



Insurance  
& technology  
to better serve  
Emerging Consumers:

Learning to improve access & service



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- Simon Ralphs, CEO, Telematicus
- Renata Rego, Project Manager Emerging Consumer, Zurich Financial Services Group
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**Zurich's Emerging Consumer/Microinsurance (ECM) Team** aims to expand insurance coverage for low-income consumers in Asia, Africa and Latin America, promoting basic risk management principles that can help reduce poverty. For more information please visit [www.zurich.com/ecm](http://www.zurich.com/ecm).

**I-Lab (Insurance Lab)** is a joint initiative of the ETH Zürich, the University of St. Gallen, and industry partners. Research topics at the I-Lab are located within the triangle of "technology – innovation – insurance." In close cooperation with industry partners, we conduct studies, build demonstrators as well as prototypes, and develop business ideas and business models. We focus technologically on the Internet of Things and mobile services on cellular phones. The I-Lab is headed by Lukas Ackermann and supervised by Elgar Fleisch, Professor for Information and Technology Management at the ETH Zürich and the University of St. Gallen, and Walter Ackermann, Director of the Institute of Insurance Economics at the University of St. Gallen.

**The technology landscape in developing countries is changing rapidly – sometimes outpacing developed countries. Nairobi city-dwellers send money by mobile phone to rural relatives, Indian farmers get market quotations from wireless solar-powered ATMs, while doctors in city hospitals diagnose patients via video-streams and remote sensing.**

In much the same way, emerging markets should be a fertile ground for technology innovation in insurance and thus for “reverse innovation,” which brings the learnings back to developed nations<sup>1</sup>. This will be particularly relevant if, as many expect, commercial insurers begin investing in microfinance to establish a durable foothold in emerging markets – with “the notion in mind that today’s poor customers will be tomorrow’s wealthier ones,” says Jim Roth, co-founder of microinsurance fund LeapFrog.

But for now, providing low-cost high-value insurance policies without a simultaneous focus on process poses significant challenges. This concern affects development of the entire proposition: product design, sales, premium collection and claims settlement. Most importantly, insurers must respond quickly, consistently, and effectively, even in remote areas, to claims. Richard Leftley, President of MicroEnsure, explains: “Once a claim has occurred, timely payments are crucial, since the goal is to keep people out of poverty and in most cases, especially catastrophes, they require immediate help.” Fast claim settlement is important not only for affected customers, but also for the success of microinsurance programs overall. Vijay Kavalakonda from the World Bank, stresses that “as a customer, you talk about something that has worked well in the past. If people see a claim being settled and money being paid, they are convinced by the product.” Increasingly, companies will rely on technologies like the ones described in this report to adapt business models – or to prepare completely new ones from scratch – to overcome challenges inherent to the market opportunity.

Earlier this year, the Z Zurich Foundation contributed CHF 3 million to the ILO’s Microinsurance Innovation Facility (MIF). This added to existing funding from the Bill & Melinda Gates Foundation. The Foundation’s contribution will help to fund selected projects aimed at “scale and efficiency challenges.” Like other practitioners, I look forward to learning from the outcomes. Nonetheless, as others have already taken practical steps in this area, my team and I were interested to learn from their experience.

The ECM team with I-Lab interviewed nearly thirty experts (see appendix) about using technology to improve access to insurance. Challenges and solutions were identified in telephone interviews conducted during October 2010.

One constant ran through every single interview: incredible generosity with time and knowledge from the busy entrepreneurs who spoke with the team. I am astonished by and extremely grateful for the openness and insight provided by all who participated.



**Brandon Mathews**

Head of Emerging Consumer  
Zurich Financial Services Group

<sup>1</sup> Immelt, Jeffrey R.; Govindarajan, Vijay; and Chris Trimble (2009): *How GE Is Disrupting Itself*. October 2009, <http://hbr.org/2009/10/how-ge-is-disrupting-itself/ar/1>



## I. A new data universe: understanding customers better

**Today, data is created and stored in volumes that were unimaginable a few years ago. In addition modern technology allows us to analyze that information and make it useful for decision makers. This transformation is not limited to wealthy markets and wealthy people: the change is happening everywhere. For insurance companies that rely on detailed and reliable information on customers, that's a big deal.**

In 2000, perhaps three-quarters of the world's population left no digital footprint – no internet connectivity or cell phone or smart card. But today, with over 5.3<sup>2</sup> billion cell phone subscriptions for 6.7 billion humans, this ratio is probably reversed. Cell phones and, more generally, digital technologies allow analysts to track where people live, work and travel, as well as determine how much they earn, spend and how reliably they pay their bills. While the new ubiquity of data and data collection rightfully raises concerns about identity and privacy protection, it also provides new ways to learn to better serve the needs and wants of low-income, underserved populations.

