people are well understood.** Considerable research has been conducted to understand the low usage of formal insurance, especially among vulnerable populations who are expected to benefit most from suitable risk management in their struggle out of poverty. While local particularities play a role, there are a number of common factors that explain low insurance uptake. They need to be understood to appreciate how suitable use of technology like that proposed by InsureTech ventures has the potential to overcome these barriers.

**Barriers to inclusive insurance (1): limited purchasing power.** In absolute terms, people with low income can spend less on insurance. They need lower insurance cover, as the overall value of their assets is lower, as is the loss of income due to death or disability. But the scalability of insurance premium is limited: while lower sums insured translate into proportionally lower actuarial risk premiums, the margins insurers need to add for administration, distribution and other expenses are not perfectly scalable, as there is a minimum cost incurred in the administration and distribution of any insurance policy.

**Barriers to inclusive insurance (2): limited understanding.** Numerous surveys in developing countries show that most people there never had any insurance, never

heard of it, and misunderstand it. Despite increasing efforts towards financial literacy of wider populations, that is not changing quickly. The focus of financial inclusion strategies and financial literacy efforts often is primarily on banking products – loans, savings, payment systems – which are more immediately relevant to most people, easier to understand, and easier to provide. They are comparable to the informal mechanisms that most unbanked people use to save or borrow. By contrast, insurance is a much more abstract concept which doesn't immediately relate to the various informal risk sharing mechanisms in use by low income communities.

**Barriers to inclusive insurance (3): limited trust.**

Even if they have no direct or personal experience with insurance, many people view it negatively. Publicly vented anger of policyholders dissatisfied with their insurer's claims service – often in relation to mandatory insurances, e.g. for cars or motorcycles – is difficult to judge for anyone with limited understanding of the basics of insurance. In countries with former state monopoly insurers, years of poor service have often tarnished the reputation of insurance so much that even after de-monopolization, markets have difficulty in rebuilding trust. Low income households are frequent victims of financial scams that exploit their limited financial literacy, so they are understandably wary. Poorly adapted processes to provide insurance to low income households often further add to disappointment and distrust, for example when insurance agents give up on rural communities and stop coming to collect premiums (resulting in involuntary policy cancellation) or when alternative distribution channels such as mobile network operators fail to explain product features thoroughly. Lastly, the conventional approach to insurance provision does not seek to interact with clients regularly; instead, they are contacted once a year to remind them of premium payment. This underdeveloped post-sales culture does not contribute to nurture the confidence of skeptical first time buyers.

**Barriers to inclusive insurance (4): unsuitable products.**

Given the lack of actuarial resources and statistics, insurance products in developing countries often replicate products in developed markets (disseminated by reinsurers). That may work for upper socioeconomic groups, people with cars, urban houses with property titles, and formal employment. But it

does not work for low income people, whose insurance needs cannot be met with products inspired by the US or Germany nor with local products “downsized” to a lower premium. Products for inclusive insurance need to be developed with good understanding of the target population's circumstances and needs as well as with insurance and actuarial expertise. When that is not the case, microinsurance products are not met with demand.

**Barriers to inclusive insurance (5): unsuitable distribution.**

Of all the aspect of insurance provision that need to be reengineered to make insurance work for low income people, distribution is the most critical. On the one hand, the cost per policy of traditional distribution – notably agents and brokers – makes it unsustainable for policies with low premiums. Unless the commission makes up a disproportionate share of the premium, these channels will not be able to serve emerging customers under this model of distribution, as their efforts cannot be remunerated appropriately. On the other hand, upfront investment cost (in product development, marketing material etc.) needs to be recouped from a very large number of policies when each has a low premium, making microinsurance an example of a high-volume-low-margin business model. But to achieve the high volume, very effective distribution is required. That usually requires partnering with third parties, and the management of this longer value chain can easily break down.

**Barriers to inclusive insurance (6): unsuitable business models.**

Most insurance companies in developing markets focus on insuring large commercial accounts and mandatory motor insurance. They are not experienced in selling to, and serving, very large numbers of individual policyholders, and are not experienced in administering millions of policies. Nor are they experienced in disaggregating the value chain and partnering with other players which can perform specific tasks better and more cheaply, for example explaining products, doing the enrolment paperwork, and collecting premium. Their processes are based on abundant use of people and paper, as pressure to increase cost efficiency and speed are low in markets where insurers still can grow nicely serving the upper classes only.

**To a surprising extent, InsureTech ventures in developed markets are driven by similar barriers.**

Even in the US and Europe, the use of insurance remains

behind its potential, because large numbers of people distrust conventional insurance business models and don't find their needs reflected by existing products and procedures. Most InsureTech propositions don't aim to make insurance work for people who are currently

excluded from formal insurance markets but focus on people who voluntarily remain underinsured in the existing models of insurance provision. But if they succeed at that, they also have to potential to overcome barriers to inclusive insurance.

### The G20 High Level Principles for Digital Financial Inclusion

- **PRINCIPLE 1:** Promote a Digital Approach to Financial Inclusion
- **PRINCIPLE 2:** Balance Innovation and Risk to Achieve Digital Financial Inclusion
- **PRINCIPLE 3:** Provide an Enabling and Proportionate Legal and Regulatory Framework for Digital Financial Inclusion
- **PRINCIPLE 4:** Expand the Digital Financial Services Infrastructure Ecosystem
- **PRINCIPLE 5:** Establish Responsible Digital Financial Practices to Protect Consumers
- **PRINCIPLE 6:** Strengthen Digital and Financial Literacy and Awareness
- **PRINCIPLE 7:** Facilitate Customer Identification for Digital Financial Services
- **PRINCIPLE 8:** Track Digital Financial Inclusion Progress

Numbers 2, 3, 5 and 6 seem particularly relevant and applicable to inclusive InsureTech, and provide guidance both to national and international discussions and knowledge sharing.



# 3.

## InsureTech Overview



**What’s really new about InsureTech is the branding, and the critical mass it attracts.** According to FinTech Weekly,

*“InsureTech or Insurance Tech are technologies and platforms that help optimize any of the principles for success or requirements of insurance. By extension: any company that provides insurance through the engagement of technology in a user-centric way.”*

Insurers have employed technology in the past, but what is different now is that previously unseen amounts of entrepreneurial creativity turn towards insurance and are met with previously unseen amounts of investor funding. Supporting factors are new insights in behavior, and recently maturing technologies and digital ecosystems such as artificial intelligence, distributed ledgers, or the analysis of big quantities of data, as well as demographic changes and faster progress towards customer-centric technology in other industries. After years of low IT investment, the insurance industry acknowledges a pent up need for new capabilities and technologies. Consulting companies and organizers of conferences further fuel the sense of paradigm shift, and supervisors are starting to address new questions systematically.

**InsureTech ventures can be clustered around a few major themes, not all of them equally relevant for inclusive insurance.** The themes that this report will focus on are:

- Peer-to-Peer insurance (P2P)
- Blockchain technologies
- “Concierge Distribution”
- Insurance on Demand
- Machine learning, artificial intelligence and big data
- Wholehearted digitization

The terminology is not standardized yet: in the media, the concepts are grouped in different ways (for example by including P2P under Insurance on Demand sometimes) and called different names (for example Distributed Ledger Technology instead of Blockchain, or Robo-Advice instead of (certain aspects of) Concierge Distribution).

Themes that will not be discussed here include the Internet of Things (including wearable devices and telematics) because they still rely on devices that low income populations in developing countries will find too costly, and the various ventures

that aim to help consumers navigate the complex landscapes of health insurance in the US and Canada. Neither will possible changes in insurance needs related to emerging technologies such as autonomous vehicles nor the increasing importance of cyberinsurance be discussed, assuming that their contribution to make insurance more inclusive in developing markets will likely be limited in the near to mid future.

### Section 3.1 – Peer-to-Peer insurance (P2P)

**P2P harnesses technology to connect the insurance experience with its roots in organized mutual solidarity.** Besides using savings, the mechanism most widely used by low income households in developing countries to cope with unexpected shocks is help from friends and family. While this help is often provided in a spontaneous way, more formalized arrangements of mutual help have evolved in many places, such as funeral societies, local health mutuals, and village based organizations. They all constitute organized forms of reciprocity that are more predictably reliable, and they are usually based on social capital and mutual trust of its members. Starting in 2010, German startup Friendsurance began replicating this concept replacing village or neighborhood communities with Facebook groups of friends who committed to help indemnify any member whose bicycle got stolen. This initial proof of concept evolved into partnerships with insurers who provide policies with higher than usual deductibles and mutual solidarity groups (organized by Friendsurance) who help their members pay the deductible in case of claim. Fueled by the success and media coverage of Peer-to-Peer lending in recent years, various other startups are testing various models of P2P insurance.

**P2P aims to bring trust back into insurance.** Dan Ariely, leading researcher and author of books on behavioral science, says

*“If you try to create a system to bring out the worst in people, you’d end up with one that looks a lot like the current insurance industry.”*

He says this in his function of Chief Behavioral Officer of Lemonade, a startup with initial P2P appeal, to emphasize the perceived conflict of interest between insurers and insureds that has so widely eroded trust between them. Many customers believe that insurers will do anything to deny a claim, and insurers worry that many customers

will submit fraudulent claims. Insurance is perceived as a zero-sum game in this mindset, and antagonism seems inevitable. P2P restructures risk pooling such that claimants know who will sacrifice income to compensate their loss, or such that they know that it is not the organizer of the insurance who will benefit when they don’t submit a claim.

**P2P hopes to reconcile the law of large numbers with the “law of small numbers” which states that trust does not extend beyond a limited number of persons.** The challenge of all attempts to base reliable insurance on existing trust networks (for example in the case of village based health mutuals) has been that the size of the initial solidarity group was too small to bear more than minor events, and that the law of large numbers that allows to statistically predict claims in insurance did not apply. This put pressure on these pools to scale up and include more members, but in doing so the original trust eroded and the inclination to overuse the cover increased, often to the point of rendering the scheme unviable. Another challenge of such small schemes has been that in addition to trust, expertise is required to run them effectively, but their small size makes the required resources unviable. P2P aims to overcome that with greater use of new technology like social media, which have made communities wider and more diversified for many people today.

**Insurance fraud adds to the cost of insurance, and by reducing the amount of fraudulent insurance claims with better alignment of interest, P2P suggests lower premiums without compromising on cover.** The Coalition Against Insurance Fraud estimates that in the US alone, insurance fraud amounts to at least \$80 billion a year across all lines of business. Fraudulently staged car crashes cost UK insurers an estimated 340 million £ per year<sup>11</sup>. Inspool, a P2P startup aspiring to “unite and reward polite drivers”, claims that 15-20% of conventional car insurance premium covers the cost of “boy racers”, that 5–15% account for false claims, and that “95% of people end up paying for the 5% of hooligans”<sup>12</sup>. Friendsurance’s model to bring high deductibles into otherwise conventional insurance policies serves the same purpose to reduce the incentive of fraudulent claims – often smaller claims that fraudsters hope will not merit thorough investigation – and this is why German insurers like the approach despite the lower premium they receive due to high deductibles. And even when not



fraudulent, small claims contribute disproportionately to an insurer's expense ratio, so encouraging people not to claim for damages that they can absorb well themselves – e.g. by peer pressure in P2P models – contributes to make insurance more cost efficient.

**Transparency is another distinguishing feature of P2P insurance.** Much distrust of consumers is owed to their perception that insurance premiums are unnecessarily high because of lavish office buildings and excessive executive pay. Inspool's advertising states that insurers' overheads are 10-25% and their profit margin 10-15%. So a transparent charging structure tends to be at the heart of P2P ventures. Lemonade will take exactly 20% of premium to cover its cost (and thereby risk not being able to recover upfront and other non-volume-proportional cost if the business volume falls short of expectations). Chinese P2P company TongJuBao takes 25% of the money pooled. Other P2Ps who don't have such a simple charging structure go to great lengths to explain pricing in detail.

**P2P also appears to disintermediate insurance.** The fact that there is an administrator who facilitates the peer risk pool can be eclipsed by the stronger emphasis on the pool members and their role (depending on the model) to decide which covers to provide and which claims to pay. Furthermore, conventional insurance distribution by agents or brokers is not seen in P2P insurance which relies on advertising, social media, word of mouth and social groups to spread awareness and attract more pool participants. This disintermediation further contributes to reduce cost.

**Disintermediation allows new responsiveness.** The greater involvement of risk pool members not only reduces cost, it also allows to provide insurance for risks that could not be insured previously under some models. As it is the customers themselves who bear the risk that premium will be insufficient to cover all claims, it is primarily their risk appetite and awareness which determines what covers are tested, allowing for more experimentation than with conventional insurers. While mostly applied to less vital covers such as "divorce first aid", this approach also allows to provide cover for serious risks that were previously not insurable.

**P2P has been portrayed as an evolution of mutual insurers.** In its Sigma report 4/2016, Swiss Re points out that

*"In many cases, mutual insurers were originally set up by specific socio-economic groups (such as farmers, fishermen and teachers) in the absence of suitable protection or savings solutions from the mainstream insurance sector. Where there is a great deal of ambiguity about the distribution of possible insured losses, risks may become uninsurable for commercial insurers or protection might become prohibitively expensive. Mutuels can often insure their member-owners at affordable premiums."<sup>13</sup>*

and highlights the similarities at least of small traditional mutuals with P2P, for example in respect of members' rights and stake in generated surplus. However, the report also remarks that P2P will have to achieve significant scale if the concept is to compete noticeably with conventional insurance. Widespread adoption of blockchain technology (Section 3.2) may help achieve that scale, as this technology is well suited to support disintermediated financial services such as Bitcoins.

**P2P shares many similarities with Islamic Insurance (Takaful).** Under the Wakala model of Takaful, peers form and join a risk sharing arrangement and delegate the administration to a Wakeel who has the specialized expertise to do that efficiently. The Wakeel is paid an administration fee while all surplus generated by members' contributions exceeding claims payments reverts to the members. The Wakeel thereby has no incentive to deny claims, and (in theory) the expenses associated with running a Takaful scheme are transparent. One significant difference to P2P is that when the funds collected from members are not sufficient to pay all legitimate claims, the Wakeel has to provide an interest-free loan to the pool which is repaid from future surpluses. Nevertheless, the general features that distinguish P2P from conventional insurance (transparency, mutual solidarity, and the absence of profits based on others' misfortune) are likely to make the concept appealing also to Muslims, and the greater cost efficiency aspired by P2P can make it a viable model of microinsurance in the Muslim world.

**Various different models for P2P are currently being tested.** While most P2P operators are specialist intermediaries (between members, or between members and insurers), Lemonade provides an example of a venture initially (but no longer) branded as P2P with insurance license. Its business model differs

considerably from that of other P2P schemes in that risk is not borne by the members and surplus is not returned to them. Instead, surplus is donated to nonprofit causes of the customer's choice, so that Lemonade does not benefit from low claims. Not the outlook to get money back appeals to clients, but the promise of low expenses, convenient interaction (app and bot based), and the aspiration to provide "insurance as a social good rather than a necessary evil". While TongJuBao marks one end of the P2P continuum where no insurance company is involved (see Box), Friendsurance – who combine P2P elements with conventional insurance – and most other P2P propositions lie somewhere in between and are often intermediaries rather than underwriters.

**Some regulators have doubts about P2P.** They wonder if there can even be P2P insurance, or if both concepts are mutually exclusive. Are "P2P" models based on a conventional insurance license (like Lemonade's initial branding) substantially different from existing insurance, or is the P2P label primarily a marketing aspect? On the other hand, insurance regulators and supervisors have little sympathy for P2P that is not subject to insurance regulation and supervision, pointing to the obvious reasons why clients and financial markets need to be protected from unbridled entrepreneurship, all the more so if they are emerging customers and first time buyers of insurance. And even though P2P ventures try to differentiate themselves as much as possible from insurance as we know it, a spectacular failure risks tarnishing the reputation of the insurance industry as a

whole, with detrimental consequences for consumer trust. Where regulation is in place that requires insurance premium and conditions to be submitted for approval by supervisors – for example to assess client value or check for possible discrimination of customer groups – it may conflict with P2P's tailor-made approach to the cost of insurance. The protection of customer data also requires particular attention in P2P insurance. The National Association of Insurance Commissioners in the US thinks that

*"Although, P2P insurance could and should be regulated like any other insurance company within the existing regulatory framework of state regulation, this innovative model of managing and delivering insurance products presents a new challenge for state insurance regulators to study its strengths and weaknesses as well as its differences from traditional insurers."<sup>14</sup>*

The fact that the majority of P2P ventures operate within existing insurance regulation documents their efforts to comply with the rules but hampers their ability to implement genuine P2P models that transcend conventional insurance. International experience with the TongJuBao model will show if P2P can work outside of insurance regulatory frameworks.

**P2P holds promises for more inclusive insurance.** In the developed markets where it is being tested so far, P2P models justify their approach with alleged widespread rejection of conventional insurance which leads many

## A Radical Approach To P2P Insurance – The Example Of TongJuBao

Launched in 2015, the Chinese company TongJuBao provides an example of P2P without any insurance company involved, showing the possible degree of disintermediation. Instead of partnering with or intermediating for insurers, TongJuBao is a matchmaker for people willing to join a common risk pool under an arrangement governed solely by civil law contracts. In addition to the matchmaking, TongJuBao also provides administration of the risk pools (using apps and chatbots to facilitate transparency and ease of interaction), but legal entitlement of pool members is only among themselves, not towards TongJuBao. The company believes that this or a similar model will also work outside of China and is preparing to launch in France and the US, where 85% of surveyed persons have reacted very positively to the value proposition.

TongJuBao provides a good example of how the absence of insurance formalisms can result in new covers that respond to users' needs, and has gone further than other P2P ventures to establish mechanisms like discussion boards and voting procedures to implement new cover ideas (even when they are not endorsed by a majority). One example is the child safety cover: it addresses the threat that children are abducted for child trafficking, an event of low likelihood but very high severity. Should that happen to a family, additional resources to employ private investigators in addition to the standard police procedure can greatly increase the probability that the child is recovered, but most families do not have the means for that. This is where TongJuBao's cover makes the difference, providing money for extra search efforts also to families of modest income.

to remain uninsured or underinsured. The reasons for this rejection are similar to demand obstacles for inclusive or micro insurance in developing countries: lack of trust in commercial insurers, preoccupation about fair prices and conditions, the absence of covers that respond to consumers' needs, and premium that many deem unaffordable. So far, P2P ventures in developing insurance markets are few, with examples in Colombia (Wesura) and South Africa (Riovic's partnership with PeerCover) in addition to China. One likely explanation is the uncertainty about what degree of true P2P risk pooling will be acceptable to regulators and consumers, given that almost all current schemes are very young and untested.

Given that mutual solidarity is much better understood than formal insurance in many of the microinsurance target populations, portraying conventional insurance more as P2P (like Lemonade does) could facilitate understanding and acceptance of first time buyers. Rather than implementing novel business models, this requires insurers to make an effort to increase the sense of mutuality – possible for example in profit sharing arrangements of group life – and the transparency of their operations, and seek ways to be perceived more as administrators of risk pools (like the Wakeel in Takaful) than as parties who benefit from rejecting claims.

### **Section 3.2 – Blockchain technology (also known as Distributed Ledger Technology)**

**Distributed Ledger Technology** refers to a novel and fast-evolving approach to recording and sharing data across multiple data stores (or ledgers). This technology allows for transactions and data to be recorded, shared, and synchronized across a distributed network of different network participants. A 'blockchain' is a particular type of data structure used in some distributed ledgers which stores and transmits data in packages called "blocks" that are connected to each other in a digital 'chain'. Blockchains employ cryptographic and algorithmic methods to record and synchronize data across a network in an immutable manner<sup>15</sup>.

**Blockchain technology enables digital assets.** Based on cryptography work from the 1990s, the concept of a distributed ledger managed autonomously on a peer to peer computer network was operationalized in 2008 and put to practice with the digital currency Bitcoin in 2009, when the technology overcame the "double

spending" challenge. Until then Digital Assets could not be exchanged in a peer-to-peer manner, as there was no effective way to ensure that the digital asset is indeed in the possession of "sender" and has not already been sent across to another person/entity. Blockchain has the potential to become for assets and transactions what the internet is to information.

**Blockchain technology has the potential to reinvent trust.** Central to the concept of a distributed tamper-proof and fully auditable ledger is the absence of a trusted intermediary. Instead, parties participating in blockchain based transactions (e.g. payment with Bitcoins) trust the system. That allows to do transactions with strangers without risking counterparty default, a risk traditionally mitigated by (central) banks, PayPal, stock exchanges, or insurance companies. It explains why The Economist calls blockchain technology a "trust machine"<sup>16</sup>. Not needing a trusted intermediary reduces the cost of transactions and expands the universe of people you can transact with, for example in respect of remittances or in the context of the "sharing economy" (where blockchain based contracts can formalize lending relationships and thus make them accessible to insurance<sup>17</sup>). But blockchain technology also offers the potential to reduce operating costs of transactions that so far require verification, as currently tested regarding the exchange of data between reinsurance and insurance companies<sup>18</sup>.

**Blockchain-based trust could support disintermediation also in insurance.** Insurance companies are an example of trusted intermediaries that guarantee that the risk pool that I have been contributing to will honor my claims when I deserve compensation. Where this guarantee is instead based on individual contracts under civil law between all members of a risk pool – like with TongJuBao – the role of the insurance company may seem obsolete, but basing risk pools on individual contracts between all of their members seems cumbersome; and even in the P2P case there is often an administrator to perform some tasks that require trust, e.g. in relation to claims adjudication. Blockchain suggests that (P2P) risk pools can be conceived without any intermediary (but possibly with some form of reinsurance), based on a more efficient form of contract between all participants.

**Blockchain technology allows "smart contracts".** Contractual relationships documented in computer code can include elements that conditionally auto-execute.

For example, a life insurance contract fully represented in a blockchain resident in a computer network linked to a web-based publication of death certificates could trigger payment automatically when the death certificate of the insured person is uploaded. Or a smart index insurance contract linked to sources of weather data such as satellites or automated weather stations could autonomously trigger payment when the insured index crosses the defined thresholds, having verified that the policy was in force and that the premium had indeed been paid. Such elements of self-execution promise (further) cost reduction both in conventional insurance (various re/insurance companies are already testing blockchain applications, including for microinsurance<sup>19</sup>) and in P2P (ventures based on blockchain are emerging). It also increases speed of transactions, addressing a common complaint of insurance customers. A prototype of blockchain-based insurance for flight delays has been developed by InsureETH<sup>20</sup> with flight delay information fed directly from the web.