Insurance is designed for specific events during specific time periods. Knowing the customer is critical to designing and implementing sustainable, valuable solutions. Whereas credit or savings products conceivably can be implemented without specific focus on how customers will use them – a working capital microloan can pay for a wedding or a dowry savings account can be emptied for a business opportunity – insurance requires an agreed event trigger to claim (even if, in the end, the claim payment is used to alternate purposes). New reliable data sources allow insurers to find the patterns necessary for product design and also for claims adjusting.

### A new data universe

	Number of bits
A page of text	8,192
Complete works of Shakespeare	41,943,040
A meter of shelved books	838,860,800
Capacity of a hard disk (2008)	1,600,000,000,000
SMS sent in 2010	6,788,282,941,440,000
All printed material	1,600,000,000,000,000,000
Digital Universe 2008 (number of bits)	3,892,179,868,480,350,000,000
Digital Universe 2010 (number of bits)	11,322,611,512,442,900,000,000

Source: <http://www.uplink.freeuk.com/data.html>, <http://www.economist.com/node/15557443>

<sup>2</sup> ITU- ICT- The World in 2010 – FactsFigures2010.pdf

### **Data mining**

Making sense of the titanic amount of available data creates a challenge and opportunity for insurers. Calvin Chin from Qifang quotes Steve Blank to underscore how critical customer insights are: "Within your building everything is an opinion; facts live outside of the building." Data availability in emerging markets is increasing exponentially. The idea of getting real feedback and data from the field by using new technology was identified by 8 of 30 participants from the study, with half of those providing specific examples:

Jonathan Hakim from ARK, a data analytics company, analyzes usage patterns of mobile phones. His company studies data from mobile network operators to derive customer types. This is done based on the customer's location, the time and duration of calls and the costs associated with the calls. Furthermore, mobile payment habits are investigated. As a result, he knows which customers might be interested in loans or insurance products in the very near future. By using SMS to send product information and ads from a trusted source, he helps companies target customers with the right offer at the right time without physical interaction. To have a trusted partner or source adds credibility to microinsurance offerings and hence can help insurers run more efficient marketing campaigns.

Camilo Tellez from the Mobile Money for the Unbanked (MMU) Programme at the GSMA, reports how EQUITY Bank in Kenya explores mobile phone and mobile payment habits. With data from M-Pesa, which serves 57 percent of the Kenyan adult population with mobile banking solutions, the bank can understand customers' payment habits and identify eligible loan customers. EQUITY Bank uses six-month financial transaction history from a mobile phone to build a credit history. This information is used later as a basis to offer loans to these customers. Collecting such information helps the bank to create better prices and understand how and where money is moved. While the information is currently used to identify customers that might be good beneficiaries, it might be a source for finding consumers with low risk profiles or a demand for a particular insurance product.

### **Monitor behavior and trends**

Simon Ralphs, CEO of Telematicus, gives another example: "We develop mobile phone-based solutions that monitor driving behavior to understand the driving-related risk profile of customers. These solutions can be devices that are attached to a vehicle and monitor speed, acceleration, and the current location. The data can be transferred via a data connection in real-time. This information can be used to target low-risk customers and may be included in the motor insurance underwriting process. It may help further on to optimize fleet management and logistics processes." The telematics solution is a real example of where the use of technology produces business intelligence.

A final example includes learning from web search behavior. Google.org Flu Trends uses aggregated Google search data as a near real-time indicator for flu activity around the world. The Internet search giant has found a close relationship between how many people search for flu-related topics and how many people actually have flu symptoms. Google mentions that, of course, not every person who searches for "flu" is actually sick, but a pattern emerges when all the flu-related search queries are added together. Google reports<sup>3</sup>: "We compared our query counts with traditional flu surveillance systems and found that many search queries tend to be popular exactly when flu season is happening. By counting how often we see these search queries, we can estimate how flu is circulating around the world." With sparse information on health conditions in emerging markets such web-based indicators provide a valuable first set of data for risk engineers and help predict and manage efforts for claims handling.