**Blockchain also allows conditional use of payments.**

Remittances and insurance payments in conventional currency can be used to purchase anything. Payouts from health insurance can be used to pay rent, and payouts from agriculture insurance can be used to pay school fees. While in some circumstances that may not matter, in others it does. The impact on family health, for example, may not develop as anticipated if health insurance payments are not used towards health care. But even when they are, the outcome may still fall short of expectations if the payouts are used for substandard health care or counterfeit pharmaceuticals. Payouts of blockchain based insurance can be conditional on the use, for example that health care services are procured at quality-certified empaneled providers. Conditionality of payments can even go further up the value chain, by guaranteeing for example that health care providers procure pharmaceuticals from quality-guaranteed supply chains. Furthermore, insurance executed via smart contracts could automatically generate statistics on its use – when do most car accidents occur in which part of the city, when do diagnoses and treatment for a particular disease peak – that could themselves trigger actions related e.g. to redesign of the insurance cover or to reinsurance when combined with suitable data analytics.

**Insurance regulators started discussing blockchain applications.** As noted above, pure P2P risk pooling

arrangements will often not be considered insurance if there is no licensed insurance company involved and product conditions and rates have not been approved. Blockchain-based arrangements involving a licensed insurer, on the other hand, are yet to prove their cost/benefit advantage. The legality and enforceability of a blockchain based contract is unclear at present, as is the legal entity corresponding to a blockchain based arrangement. Hence an administrative step might be required to transform a contract based on blockchain code into a legal document in the conventional sense. Other concerns relate to the location and security of personal data that often is subject to data protection rules. And contracts that make claims payments automatically raise new questions about solvency requirements appropriate to safeguard the ability to honor all claims at all times, as well as the role of human judgement in claims adjudication. However, some regulators are encouraging the assessment of blockchain uses in less disruptive ways. For example, the UK's Financial Conduct Authority director of strategy and competition recently told the Financial Times they were

*“talking to firms thinking about how to apply that to financial services and how it could benefit consumers or indeed make the business of compliance easier”<sup>21</sup>*

**Blockchain technology can help overcome several of the barriers to inclusive insurance discussed in section 2.** The reduction of administrative friction and cost hopes to reduce the price of insurance (assuming the initial investments in blockchain technology are amortized over a large enough number of policies), thus alleviating constraints in the ability to pay. Expectations that blockchain can help reduce payment for fraudulent claims through crowd-sourced verification may further reduce the cost of insurance. Increasing the speed of processing – especially for claims – will benefit the customer experience. The blockchain premise, if properly understood, replaces trust in insurance companies – often challenged - by trust in a system and might eventually contribute to a more rational approach to risk management.

**The exploration of blockchain technology to insurance is nascent, and its impact on inclusive insurance will not be immediate.** But this exploration is pointing insurers in mature markets to consumer pain

points that are bigger obstacles to insurance inclusion in less developed markets. The transferability of the technology (apart from local regulatory aspects) means that substantial innovation, once prototyped and tested in developed markets, can provide a pathway for adoption in developing markets with appropriate modifications to take into account local context.

### **Section 3.3 – Concierge Distribution and robo-advice (also referred to as platform based models)**

**Concierge Distribution is the evolution of price comparison websites for insurance.** It is provided by smartphone applications which not only promise to help buyers find the best price for the insurance they are looking for, but also to help them realize what insurance they are – or should – be looking for, often involving chatbots which support the customer in this needs assessment (hence the term “robo-advice”). Simplified enrolment and underwriting with cooperating insurers may provide increased convenience when the information required in insurance forms already resides in the app. This allows to streamline what is often experienced as a cumbersome process especially by digital natives accustomed to immediate transactions and high convenience. Additional services offered by some apps include the possibility to import already existing insurance contracts for easy retrieval and administration (for example to optimize or check for duplications of cover), and to receive reminders for premium due dates. Some apps even provide support when submitting claims, for example via chat and photographs. In health insurance, further service components can include the facilitation of doctors’ appointments and prescription management.

**Concierge Distribution thus aims to digitize core service components of insurance, to reduce cost and improve user experience.** Best advice based on customer needs assessments is a task traditionally performed by insurance brokers or agents who often have a long term trusted relationship with the client. Their services are appreciated but come at a cost and usually delay the process of acquiring insurance, and a majority of customers are no longer willing to pay for face-to-face services<sup>22</sup>. Disintermediation based on online comparison facilities and web-based self-enrolment has reduced the price of insurance but at the

cost of leaving people alone in their purchase decisions. Concierge Distribution and robo-advice harness new technologies to bring back assistance without the cost it used to carry (although some ventures combine chatbots with experts in callcenters). It also replaces paper-based with digital processes, increasing convenience for customers (accustomed to single sign in of cloud-based applications like the google/android ecosystem) and cost efficiency for insurance when systems are set up to appropriately interface.

**Concierge Distribution also promises to bring values to insurance that are important to new target markets.** While most customers like client-centricity, and convenient hassle-free immediate transactions, millennials in particular have come to expect that from any company they do business with. But insurance has been slower than other industries to meet these expectations: its customers interact only sporadically with their insurer, and are less satisfied with their interaction experience than customers of banks or retailers. Consumer satisfaction with online experience is particularly low for insurance, half that of airlines for example<sup>23</sup>. At the same time, consumers are increasingly accustomed to be in control of their financial and purchase decisions, in contrast to the traditional way of buying insurance which is often perceived as opaque. Being in control includes sharing feedback – negative if necessary – and thereby pressure service providers to pay due attention to their customers’ experience. Being in control also includes the possibility to easily switch service providers, something that has not been straightforward in conventional insurance. Ultimately, being in control means that consumers meet providers at eye level, an experience that has been the exception in insurance because of the asymmetry in understanding of technicalities.

**(Small) businesses may benefit even more from Concierge Distribution.** Managing the insurance needs of enterprises is considerably more complex than for households, especially if they operate in the formal sector with its various requirements for mandatory insurance. Large companies have specialists in charge of this task, and may negotiate favorable terms with insurers. Small businesses don’t have that advantage. SMEs operating in the informal economy may not comply with requirements for mandatory insurance but are still exposed to a number of personal and property

risks that are seldom well met in developing countries. CoverWallet for example is a US online broker offering Concierge Distribution services to (small) businesses, addressing covers like Workers Compensation and Directors & Officers liability.

**Concierge Distribution raises regulatory questions, in particular the robo-advice component.**

Distribution of insurance is subject to market conduct regulation in most jurisdictions, in particular the act of providing sales advice and making binding offers. The corresponding regulation usually requires special qualifications for people who sell insurance, often asking they be licensed. The liability for inappropriate advice – which can cost customers dearly when it leads to wrong insurance purchase decisions – tends to be clearly stipulated. This needs to be clarified for Concierge Distribution: are chatbots merely providing advice, or are they mediating insurance? Other issues to consider relate to rules about the protection of personal data. It is not obvious who owns the data provided to a Concierge Distribution app, nor where they reside and how securely they are stored. Furthermore, the claim that a Concierge Distribution app (and the call center staff when part of the service) provides truly independent advice and facilitates to buy the best possible insurance for a consumer’s needs and circumstances is not easy to verify for the consumer, who knows little about the incentive structures guiding the (human or robo) advice. Some InsureTech distribution startups merely provide potential customer leads to the insurers they partner with, or they are geared towards upselling, with little aspiration to best advice.

While the transparent comparability of insurance premiums is advantageous for consumers and can be expected to stimulate competition for lower rates and more generous conditions, this competition risks going too far and leading insurers if not to insolvency then to liquidity issues<sup>24</sup>. And Concierge Distribution inherently aims to commoditize insurance and be the primary brand and interface to (and owner of) the customer. While such white-label approach to distribution partnerships is not new, tends to be acceptable to insurers when the partner’s distribution potential is stronger than their own – for example when microinsurance is provided by mobile network operators-, it exposes the partnering insurer and the entire insurance industry to reputation risks from their

association with new and un- or differently regulated players in the value chain. Regulators in countries where such “m-insurance” has grown strongly are increasingly aware of the need to address this.

**Inclusive insurance can benefit in various ways from the concept and technology of Concierge Distribution.**

Bringing transparency to insurance products, prices and conditions can be expected to increase customers’ value for money, and improve affordability. Training, licensing and professional liability insurance contribute to make conventional distribution channels too costly to service the majority of low income or geographically remote populations. Regulatory requirements for disclosure (often requiring paper based information) and advice further increment the cost of distribution. Concierge Distribution can reduce cost in these areas, and with growing prevalence of smartphones can reach populations that other distribution channels have failed to serve sustainably. The customer-centric aspiration of Concierge Distribution can help overcome distrust, when the app and the chatbots or humans that provide the advice are perceived to genuinely advocate for the customer. It can also overcome the lack of understanding, when low cost communication technology such as chatbots can (repeatedly) explain the basics of insurance in general, and the particularities of a person’s cover, whenever they have any doubt and at typical pain points such as renewal or claims stage. This has the potential to make insurance less opaque and reduce understanding asymmetries that make first time buyers uneasy, while replacing the hassle of filling forms by providing information through interactive chats. Concierge Distribution furthermore not only aims to make buying insurance but also having and using insurance more pleasing. It could thus complement freemium and other insurances sold via mobile network operators in Africa and Asia which struggle with worryingly low utilization.

The innovative use of smart phones that characterizes Concierge Distribution (for example to make car insurance proposals based on a photograph of the license plate<sup>25</sup> is already being tested in other attempts to make insurance more inclusive<sup>26</sup>.

**m-insurance, that is simple insurance intermediated by mobile network operators (MNOs), could be considered a precursor of Concierge Distribution.** Predating the emergence of InsureTech, this form of

insurance is not supported by technology innovations beyond an (ideally) seamless integration of data administration platforms of the insurer, the MNO and usually also a technology service provider, and convenient payment of premiums and claims via mobile banking or airtime. This has reached many millions of emerging customers previously excluded from conventional insurance markets<sup>27</sup>. Increasingly, this growth (with its success stories and occasional failures) is motivating regulators to discuss frameworks to support responsible development of this market, often with support from the World Bank Group or the Access to Insurance Initiative. To achieve their objectives, these discussions need to include not only insurance regulators but also telecommunications regulators (because of the crucial role of MNOs) and central banks (because of the alternative payment methods). Stakeholders in these discussions would be well advised to take note of InsureTech developments outside their jurisdictions which may eventually reach their citizens, to provide an appropriate framework for digital insurance beyond m-insurance, which may turn out to be only a transition towards even less traditional forms of insurance provision.

### Section 3.4 – Insurance on Demand (IoD)

**Insurance on Demand questions why insurance cover has to be purchased in yearly doses.** The “sharing economy”, exemplified by AirB&B and carsharing businesses, has transformed the concept of property. It facilitates the temporary use of things and raises the question of their need to be permanently insured. IoD allows people to decide when they want insurance cover to start and to end, and to do that repeatedly during one year. For example, sporting equipment can be insured only when it will be used during the skiing season. Telematics – and even simple smartphone apps - allows to insure cars only when they are driven (also referred to as usage-based insurance), and other ways to insure rarely used cars only when needed are offered by InsureTech startups. Positioning itself in the context of the sharing economy, IoD ventures not only seek to benefit from a tendency that resonates with new target groups such as millennials, but also bet on substantial growth of the sharing economy. Safeshare, “the insurance solution for the sharing economy”, estimates that the sharing economy sector (including accommodation, car sharing, and online staffing) will grow from 15 billion USD in

2013 to 335 billion USD in 2025, matching the size of the traditional sector.<sup>28</sup>

**IoD also questions why insurance contracts have to provide all-inclusive cover.** Insurance against theft or damage of household items is usually provided for the entire content of the household. This includes both things that the owner deems worthy of insurance and those she cares less about. IoD offers customers to insure only what they care about. As additional benefit, it provides users with an inventory of their possessions and their worth.

**IoD works because it overcomes one main reason for annual insurance contracts.** Traditionally, establishing an insurance contract caused expenses that are mostly not proportional to the size (in terms of premium or sum insured) of the contract. The cost of transacting paper based information, transferring it from paper to IT, assessing the conditions for insurability, and invoicing insurance premium carried a minimum cost that made insurance for shorter durations unviable or expensive. But new more cost effective payment systems have overcome these limitations, and the use of mobile phone based banking makes payment of insurance premium sustainable even on a daily basis in places like Pakistan.

**Two technologies come together to enable IoD.** More cost efficient payment systems allow to buy insurance for cents at a time. And the omnipresence of smartphones provides the means to switch insurance cover on and off with hitherto unknown ease for both client and insurer, at marginal administrative cost. Applications on smartphones furthermore allow to add new items to the insured list, choose their sum insured and deductible, and to post claims and interact with the insurer in their settlement, all at very low cost if suitably digitized on the insurer’s end. In addition to connectivity, smart phones also bring cameras and geolocation to the use of insurance.

**This use of technology allows IoD companies like Trov to transfer the “sachet principle” to insurance.** The sachet principle was Unilever’s answer to the insight that the price of shampoo was not the main barrier for its use in subsistence marketplaces in India, but the risk implied by large bulk outlays for unknown products combined with liquidity constraints faced e.g. by day laborers. Shampoo was henceforth sold in increasingly smaller packages, leading to the single-serve sachets

that now constitute 70% of shampoo sales in India.<sup>29</sup> The best known transfer of this principle has been the availability of cellphone airtime in small amounts via scratch cards, which unlocked the mobile telephony to even the poorest, and allowed this industry to become masters of the high volume small margin business model. Insurance has largely failed at replicating this model so far, in part because of the high administrative and distribution expenses (the “packaging cost”) of any unit of insurance cover<sup>30</sup>. Because of this, first time buyers of insurance faced two major barriers: they often need the liquidity to pay for annual upfront premium, and they always face a substantial decision which can negatively impact their finances for a whole year if based on mis-selling or misunderstanding (and attract ridicule by friends and family).

**Microinsurance has been familiar with the sachet principle, but has rarely harnessed technology to take full advantage of it.** In 2008, Kenya Orient insurance launched the short term personal accident insurance “Safari Bima” which was purchased on scratch cards like those of airtime, and like airtime had to be activated by the user (“The Safari Bima scratch cards work like the regular mobile phone top up card”). But while it met an insurable need that had particular demand during the 2007/8 post-election violence, Safari Bima did not reach the anticipated scale, partly because the scratch cards had to be delivered to customers and the economies of scale were not the same as for airtime. 4,000 policies were sold, and Safari Bima was eventually discontinued. In 2007, ACA Insurance in Indonesia offered insurance against dengue fever based on the same scratch-card

self-activation principle. Although distributed through 2,500 outlets of a retail chain belonging to the same conglomerate, uptake also fell short of expectations, and the insurance was eventually discontinued – also because with inflation, the cost of producing the physical scratch cards became unsustainable<sup>31</sup>.

**Regulators are discussing potential issues with IoD.** In jurisdictions where rates have to be approved before a product can be marketed, IoD’s possibility to “insure anything in a snap”<sup>32</sup> will require to re-examine how rates and conditions can be pre-approved. Another worry refers to moral hazard and insurance fraud which might be encouraged if insurance can be switched on and off at will; addressing this with higher premium might lead to an antiselection spiral in which only higher risks or more fraudulent intentions remain attracted to the insurance. At present there is uncertainty about customers’ temptation to switch on insurance after the damage has happened, thus invalidating the entire concept, and this seems to be the most fundamental challenge for practitioners and regulators. Clarity may emerge only as IoD ventures scale up and behavioral data accumulates. In any case, IoD makes it more challenging for insurers to keep track of their commitments at all times and make sure they are able to honor their liabilities.

**While not developed with low income households in mind, the value proposition of IoD is highly relevant for inclusive insurance.** IoD ventures show how to make insurance purchase decisions “bite-sized”. While the concept has been around in microinsurance, and low cost digital payment systems increasingly make payments of small insurance premium and claims amounts sustainable,

### **A Technology Enabled Example Of The Sachet Principle In Insurance – The Acre Africa Replanting Guarantee**

Smallholder farmers can achieve much higher yields if they use suitable inputs, and if they can afford them, money spent on seeds or fertilizer generates high returns, unless the crop fails, typically due to climate anomalies. So buying a bag of seeds remains a risky decision for these farmers. Acre Africa combined innovative use of various technologies to mitigate that risk. When farmers buy bags of maize seeds from some agro dealers, they find inside a scratch card similar to those used to top up cellphone airtime. When the farmers plant the seed, they transmit the card’s unique eight digit number via USSD to the scheme operator from their farm. That starts the insurance period, they are enrolled as policyholder with the personal details corresponding to the registration of their SIM card, which also provides their mobile banking connection, and the geographic location of their farm is determined for satellite surveillance of local rainfall. If rainfall is too low for germination during the following 21 days of cover, the satellite data triggers a payment of the corresponding index-based insurance to the farmer’s mobile banking account, allowing her for example to buy another bag of seeds if the rainfall has just been delayed. That way she can catch up with the expected crop production. The entire process is highly digitized and cost efficient.



the other technology component – smart phones and the corresponding applications – have not yet been widely harnessed for inclusive insurance. With falling prices for smartphones and their growing availability even among lower income households, it is not unreasonable to expect that processes tested and matured in IoD will soon be transferred to developing country insurance markets, where increasing numbers of insurers already offer some apps to their current customers of conventional insurance to increase the ease of interaction, customer loyalty, and convenience<sup>33</sup>. Making properly digitized insurance available for first time buyers in small “sachets” will not only overcome liquidity constraints and offer insurance at overall lower cost; more importantly, it will reduce the risk of mis-buying insurance and thereby lower the hurdle to try it, ideally supporting emerging customers with the high degree of client-centric interaction that is part of many IoD ventures (albeit often delivered via chatbots). In addition, IoD is likely to teach insurers and their distribution partners how to bundle insurance with other services more cost-efficiently and transparently, opening the door to bundled insurance covers with more convincing client value. All this may gradually lead to insurance becoming part of everyday life, both for millennials in New York and for slum dwellers in Nairobi.

### **Section 3.5 – Machine learning, artificial intelligence (AI) and big data**

**Data is said to be the lifeblood of insurance.** Data is required to understand the target market’s circumstances and insurable interests and needs, as well as their willingness and ability to pay. Data is furthermore needed to design and price insurance products that respond to these insights, both at initial stage and to monitor actual versus expected performance of the product so as to be able to adjust parameters. Insurers have been doing this since the advent of computers. What is new now, however, is the amount of data that consumers in developed – and increasingly in developing – countries produce, and the tools available to analyze this data. Every interaction with a connected device creates a trail of information, from habits, preferences, interests, and affiliations, to geographic location, purchasing power and spending patterns. Social media, online shopping and wearable devices invite ever more people to disclose rich information about themselves and their lives, resulting in the amount of what is called big data. Finding patterns in these amounts of data and relating them to insurance

relevant dimensions such as a person’s propensity to buy, his brand loyalty or inclination to commit fraud, requires computing power and algorithms not widely available until recently. Standard statistical tools allowed UK insurers in the 1990’s to differentiate car insurance premium based on the driver’s astrological sign<sup>34</sup>, but more sophisticated methods were recently used by a UK bank to determine how financial behavior correlates with driving behavior and justifies offering discounts to account holders who stay within overdraft limits. Similar methods recently led a retailer to offer lower insurance premium to a subset of its customers identified through data collected via the retailer’s loyalty scheme<sup>35</sup>.

**Correlation is increasingly complementing causality in our understanding of the world.** Most knowledge we are presented today is of statistical nature, generated by surveys or randomized control trials. It is no longer necessary to understand why someone’s financial or shopping behavior makes it possible to predict her driving style to use that information in pricing decisions. It is not necessary to assess the impact of weather anomalies on the farm of someone who bought index insurance as long as the statistical correlation between weather index and crop damage is reliable. It is no longer necessary to understand why and how an identifiable condition or behavior relates to insurance as long as its impact on insurance claims has been established. While car insurance premiums based on astrological signs were rejected by the market in the 1990’s, predictors that might seem equally random are used in pricing decisions today (albeit less overtly). Acceptance of statistically generated knowledge is higher than ever before. One downside of this is that the potential of insurance to motivate more risk-conscious behavior of customers may erode when the links between premium and behavior become increasingly intransparent<sup>36</sup>.

**Machine learning has matured and become more widely available to extract insights from large amounts of data, at lower cost and much faster than before.** AI consists of machines replicating cognitive behavior typically associated with humans. Machine learning (a subset of artificial intelligence) means giving computers the ability to learn without being explicitly programmed. For years already it has been part of our everyday life, in search engines, spam filtering, and personalized advertising and recommendations<sup>37</sup>. It is a

powerful tool to discern patterns from data that may be too sparse, noisy, raw, or vast for conventional statistical analysis. For example, MasterCard has filed a patent application for a method to estimate people's weight from their payment transactions and intends to sell that information to airlines as a basis for passenger seating. For insurance, patterns discernable in unstructured data are of interest when they allow to predict the likelihood or severity of claims and the likelihood of fraud. In theory, they could also predict price elasticity of an individual's demand for insurance or his inclination to change insurer if service is not prompt. Such predictors allow a higher pricing granularity, known for example from different life insurance rates for smokers and non-smokers. But they carry the risk of eroding solidarity, and while some predictors of higher insurance cost can be addressed by the individual – stop riding motorcycles – others such as inherited conditions cannot.

**Advanced understanding of risk relevant indicators will lead to more granular pricing and put pressure on insurers who don't follow.** Advanced analytics on ever larger amounts of data allows insurers ever more precise predictions of an individual's expected insurance claims amounts. This allows for differentiation of premium accordingly, and for offering insurance to some that is not made available to others (within the regulatory boundaries). Furthermore, when embedded in suitably digitized environments, such decisions can be taken instantaneously by software. But every disaggregation of a risk pool – for example, disaggregating all men in those who smoke and those who don't – leads to more favorable conditions to one subset and less favorable conditions to the other. Smokers will therefore switch to insurers who don't differentiate premium by nicotine use. These insurers will see their claims increase with the increasing proportion of smokers in their portfolio. If they respond by increasing premium rates, non-smokers will leave and the proportion of smokers will further increase. Hence, they have little choice but to differentiate premium by smoking status as well. While that was easy for smoking / non-smoking as the cotinine test was robust and affordable and the excess mortality was well researched, machine learning on big data is producing proprietary intellectual capital that other insurers cannot easily replicate. In other words, one insurer's proprietary AI can uncover a risk-relevant differentiator that helps it be less attractive for higher

risks which will therefore move to other insurers; these other insurers will not easily be able to predict what this shift in disaggregated portfolios implies for the claims experience, nor how to react to it. That is one explanation for the considerable interest of the insurance industry in artificial intelligence, big data and machine learning, but makes it difficult to predict their mid-term impact on insurance.

**Advanced understanding of risk relevant indicators, along with underwriting processes supported by artificial intelligence, allow to streamline the insurance enrolment process and make it more convenient for the customer.** A better understanding of risk factors relevant to a specific person and product can reduce the standard number of questions traditionally asked to assess insurability of a risk. If the insurer already has access to additional information on the applicant, less questions may need to be asked. If automated underwriting systems are employed which can interactively prompt for additional information or specifications (see 4.), the time it takes to buy an insurance can be reduced from weeks to minutes. This is the proposition e.g. of HavenLife, a venture backed by MassMutual which justifies its slogan “getting life insurance should be painless” with simple online applications and immediate decisions. AI is also behind the chatbots that provide “robo-advice” under the Concierge Distribution model.