<sup>3</sup> Google 2010: Google Flu Trends: How does this work?  
<http://www.google.org/flutrends/about/how.html>

### **Implications for insurance**

The exponential growth of digitized data, particularly where it describes the needs and wants of lower income households, makes it possible to perform analyses and develop new products that were unthinkable years ago. Gathering and understanding customer data is important at all stages of the insurance value chain:

- Extracting information on customer behavior, expectations and risk exposure supports product design and pricing.
- On group schemes, data mining helps channel sponsors to understand the risk mitigation needs of its clients, and design a custom solution with a risk carrier.
- Insurance companies select and target specific customers based on their risk profile and spending patterns.
- For claims settlement, readily available data helps to settle claims quickly and with reduced documentation.
- Companies use data mining to compare claims and market developments to detect moral hazard and fraud in the portfolio.

While data mining sometimes raises privacy and identity theft issues, allowing people to “opt-in” for an extensive analysis of their data allows service providers including insurers to expand their services. For neighborhoods where marketers have yet to enter with clipboards, the new data opens possibilities that might otherwise never exist. Still, it will probably take a period of experimentation and dialogue for companies, regulators and customers to figure out the right balance between privacy and transparency.

## II. The bank in your hand: providing financial access through mobile phones

**Mobile phones deserve their reputation as a game changer: they now greatly outnumber landline connections, with customers using a wider range of communication and payment mechanism than anyone could have expected. As low-cost collection/transmission of payments is a key requirement for access to insurance, mobile payments could be the next big enabler for insuring new customers.**

The International Telephony Union estimates that mobile networks are now available to 90 percent of the world's population, and 80 percent of the people living in rural areas. Mobile phones are nearly ubiquitous and more and more business is done on them. As mobile phones penetrate where there is no main street, banks "are on phones and have antennas."

Today, more than 108 million people use simple mobile phones to pay bills and transfer money<sup>4</sup>. This number is expected to more than triple by 2014, when the total transaction value is expected to reach USD 245 billion. In developing countries, mobile payment systems can offer the best access to the financial system. With operators acting in 53 countries, the concept of mobile payment has spread quickly. SMS remains the dominant mobile payment technology. Its wide presence and ease of use makes it the technology of choice, especially for consumers in developing markets. And some companies have realized the opportunities of Near Field Communication (NFC) payments, where contactless cards facilitate financial transactions.

### **Branchless banking**

In recent years, no example of branchless banking has created more enthusiasm than M-PESA, the mobile payment service offered by Safaricom. Started in Kenya, it is just over three years old and already counts 57 percent of the Kenyan adult population as clients. M-PESA converts over 20,000 stores and other existing retailers into places where customers can deposit and make payments – that's 20 times the number of bank branches in the country<sup>5</sup>. The Gates data shows M-PESA reaching 70 percent of all households in 2009. M-PESA sometimes overshadows the success of a different approach to branchless banking found in Brazil that relies not on mobile phones but on point-of-sale (POS) devices deployed to agents. Following a ramp-up of agents by state and private banks, Brazil could claim by 2005 that every municipality in the country had a financial service point, changing the geography of financial inclusion. Based on these and several other promising pioneers, donors are investing large sums in branchless banking.

Benjamin Lyon from FrontlineSMS:Credit expects that with over 108 million mobile money users worldwide, payments over the phone will become standard in many developing regions. As he explains, mobile payment systems such as FrontlineSMS:Credit use commonly available technologies like SMS and USSD (dial-code commands).

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<sup>4</sup> Gartner 2010: Gartner Says Number of Worldwide Mobile Payment Users to Reach 108.6 Million in 2010, 10 July 2010, <http://www.gartner.com/it/page.jsp?id=1388914>

<sup>5</sup> Financial Access Initiative, Blog, October 28 2010, M-PESA Marches On, guest post by Jake Kendall of the Gates Foundation, <http://financialaccess.org/node/3593>



Alexandre Badolato, former Director of Garanttech, suggests that the value of mobile phones is not only in their convenience but in the flexibility in payments they offer. With a regular income being the exception rather than the rule for emerging consumers, it is worthwhile for insurers to review their handling of late payments: "We have seen companies which did not allow flexible payments. As a result, 20 percent of their customers were canceled and removed. Other companies could reduce their cancellation rate to 2 percent by being more flexible and accepting late payments. Customers in both companies were basically the same." During the interviews, 10 out of the 30 participants mentioned the use of mobile payment as a technology trend that will help emerging consumers to gain access to the financial system.