**AI can streamline insurance processes in new ways.** One area where AI is having increasingly noticeable impact is natural language processing and speech-to-text conversion. Computers can sustain dialogues with customers that resemble the traditional insurance sales process, but can do that over the phone, in a multitude of languages, at large scale and low cost, while abolishing the need to fill forms. Insurify, a Concierge Distribution venture, includes a virtual advisor that can talk to people in natural language. Not only does this reduce cost and increase turnaround time, it also has the potential to improve customer experience as these approaches mature. In most cases, AI applications are expected to reduce operating cost, as tasks traditionally requiring highly specialized humans are delegated to algorithms. Media coverage of resulting staff redundancies at insurers started in January 2017<sup>38</sup>.

**But artificial intelligence can also allow insurability of new risks in new circumstances.** One example is the International Food Policy Research Institute’s “Picture Based Insurance”. It is testing an alternative crop loss assessment that can make agriculture insurance sustainable for small scale farmers. It uses the smartphone cameras and a special application to collect visual information on crop development by local farmers, without the need for experts to visit the (often remote) fields. The application also provides an efficient way to collect additional information from the farmers, and a combination of machine learning and expert panels aims to improve the reliability of these data to predict crop losses. Analytics based on artificial intelligence applied to big data could lead to considerable progress in the insurability of risks related to pandemics, disasters, disruption of global supply chains or climate change. The insurer AIG is combining AI with wearable devices to reduce the risk of workplace injury. Analyzing vast amounts of unstructured data from multiple sources also allows insurers to better detect changes in society and environment that can impact insurance utilization, thus reducing the risk of change that made some risks difficult to insure. AI can facilitate claims assessment by judging the likelihood of fraud from other data, reducing claims adjustment costs that might have been prohibitive before, and it can add precision for claims reserving.

**Regulators are faced with a number of questions concerning AI and its uses in machine learning and analyzing big data.** Data protection is a considerable concern: mining data from social media, online purchase records, financial and other records to assess an individual’s risk conflicts with privacy rules in many jurisdictions, and is often not acceptable to the general public. Furthermore, the data collected and generated through analysis will likely reside on cloud servers beyond the control of the insurer (in case he partners with an AI company) and the insurance supervisor. Although surveys with, there are worries that they might regret this disclosure at a later date when it leads not to lower but to higher insurance premium or outright refusal. Some regulators think such disclosure decisions require similar protection as other aspects of insurance purchase decisions. The constant surveillance envisioned from harnessing the stream of risk-relevant information from wearable devices (as well as telematics and the Internet of Things) will require broad societal debate that may result in its rejection (and possible clandestine continuation).

Discrimination can be another concern. Unless the owner of the AI algorithms who determine who gets what insurance at what conditions disclose these algorithms to insurance supervisors (and insurance supervisors are capable of understanding them), the risk of racial profiling or other forms of discrimination proscribed by insurance regulation and society is difficult to manage. Such disclosure is questionable at present, considering the substantial investment in this intellectual property and the competitive advantage it promises. On the other hand, dynamic and tailor-made rating on applicants may not be possible where jurisdictions insist on traditional actuarial justification of insurance premiums and conditions.

Another issue is the legal uncertainty surrounding professional advice provided not by humans (such as licensed and trained insurance intermediaries) but by machines. In January 2017, the European Parliament started discussing a legal framework for robotics and AI , but it will take considerable time for jurisdictions in developed and developing countries to regulate AI. And while these efforts are underway, AI will continue to evolve, making up-to-date regulation increasingly difficult. In the meantime, supervisors have to decide on the liability aspects of robo-advice and how much automation of insurance processes they accept. Suggestions to point out more clearly when customers are communicating with a machine and not another person may obliterate some expected advantages especially in customer experience, if it makes customers uneasy. In addition, ever more granular underwriting, and products tailor-made to ever smaller target sub-markets, may erode the tenet that insurance is transfer of money from the fortunate to the unfortunate, questioning the very solidarity principle that has been core to insurance. This problematic trend could go largely unnoticed where the awareness of the solidarity principle is low, especially in developing countries with low insurance literacy. This trend can also lead to an atomization of risk pools that threatens the applicability of the law of large numbers, another pillar of insurance that is often misunderstood.

And to the extent that AI tools not owned by insurers become increasingly determinant to competition, insurers may find themselves relegated to providers of license and balance sheet, losing the client relationship to technology companies not supervised by insurance regulators, and vulnerably dependent on the partnership with the AI provider.

What is clear is that more widespread use of AI in insurance confronts regulators and supervisors with new challenges, and may drive them to adopt more technology-based approaches to regulation themselves. This might be necessary for example to evaluate the data used by insurers for product design, pricing and reserving decisions, and to assess the algorithms used in this and in other areas of insurance operations such as investment, asset-liability management and risk management. With the advent of FinTech, supervisors of other financial sectors have been faced with this challenge before, leading to coin the term “RegTech” to technology-supported supervisory answers to technology-driven financial innovations. While several companies already offer products in that space<sup>40</sup> and jurisdictions are starting to compete in this respect, a market for insurance-specific solutions has not yet emerged.

**The possible applications of AI in inclusive insurance are manifold.** AI applications are expected to reduce cost of insurance significantly, making it more affordable to emerging customers. Despite this cost reduction (that includes intermediation cost like agents’ commission), thorough interactive needs assessment and advice can be provided to customers, already capturing the data traditionally submitted on paper forms. This will increase convenience (e.g. turnaround time in every interaction) for everyone who doesn’t mind to discuss insurance needs with an algorithm (or doesn’t notice),

and can reduce mis-selling through standardized (if complex) and auditable decision trees. AI can facilitate the identification and authentication of people based on voice or facial recognition, improving access to insurance to people without formal IDs; interpreting facial expressions can also help against insurance fraud. AI furthermore allows to detect insurable needs from patterns in big data, and to generate calculatory bases to price and reserve products meeting these needs even where traditional approaches to insurance would have struggled with the absence of statistics – a common worry in microinsurance. Both innovative and conventional products can be tailored very specifically to individuals or businesses, so that they provide better value for money. Pricing and product design could be adjusted quickly to respond to new insights, lowering the hurdle to launch new products in previously data-scarce situations. Completely new distribution channels can be harnessed when all insurance expertise necessary for the sales and enrolment process resides in a software that easily interfaces with other systems. Some of these channels will be the owners of big data generated by their clients e.g. from online sales, and will thus re-define the interest of the various players in owning and controlling the insurance. That can challenge the traditional role of the insurer, but will also engage distribution channels more forcefully than in past attempts to sell microinsurance via microfinance institutions (for example).

### Joint Ventures Between Technology Companies And Insurers – The China Example

In January 2017, the Chinese e-commerce company TenCent announced that it was taking stakes in the Hong Kong operations of British insurer Aviva, together with the hedge fund Hillhouse Capital (which also holds stakes in AirB&B and Uber). TenCent, one of world’s top 10 most valuable companies, is the world’s largest gaming company and one of the largest Internet companies, and its services include e-commerce, social networks, instant messaging, web portals, and WeChat which does all of the above for 767 million active users per month. The intention of the deal is to increase Aviva’s digital focus and grow TenCent’s presence in the insurance business beyond its participation in the insurers Zhong An and He Tai.

Hillhouse Capital was also part of the joint venture between the German insurer Allianz and the Chinese internet company Baidu in 2015 to establish a nationwide digital insurer after talks with AliBaba, TenCent’s longtime rival for internet dominance, did not flourish. According to Allianz’ press release, “Baidu, a technology-based media company, is the leading Chinese language Internet search provider with a mobile search user base covering over 640 million monthly active users”, and the deal aims to put Allianz at the forefront of disruptive innovation.

AliBaba has meanwhile established a partnership with French insurer AXA. Although AXA has considerable market presence in China already, it expects that the partnership with AliBaba and its online payments company Ant Financial will speed up its outreach to more customers. For AliBaba, on the other hand, the partnership is part of the company’s globalization strategy.

### Section 3.6 – Wholehearted digitization, and the “digitally born insurer”

**What if all the latest technology would be applied by an insurance undertaking not encumbered by legacy systems and procedures?** The outcome of this thought experiment is sometimes referred to as the digitally born insurer, a metaphor for utmost digitization. It refers to the conventional business model of insurance – not necessarily P2P or blockchain-based – and is relevant especially when comparing with the insurance industry’s current implementation of technology. The majority of large insurers are decades old or older. The industry invested substantially in IT in the 70s and 80s, when most IT solutions for insurers were tailor-made. Many insurers run a diversity of administrative IT systems in parallel, frequently with patches to address specific aspects rather than state-of-the-art systems infrastructure, explaining costly and slow processes. Relative to revenue, insurance invests half as much in IT as banking<sup>41</sup>. There is considerable pent-up investment need, but the older and larger an insurer, the more difficult a radical modernization is.

**Consumer demands have evolved beyond the level of service the average insurer’s IT can provide.** Consumers in mature insurance markets have grown accustomed to interact with providers through digital

channels and even social media, but expect high quality customer-centric websites and applications, seamless interaction across media, fast response, and high degrees of data and privacy protection. As more and more industries strive to live up to these expectations also in developing countries, even first time buyers of insurance will be less satisfied with insurers offering pre-digital customer experience only. And in addition to evolving consumer demand, evolving regulatory demand also puts stress on outdated administration systems in insurance.

**Adopting updated technology could result in substantial cost reduction for the average insurer.** BCG and Morgan Stanley estimate that combined ratios could be reduced by 17 to 21 %; in detail, the net impact of different technologies for a motor insurer in a mature market is estimated as

- Using Big Data analytics to improve pricing: 6.7 percentage points reduction in combined ratio
- Automating enrolment procedures: 0.1 ppts
- Shift sales to online digital channels: 6.0 ppts
- Automating service and administration procedures: 1.1 ppts
- Improved fraud detection with Big Data and AI: 1.5 ppts
- Automated claims management: 1.2 ppts
- Lower reserve volatility using Big Data and AI: 0.1 ppts
- Optimizing support functions: 1.2 ppts
- Replacing legacy systems with up-to-date front and back end systems: 0.7 ppts

### Zhong An, The Example Of A Digitally Born Insurance From China

Zhong An was launched in 2013 as China’s first online-only insurer, and posted 25 million USD net profit two years later. In terms of insurance penetration, China in 2014 ranked 57th (between Saint Vincent and India) with total premium amounting to 3.16% of GDP. But between 2014 and 2016, Zhong An sold 5.8 billion policies to 460 million customers. Over 300 million policies were sold on November 11, 2015 alone (the Chinese shopping holiday known as Singles Day). It helps that Zhong An is backed both by insurance conglomerate Ping An and by e-commerce titans Alibaba and TenCent, who enable the sale of large numbers of small policies – for example covering the shipping cost of returns at an average premium rate of 3% – seamlessly and conveniently during online shopping. Starting unencumbered by legacy systems in a regulatory environment that encourages innovation, Zhong An runs all processes and Big Data analytics on a cloud based platform, and an open platform to facilitate seamless integration with the systems of its 300+ partners.

This allows scenario based product design to follow client needs identified by partners, allows to tailor products profitably also for small market niches and to sustainably sell policies with very small premium, and being quick to market and to adjust as needed. Zhong An is able to price more accurately, assess risk with greater precision, and underwrite dynamically in microseconds. It has perfected the integration into a multitude of systems across the travel, e-commerce, motor, health and other sectors, and systematically facilitates cross selling. And Zhong An claims to have optimized fraud detection while providing fast, transparent and convenient claims service through substantial automation. All this allowed the company to test its model with somewhat conventional insurance such as shipping return cost and flight cancellations. That was the starting point for the launch of more than 200 insurance products, some quite novel such as health insurance that incorporates information from wearables, drone insurance, or insurance that pays when temperatures exceed 37C. Zhong An, which has been described in the Financial Times as “a technology company that happens to focus on insurance”, exemplifies a business model that is not product centric but customer centric, and built on online ecosystems to respond to customer demand and enhance customer experience.

While this assessment is hypothetical, the report<sup>42</sup> also analyses the case of two US insurers (Geico and Progressive) who have achieved considerably lower expenses through strategic use of IT, funding increases in marketing budgets that resulted in above-market growth.

**Insurers don't need to develop all this capacity in-house but can buy services that move them towards new business models that support more inclusive insurance.** Companies like Shift Technology and TycheRisk offer AI services for claims management to insurers. Companies like SimpleSurance offer seamless integration of cross selling at e-commerce checkout. Companies like CarpeData offer insurers predictive scores to “assess risk at critical steps in the insurance policy lifecycle”, and connected platforms to “consolidate and functionalize the next generation of data”, including data aggregated from social networks. Such services support step-change towards consumer centricity. However, to reach the full transformational potential of new technologies, incumbent insurers have to question every aspect of their business model. This can alert “corporate antibodies” opposed to change, which is why some insurance groups nurture promising technology investments in separate incubators.

**Regulatory frameworks for e-commerce and digital provision of insurance are the most relevant for the outlook of a digitally-born insurers, or one moving towards “de-materialization”.** In some jurisdictions the frameworks already support this approach, while others are in the process of drafting and discussing regulation, often motivated by the recent growth of

insurance intermediated by mobile network operators (see paragraph on m-insurance on pages 14 and 15). As an insurer employs one or more of the InsureTech themes discussed above like Zhong An, the corresponding regulatory concerns highlighted in Sections 3.1 to 3.5 also apply to a digitally born insurer or one transitioning towards that model. Insurance regulators may be concerned, for example, that substantial use of AI on Big Data may lead to pricing and underwriting decisions that they fail to understand and that may discriminate certain consumer groups in undesired ways.

**“Digitally-born” insurance, or insurance provision inspired by the example of Zhong An, can contribute in a number of ways to overcome barriers to inclusive insurance.** Lowering cost of quality insurance by lowering administration expenses through determined automation of processes and reducing fraud through AI will make insurance more accessible to low income households and MSMEs. Cloud based platforms built around application program interfaces support cost- and service-efficient integration of a variety of alternative distribution partners that may reach people not served by the traditional microinsurance multipliers like microfinance institutions and cooperatives. These two measures will make provision of insurance with very small premium sustainable even at lower scale than that normally required for microinsurance. To the extent that an insurer applies the InsureTech themes discussed in 3.1 to 3.5, the corresponding benefits in respect of inclusive insurance proposed there apply. But in addition, what sets a truly (or aspiring) digitally

### Protecting Nascent Innovation From Corporate Antibodies – The Lumenlabs Example

MetLife, the largest US insurer (Forbes 2017), launched LumenLabs in 2015 as its disruptive innovation center in Singapore, far from its corporate headquarters but close to vast markets of populations leapfrogging older technologies to go directly digital. LumenLabs “applies a thoughtful, structured and methodical process to incubating ideas, and developing new businesses that can scale”. The process, which distinguishes the exploration phase (frame, explore, create) from the experimentation phase (blueprint, experiment, pilot), is applied to pursue increases in revenue (new revenue through new services, new business models through disruption), cost reduction (improved workflow efficiency, improved claims handling and fraud detection), increased value of new business (new solutions for underserved Asian populations, technological advantage for MetLife intermediaries), and increased persistency (technology facilitated cross selling, sticky value added services).

Once an issue has been defined, a call for proposals invites InsureTech companies from around the world to suggest solutions. In one case, 40 submissions were longlisted out of 140 (including one from Afghanistan), and 2 were finally selected. The collaboration with the AI company Shift Technology which resulted from this process saved MetLife Japan considerable amounts of fraudulent claims payments in 2016. More importantly, LumenLabs is subtly transforming the way MetLife staff cooperate with InsureTech startups.

born insurer apart is that innovations are integrated in an appropriate architecture and business model, instead of being deployed alongside conventional processes and customer relationship paradigms.

The following table summarizes the potential that the various InsureTech themes discussed in Section 3 offer to overcome barriers to more inclusive insurance discussed in Section 2. The corresponding risks will be discussed in

Barrier to inclusive insurance	InsureTech solution
Limited Purchasing Power	<ul style="list-style-type: none"> <li>• P2P promises to reduce cost of insurance through disintermediation and less fraudulent claims</li> <li>• Blockchain-based models may reduce cost through disintermediation, and smart contracts can reduce administrative cost even under conventional business models</li> <li>• Concierge Distribution reduces cost through automated intermediation and advice, and through more transparency that leads to more competition and prevalence of best-in-class providers</li> <li>• Insurance on Demand makes payment of premium easier</li> <li>• Wholehearted digitization reduces operating cost</li> <li>• Artificial Intelligence and Big Data analytics reduce cost of fraud</li> </ul>
Limited Understanding	<ul style="list-style-type: none"> <li>• IoD facilitates trying insurance to confirm understanding</li> <li>• P2P concepts help first time buyers understand formal insurance in the terms of the informal risk management mechanisms they are familiar with</li> <li>• Concierge Distribution reduces the cost of communicating with clients to reiterate messages, clarify doubts and engage with clients</li> </ul>
Limited Trust	<ul style="list-style-type: none"> <li>• P2P aims to bring trust back to insurance (including through greater transparency)</li> <li>• Blockchain aims to replace the need for trust with tamper-proof transparency and auditability</li> <li>• IoD facilitates trying insurance to test reliability of providers and products</li> <li>• Concierge Distribution positions itself as provider-independent partner and advocate of client</li> <li>• Wholehearted digitization and AI allow faster response including payment of legitimate claims, improving tangibility</li> </ul>
Unsuitable Products	<ul style="list-style-type: none"> <li>• P2P models can crowdsource product needs proposals from their members; Concierge Distribution also offers that potential</li> <li>• AI and Big Data allow to identify previously hidden insurable interests</li> <li>• AI and Big Data allow to generate the calculatory bases to design and price new products even when traditional statistics are missing</li> <li>• AI and Big Data support underwriting and claims handling of products and customer groups that traditionally could not be underwritten, or only at high cost</li> <li>• Consumer experience – an integral element of insurance products – is enhanced through appropriate processes supported by elements of Concierge Distribution, IoD, or wholehearted digitization</li> <li>• Wholehearted digitization can reduce operating cost to a degree that previously unsustainable products become viable</li> </ul>
Unsuitable Distribution	<ul style="list-style-type: none"> <li>• Smartphone based, disintermediated distribution via Concierge Distribution and IoD can sustainably reach new segments where agents and brokers (as well as the typical microinsurance distributors) failed to reach scale</li> <li>• P2P relies on social media word of mouth (potentially “viral”) dissemination</li> <li>• With cloud based platforms and application program interfaces, wholehearted digitization facilitates seamless integration with a new generation of potential distribution partners, for example in the mobile and e-commerce sectors</li> <li>• Wholehearted digitization and dematerialization / paper-free insurance overcomes geographic barriers (paper trail logistics)</li> </ul>
Unsuitable Business Models	<ul style="list-style-type: none"> <li>• IoD has the potential to make the large-volume-small-margin business model work for insurance, making provision of small insurance sustainable</li> <li>• Wholehearted digitization, and digitally-born insurance in particular, reinvent the business model towards customer centricity and cost efficiency</li> <li>• Increasing internet use and smartphone ownership among low income households bring them into a potentially global market for digital-based insurance where their socioeconomic status is less relevant</li> </ul>





# 4.

## Risks



**Radical change is part of the unique selling proposition of many InsureTech startups; if just some of them succeed on a scale commensurate with the funding they attract, insurance and the role of incumbents will change in ways that are difficult to predict.** Despite occasional new products responding to new societal circumstances and the occasional adoption of omnipresent technologies, provision of insurance has changed little since the 19th century. Although donor funding has allowed for testing of a variety of new approaches in microinsurance, they have not contributed much to disruptive innovation in conventional insurance, even in the areas and countries where they scaled up successfully. It is this pent up innovation potential in insurance compared to other sectors that is attracting investors. One immediate risk is posed to incumbent insurers. Depending on the InsureTech model, their role may be relegated to providing the license and balance sheet while client ownership and interaction will be held by other players. Some insurers may be replaced by new entities like digitally-born insurers or P2P and blockchain structures (albeit some possibly operating in regulatory grey areas for some time). While in jurisdictions with strong legal frameworks and supervisory capacity, *“regulation is the one problem you cannot solve by throwing money at it”*<sup>43</sup>, jurisdictions with weaker supervisory capacity may take a while to formulate a response to some proposals like pure P2P ventures. This can lead to an uneven playing field where incumbent insurers feel disadvantaged and have an even stronger motivation to wish failure to InsureTech ventures. Regulatory “sandboxes”, i.e. clearly defined frameworks where startups and incumbents alike are given protection from some elements of regulatory uncertainty for a limited time and under close surveillance, are one tool to address this situation which is being deployed not only in Europe (e.g. UK) but also in Asia (e.g. Singapore, Malaysia), sometimes supported with innovation hubs that facilitate early stage dialogue with regulators. But even with level playing fields, market structures are likely to change (to the benefit of the consumer, according to the promise of InsureTech companies). One likely change from increased automation of insurance processes is a reduction of the number of people earning an income from work in insurance.

**Even where InsureTech startups emphasize that they are fundamentally different from conventional insurance, they may tarnish the reputation of the insurance industry if they fail spectacularly.** Statements like Ariely’s “If you try

to create a system to bring out the worst in people, you'd end up with one that looks a lot like the current insurance industry" and claims that "old insurance is rubbish"<sup>44</sup> disparage the image of conventional insurance, and the justification for many InsureTech startups - the perceived dissatisfaction of consumers - is amplified in their marketing. Whether or not such criticism is accurate, confidence in insurance may end up being lower unless InsureTech can live up to its promise to replace old insurance with something better. Confidence can be particularly shaken if an InsureTech venture was to fail very visibly, especially if it had attracted many customers already. Failure in this case does not necessarily mean insolvency and default on obligations towards clients, but could be merely a withdrawal from the market due to disappointed (investor) expectations. With the number of startups, this is a realistic scenario: Munich Re, for example, sees 50-100 investment proposals each month, and know that some of their investments in this space will fail. Munich Re has a plan to manage failures so that no customer gets disadvantaged and regulatory requirements are met<sup>45</sup>, but that may not be the case for every investor everywhere.

**Reliance on innovative technology that has not been vastly tested poses a threat to the operational stability of insurers in general and InsureTech ventures in particular; even when their disruption or failure does not tarnish the reputation of the insurance industry, it can harm customers.** Some InsureTech ventures are based on latest technology such as blockchain or artificial intelligence that has not been widely tested so far. Nor has their integration with the traditional procedures of insurance provision been tested, or the novel business models based on them. All ventures assume reliable connectivity, interface standards, electricity supply, data security and the availability of specialized human resources; these may be reasonable assumptions in very developed countries but less so in developing countries. On the other hand, insurance markets there are less constrained by tradition and are cognizant of greater need for innovation. Beyond reputational damage, the risks to consumers may be lower than in FinTech, as insurance for emerging customers will continue to be short term and without asset accumulation in the near to mid future. But abrupt loss of health or life insurance cover can still lead to hardship. Insurance supervisors

can learn from the evolution of m-insurance and consider adoption of concepts like the living will that assures orderly unwinding of a partnership or enterprise<sup>46</sup>. Another lesson from m-insurance is that structures that rely on a functioning partnership between various parties are vulnerable to one of the parties abruptly leaving the partnership. This risk will likely be higher in InsureTech, because more core functionality is outsourced beyond the control of the insurer to enterprises with a unique selling proposition that cannot be easily replaced and who contribute proprietary technology that cannot be easily reproduced by the insurer if necessary, augmenting the question of ownership of key business assets.

**More systemic risks, however, are not likely to originate from InsureTech in the near future, especially from inclusive InsureTech, due to its currently limited scale.** The most urgent insurance needs of people currently uninsured (in developing countries) or underinsured (in developed countries) can be met with short term insurance without elements of capital accumulation. By contrast, the biggest risks to the insurance sector – which have the potential to threaten an entire economy's financial stability – so far related to long term commitments that were not correctly anticipated, such as asbestos liability claims or interest rate guarantees. Increasingly, capital requirements reflect these risks, motivating incumbent insurers and startups alike to avoid them. This potential long term nature of insurance liabilities, and the resulting risk of asset-liability mismatches, are not palatable to most investors in current InsureTech ventures, who will therefore steer clear of them. While long term financial planning and asset accumulation is a growing need in developing countries and among low income households, the financial planning horizon there does not yet lead to noticeable demand for long term life or annuity insurance. Furthermore, the predominant investment strategies there respond to the emerging local capital markets, and risks e.g. of concentration and related party transactions outweigh possible risks of InsureTech related market changes such as disruption of new business of incumbents.

**On the other hand, InsureTech elements contribute to mitigating some of the traditional risks of insurance undertakings.** The general expectation that InsureTech will allow more accurate pricing

and underwriting, through Big Data and Artificial Intelligence for example, should lead to a lower underwriting and pricing risk. Big Data and Artificial Intelligence can also help reduce the product design risk, as well as the risks of incorrectly forecasting the economic environment and policyholder behavior. Claims risk can be reduced through improved detection of insurance fraud. Increased automation and digitization, as well as more immediate customer engagement, allow for prototyping and testing of new products more efficiently, and help companies to react quickly when deviations from expectations suggest changes to products or processes. If done properly, increased automation and digitization are also likely to decrease operational risk, at least when models reach

some maturity and the risk of technical malfunctions is outweighed by the benefits of conscientious reengineering of processes.

**A detailed assessment of the risks specific to a particular market is advisable when InsureTech ventures or themes start spreading there.** Insurers will have to revisit their enterprise risk management, and regulators together with other stakeholders will have to evaluate a more detailed and country-specific list of potential risks, including regulatory arbitrage, mis-selling, money laundering, data and privacy protection, market dominance and the crowding out of established insurance industries, systemic threats to financial market stability, and discrimination.

## Data Protection And Data Privacy

New ways to process old and new types of (meta)data are at the core of most InsureTech propositions, and given the nature of insurance, most of the data in question is personal. Rules concerning ownership, privacy and appropriate handling of customers' personal data exist in most countries. But they have evolved in times where the majority of personal client data was disclosed by the client herself via paper based processes (such as insurance application forms) that put limits on the amount of data to be captured. Labor intensive procedures limited the use of this data. Today's data privacy and protection rules don't fully reflect the increased amounts of data generated by the use of mobile phones, social networks, media streaming and online shopping, and they don't reflect the new possibilities to make sense of these increasing amounts of data, for example by combining anonymized customer transaction data from several sources to guess the real identity of the corresponding person and henceforth target him with customized offers. With cross selling being a frequent objective of InsureTech ventures, exchange of customer data between different businesses and via the InsureTech third party will increase. Open application programming interfaces, an enabler of many InsureTech ventures, open new gateways for the proliferation of personal data.

Social networks and other dominating technology companies have made growing numbers of people increasingly comfortable with the sacrifice of privacy required for full convenience of online experiences. Market research shows that the "oversharing generation" of millennials is particularly willing to provide details about their personal preferences and habits to marketers, in exchange of the smallest rewards. In the case of insurance, such rewards can come in the form of lower premium, and can be substantial in the short term. But it is unclear what conclusions will be drawn by algorithms from peoples' data as time passes, and initially lower premiums can turn to higher premiums (be it reflecting perceived higher risks or lower price sensitivity), or exclusions. Being widely acceptable to one socioeconomic group, user agreements and terms of service that require customers to relinquish some data privacy may increasingly be imposed on other customer groups as well.

Another issue regarding personal data is its security. Large scale data breaches involving retailers like Target and insurers like Anthem highlight the vulnerability of data to criminal attacks, and raise the question of how well small InsureTech startups are able to protect the data they handle. On the other hand, many jurisdictions require that personal data – for example related to insurance – is stored on servers within the geographic boundaries of the country. That presents a considerable obstacle to cloud-based IT solutions, challenging the viability of some insurance innovations. Regulators across different competences (like e-commerce, telecommunication, and finance) will need to find an appropriate balance between fostering innovation and protecting consumers.



# 5.

## Recommendations



**A better understanding of InsureTech will help players along the insurance value chain in developing markets relate the trend to their circumstances.** InsureTech being a relatively new phenomenon, the familiarity of insurers and their potential partners in developing countries with it is still limited. Investments in InsureTech were geographically more diversified in 2016 than in previous years, but still 62% went to North America, and another 16% to European countries. Incubators, innovation hubs, investor meetings and conventions are only just starting to spread awareness and understanding of InsureTech in Africa and most of Asia and Latin America, even though exciting innovations are being piloted there which perfectly fit the label<sup>47</sup>. So while some insurance innovation happens everywhere, the movement that attracts attention of investors, entrepreneurs, regulators and the media, and spreads understanding, is yet to arrive to developing markets. Helping everyone understand how emerging solutions can help serve emerging customers in emerging countries will accelerate the transfer.

**Local practitioners along the insurance value chain may appreciate help to understand what InsureTech will bring to their markets.** Even when InsureTech concepts are well understood, it is not straightforward to predict how they will affect a developing insurance market and the business of any one insurer, intermediary, or specialist professional such as underwriters and claims adjusters. Insurers and brokers that are part of an international group with strong presence in North America or Europe may get guidance and even strategic direction internally, and large international insurance and reinsurance groups mostly have their strategic approaches to InsureTech (such as MetLife's LumenLabs). But purely local players may lack insights to anticipate how InsureTech could affect competition and client behavior, and how they can prepare and participate.

Regulators will be faced with new questions that will demand fast response, in coordination with the insurance industry and regulators of other areas. M-insurance provides an example where regulators in Africa and elsewhere have welcomed support – for example in form of organized South-South exchanges – in adapting the frameworks to new realities. The need for such support in maintaining a fair, safe and stable insurance market will be even greater when more innovative forms of InsureTech arrive.

**The same practitioners may benefit from encouragement and guidance to address barriers to *inclusive* insurance with elements of InsureTech.**

Even though much of InsureTech is motivated by voluntary underinsurance by certain groups in developed countries, it does not generally focus on low income individuals or MSMEs. InsureTech does offer clues on how to overcome exclusion and serve more low income households and firms. But expertise is required to make that transfer, especially until successful InsureTech companies come to developing countries, and offer their services there guided by global and local lessons learnt in microinsurance. Until that time, concepts such as Concierge Distribution have to be recreated by local companies, along with the underlying technologies and business processes. That should be easier than recreating AI for example, but would still require going through the learning curve with little more guidance than lessons made public from pioneers elsewhere. Given the so far moderate interest of most insurers in developing countries to venture beyond the comfort zone in order to better serve the poor, InsureTech will not lead to innovative inclusive approaches without some handholding. In this respect, the insurance value chain also includes regulators and supervisors; they will need to balance the usual consumer protection considerations with encouragement of inclusivity through innovation, and they will need to learn how to effectively supervise operations based on new technologies.

**Donors can support the transfer of InsureTech concepts to inclusive insurance.** InsureTech is attracting considerable amounts of investor funding – 1.7 billion USD across 173 deals in 2016 – but that goes mostly to developed insurance markets. Some multinational insurance groups proactively explore how InsureTech can improve their outreach in developing countries. But most local insurers and their partners will be more ready to explore innovations for inclusion with external support. That support can be in the form of technical assistance – bringing for example specific skills and lessons learnt elsewhere – and in the form of suitable financial investments, for example in startup joint ventures. It can also come in the form of public goods, for example assistance to regulators to implement a suitable framework, possibly including “sandbox” or similar approaches. Substantial donor support has contributed to the development of microinsurance, which today covers more than

300 million persons, and index based agriculture insurance. Admittedly, not all donor-funded ventures in microinsurance proved successful, but the lessons they generated have accelerated the progress along the learning curve of others who today look successful. Donor funding can thus be particularly impactful when it comes with the commitment to document and disseminate lessons learnt. This will be no different in the effort to harness InsureTech for more inclusive insurance in markets where exclusion sustains poverty.

**The World Bank (WB) has a unique role to play, for example in respect of policy and regulation.** It has a long track record of helping governments shape conducive policy for finance and other areas, and can provide financing to implement necessary modernization. Examples include the Financial Inclusion Strategy Framework program and other initiatives for financial inclusion, consumer protection, and financial literacy. It has equal expertise in helping jurisdictions assess and improve their regulatory frameworks for insurance in accordance with government policy, particularly in respect of new developments such as microinsurance and index insurance. Long standing close dialogue and cooperation with standard setting bodies such as the International Association of Insurance Supervisors or the European Insurance and Occupational Pensions Authority ensure that the WB is informed of latest consensus of good practices, and in fact contributes to shape them. That has allowed the WB to help regulators in many jurisdictions around the world to update their regulatory frameworks (in dialogue with the industry) so that they better reflect recent developments in insurance, including microinsurance, index insurance and mobile insurance. It also makes the WB a trusted partner when updating supervisory capacity to new circumstances. The WB also contributes to disseminate the understanding of new rules among stakeholders, partnering for example with the Access to Insurance Initiative. As InsureTech spreads, the WB can help jurisdictions find appropriate approaches to licensing and supervision requirements of new types of players along the insurance value chain that is getting longer. And it can help to harness technological innovation to make social security systems more inclusive. Technology, for example, to make adherence of informal sectors to national universal health care schemes easier, and increase the efficient operation of these systems for improved client value.

**The WB's Finance, Competitiveness & Innovation Global Practice also contributes to strengthen the wider ecosystem required for inclusive insurance to flourish, with interventions that go beyond policy and regulatory advice.** A good example is technical assistance to leverage agent networks established for mobile money and other digital financial services for distribution of microinsurance products. Another example is support to bundle insurance with governmental cash transfer programs for better achievement of policy purposes<sup>48</sup>. Beyond payment systems, conducive infrastructure also includes national identification systems, and sustainable availability of data that can be used for insurance and other purposes, and the WB can help countries identify gaps and develop action plans to close them. Such technical assistance, provided by specialists experienced in a variety of fields, can be supported by donor funded trust funds, or it can be part of larger interventions that deepen and broaden countries' financial sectors, which may include components for specific implementations. Donors who want to have an impact in any area of financial services can consult with the WB to identify the most promising strategies. One example of the WBG's many partnerships is the collaboration with the UK Department for International Development under the Harnessing Innovation for Financial Inclusion program that focusses on the use of technological innovations to deliver financial services to some of the world's poorest and most excluded people, particularly women and people living in fragile and conflict-affected areas. This multi-dimensional work with standard setters and practitioners explains the convening power of the WBG, which is welcome by the G7 and G20, the UN and the Alliance for Financial Inclusion, to support both high level dialogue and the advancement of tools, standards and solutions. The WB uses its convening power also to foster South-South dialogue, communities of practice and other forms of knowledge exchange such as international conferences. Lastly, the WB itself explores the use of new technologies for development, for example with its Blockchain Lab, an incubator for learning, experimenting and knowledge sharing on Distributed Ledger Technologies.

**The World Bank Group directly supports the private sector through the International Finance Corporation (IFC).** The IFC invests in insurance companies and insurance intermediaries in emerging

markets and in new technologies which support the insurance industry such as payment systems, mobile wallets, and new business models like aggregators and digital insurers. It supports its investees in the adoption of new technologies and approaches to reduce poverty and increase prosperity, and partners with champions of impactful technology such as Ant Financial to enable digital financial inclusion in Emerging Markets. The IFC has investment and advisory services expertise in a wide range of areas that include venture capital, FinTech, digital financial services, microfinance and microinsurance, and health. The IFC's Gender Secretariat has particular expertise in making insurance work for women – both as service and as employer – which it provides to its partners. The Global Index Insurance Facility has delivered proof of concept for various business models for agriculture and disaster index insurance that have reached millions and provided guidance for many other ventures, piloting technologies such as satellite-based payment triggers. The IFC therefore plays an important role in the development and dissemination of new ideas, markets and services.

**The Consultative Group to Assist the Poor (CGAP) contributes to this work, promoting financial innovation and customer centricity in particular.** Housed at the WB, CGAP is a global partnership of over 30 leading organizations that seek to advance financial inclusion. Its mission “to improve the lives of poor people by spurring innovations and advancing knowledge and solutions that promote responsible, sustainable, inclusive financial markets” is particularly aligned with the drive to employ InsureTech for greater financial inclusion. CGAP's research provides insights into the financial lives and needs of low income populations, and how well they are served by traditional and new financial services such a mobile insurance. These insights are used to help policymakers and regulators better calibrate the balance between consumer protection and innovation, and to help the private sector to develop better sustainable pro-poor business models; both are core activities of CGAP. Its core activities also include guidance to policy makers, global standard setters and (supra)national regulators, who benefit from CGAP's research as well as from the projects it conducts with private sector players and the lessons they provide. All this work also benefits donors and investors. In the area of insurance, CGAP

works with the Access to Insurance Initiative and the International Association of Insurance Supervisors to advance inclusive insurance, and is helping regulators to respond appropriately to m-insurance. An example of CGAP's action research to test solutions based on behavioral insights and human-centered design is its cooperation with MicroEnsure to leverage mobile phones for the delivery of insurance<sup>49</sup>.

InsureTech is evolving rapidly. Since 2016, startups have failed or reinvented themselves and their business model, and investments have diversified more beyond the United States. Incumbents have reasserted their role, and much of what was announced as disruptive has been incorporated in the traditional insurance value chain, which is becoming less traditional in the process. Prominent recent cases of improper and unauthorized access to and use of personal data both in developed and in developing countries indicate that this topic in particular deserves analysis beyond the scope of this note, as do the algorithms applied to such data. Cybersecurity especially in the financial sector is receiving due attention, witnessed by recent publications for example from the World Bank Group. Regulatory sandboxes are increasingly discussed also in Africa

and Asia as a tool to address innovative propositions in the insurance space. There is increasing guidance for regulators in emerging markets and developing countries to help them make sense of InsureTech before being confronted with the need to regulate and supervise it appropriately. New ways to use technology in regulation and supervision are making "RegTech" and "SupTech" an ever more widespread reality. The World Bank Group launched a Blockchain and AI Lab to help build awareness and expertise in applications of these disruptive technologies and solve development problems in our client countries, and is exploring the use of artificial intelligence for new solutions to complex problems and the effective design development policies. The World Bank Group is also working with Standard Setting Bodies and the G20 to develop and adapt guidance for policymakers and regulators to more effectively support the use of technology in improving financial inclusion, for example through the publication of the report called Digital Financial Inclusion - Emerging Policy Approaches; and another one on Distributed Ledger Technology and Blockchain. While this note provides only a snapshot, it documents a stage in the progression towards ever more actionable recommendations. Contact us to find out more!



## Endnotes



1. The number of smartphone users is forecast to grow from 1.5 billion in 2014 to around 2.9 billion in 2020 (<https://www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/>)
2. Products that recognize lower than average life expectancy and provide accordingly higher annuity payments
3. Proprietary global insurance consumer survey in 12 countries on perceptions about technology
4. [https://www.linkedin.com/pulse/2117-insurance-odyssey-inga-beale?trk=v-feed&lipi=urn%3Ali%3Apage%3Ad\\_flagship3\\_feed%3Bs7JjQqFFJvRPjDTbBWS0EQ%3D%3D](https://www.linkedin.com/pulse/2117-insurance-odyssey-inga-beale?trk=v-feed&lipi=urn%3Ali%3Apage%3Ad_flagship3_feed%3Bs7JjQqFFJvRPjDTbBWS0EQ%3D%3D)
5. <http://www.the-digital-insurer.com/wp-content/uploads/2014/10/372-evolution-revolution-how-insurers-stay-relevant-digital-world.pdf>
6. [http://www3.ambest.com/review/article/January2017/60\\_AgentsofChange.pdf](http://www3.ambest.com/review/article/January2017/60_AgentsofChange.pdf)
7. Opening remarks at Fintech and Financial Inclusion Roundtable in Amsterdam, May 12, 2017
8. Commonly defined as premium to GDP
9. Source: AXCO Insurance Services Global Statistics (2015 figures )
10. <http://data.imf.org/?sk=E5DCAB7E-A5CA-4892-A6EA-598B5463A34C&sId=1390030341854>
11. <https://www.insurancefraudbureau.org/insurance-fraud/crash-for-cash/>
12. <http://inspool.com/boyracers/>
13. 2016 Swiss Re “Mutual insurance in the 21st century: back to the future?”, which includes a good overview of P2P schemes on p.37
14. [http://www.naic.org/cipr\\_topics/topic\\_p2p\\_insurance.htm](http://www.naic.org/cipr_topics/topic_p2p_insurance.htm)
15. World Bank Fintech Note #1 (forthcoming)

16. <http://www.economist.com/news/leaders/21677198-technology-behind-bitcoin-could-transform-how-economy-works-trust-machine>
17. See for example <http://blog.stratumn.com/unveiling-the-lenderbot/>
18. See for example <http://www.insurancejournal.com/news/international/2017/02/06/440629.htm>
19. <http://consuelo.mx/index.html#>, <http://www.diariobitcoin.com/index.php/2016/04/25/consuelo-un-microseguro-blockchain-para-trabajadores-migrantes/>
20. <http://fintank.net/2016/06/09/insureth-smart-contracts/>, <http://insureth.mkvd.net/>
21. <http://www.safeshareinsurance.com/insurance-post-why-unhackable-blockchain-could-revolutionise-the-insurance-industry/>
22. Morgan Stanley/BCG Global Consumer Survey 2014, BCG e-intensity index, Morgan Stanley Research.
23. See e.g. <http://www.the-digital-insurer.com/wp-content/uploads/2014/10/372-evolution-revolution-how-insurers-stay-relevant-digital-world.pdf>
24. This is why regulators impose minimum premium tariffs for the most competitive lines of insurance business in some countries
25. <https://insurify.com/>
26. Examples of the use of smartphone cameras beyond Concierge Distribution include some InsureTech startups' proposition of video-based assessment of car accident claims via smartphones, with the objective of reducing the need for costly on-site expertise. A comparable venture aimed at improving the insurability of small scale agriculture is discussed in Section 3.5
27. For example 40 million persons in Asia (source: <http://www.microinsurancenetwork.org/groups/mobile-microinsurance-covers-40-million-people-asia>)
28. <http://www.safeshareinsurance.com/>
29. See e.g. [http://www.emeraldinsight.com/doi/pdfplus/10.1016/S1571-5027\(07\)20011-7](http://www.emeraldinsight.com/doi/pdfplus/10.1016/S1571-5027(07)20011-7), or mention in Prahalad's "The Fortune at the Bottom of the Pyramid"
30. An exception to this has been short term travel insurance, which in several cases could be purchased from vending machines on airports
31. Despite this experience, several insurers launched scratch card-based microinsurance in Indonesia starting in 2014, with little success so far
32. The slogan of Cover (<http://www.usecover.com/>)
33. See e.g. [http://www3.asiainsurancereview.com/News/View-NewsLetter-Article/id/33327/Type/eDaily?utm\\_source=Edaily-News-Letter&utm\\_medium/Group-Email&utm\\_campaign/Edaily-NewsLetter](http://www3.asiainsurancereview.com/News/View-NewsLetter-Article/id/33327/Type/eDaily?utm_source=Edaily-News-Letter&utm_medium/Group-Email&utm_campaign/Edaily-NewsLetter)
34. Whether to grab attention or to gain competitive advantage via more granular pricing that attracts better risks
35. <https://www.ft.com/content/7b1226b0-0853-11e4-9afc-00144feab7de>
36. By contrast, transparent behavior-determined insurance premium via bonus-malus systems in motor liability insurance can contribute considerably to road safety
37. For an overview of AI applications expected to transform other industries see e.g. [https://www.cbinsights.com/blog/artificial-intelligence-top-startups/?utm\\_source=CB+Insights+Newsletter&utm\\_campaign=47bc29cda7-Top\\_Research\\_Briefs\\_1\\_14\\_2017&utm\\_medium=email&utm\\_term=0\\_9dc0513989-47bc29cda7-88045581](https://www.cbinsights.com/blog/artificial-intelligence-top-startups/?utm_source=CB+Insights+Newsletter&utm_campaign=47bc29cda7-Top_Research_Briefs_1_14_2017&utm_medium=email&utm_term=0_9dc0513989-47bc29cda7-88045581)
38. See e.g. <https://www.theguardian.com/technology/2017/jan/05/japanese-company-replaces-office-workers-artificial-intelligence-ai-fukoku-mutual-life-insurance> Similar coverage for banks: <https://www.ft.com/content/3da058a0-e268-11e6-8405-9e5580d6e5fb>

39. See e.g. <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML%2BCOMPARL%2BPE-582.443%2B01%2BDOC%2BPDF%2BV0//EN>
40. See e.g. <https://www2.deloitte.com/ie/en/pages/financial-services/articles/RegTech-is-the-new-FinTech.html>, <https://www.ft.com/content/fd80ac50-7383-11e6-bf48-b372cdb1043a>
41. [www.gartner.com](http://www.gartner.com) 2013, as quoted in “Insurance and Technology - Evolution and Revolution in a Digital World” (see footnote 5 for source)
42. Insurance and Technology - Evolution and Revolution in a Digital World (see footnote 5 for source)
43. Quoted from a US insurance commissioner
44. <https://heyguevara.com/>
45. <https://www.cbinsights.com/blog/munich-re-startup-partnerships/>
46. See e.g. <http://www.cgap.org/blog/m-insurance-ensuring-take-while-doing-no-harm>
47. See e.g. <http://disrupt-africa.com/2017/01/tanzanias-jamii-raises-750k-funding-for-expansion/>
48. An example is the Indian Jan Dhan Yojana program, which provides personal accident insurance for active account holders
49. An example is provided in <http://www.cgap.org/blog/increasing-immediate-value-microinsurance-poor>