Brian Richardson, CEO of Wizzit, innovates in multiple directions simultaneously. His company uses mobile phones to establish new access to a full bank. WIZZIT bank accounts are offered to clients by "Wizz-kids," people from the community where the clients live and work. The "Wizz-kids" provide the initial explanation of the account and help customers sign up. In many cases, Wizz-kids maintain a relationship with the customers and keep their contacts up to date on available offers. The bank accounts themselves are linked to the customer's mobile phones which they can use to send money to other accounts. Financial transactions, such as payments to other WIZZIT customers or bank accounts, are cheaper than those of their competitors. By combining technology with social marketing and training, Wizzit learns quickly about what works and what doesn't in serving its customers.

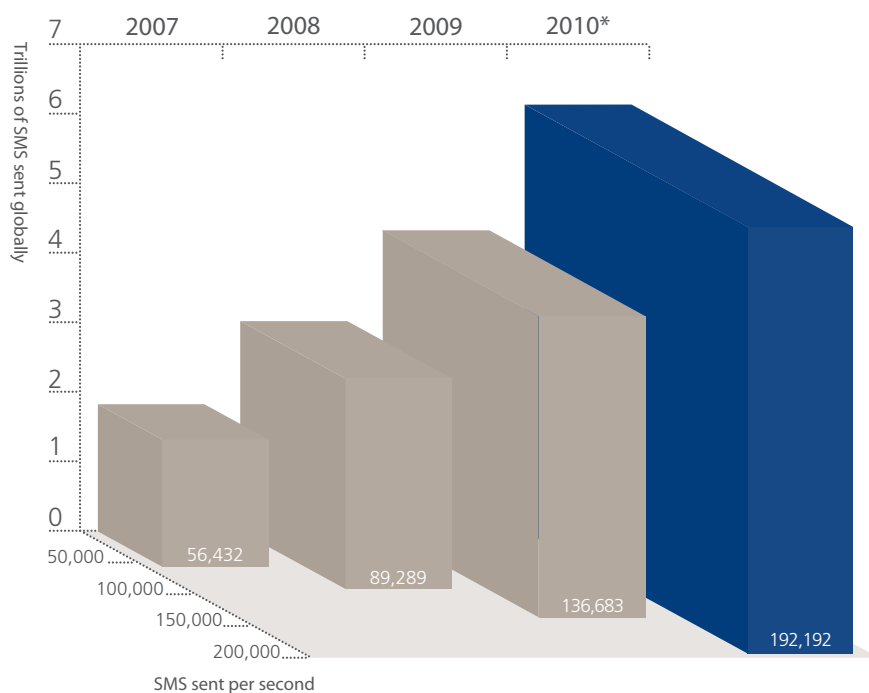
Despite the rapid recent growth of mobile phones as a tool for financial access, regulatory conditions can be a constraint in some regions. For example, mobile payment solutions are restricted by regulation in India and will only free up in early 2011. Ken Banks from kiwanja.net, who offers platform solutions for mobile services, complains that most of the mobile payment schemes are not compatible with each other. He draws comparisons to SMS, which in earlier times didn't work between different providers. "However, once SMS could be sent regardless of the provider, it took off."

In the end, mobile banks can be more easily accessed than physical banks because customers are familiar with and trust their phones. Vijay Aditya, co-founder and CEO of ekgaoon: "Nobody writes about teaching people to use a mobile phone in emerging markets. Nobody went to a remote place in Africa to teach women how to use mobile phones. They learn on the usage of it." That learning by using is a present reality for low-income people. As with banking, learning by doing seems to be an important strategy for insurers seeking to expand their distribution to reach existing demand.

### SMS advertising and sales

Simple mobile technology is also used to market services. It may offer an efficient way to target customers on an individual level and understand demand more precisely. C. V. Prakash, CEO and Founder of Gradatim, suggests that: "Advertisements could run via SMS. 600 million people in India have cellphones. Messages can be sent out to customers this way. You might not explain the whole product but you could inform them about social gatherings where information is distributed. I know a lot of MFIs that are telling people about community meetings." But Camilo Tellez cautions on challenges with new products: "It will be possible to sell via SMS and push advertisement. The problem is that you still have to explain what the product is, as the idea of insurance is not known to everyone in developing markets." Delwar Hossain Azad, Head of Financial Services at Grameenphone mentions the use of a reminder notification to customers prior to the payment date. Since most customers in emerging markets withdraw money from their accounts as soon as they get paid, the accounts are normally empty. When reminded via notification, the client knows that they have to ensure sufficient funds are in their mWallet account to pay for the premium.

### SMS triples in three years



\* Estimate  
Source: <http://www.itu.int/ITU-D/ict/material/FactsFigures2010.pdf>

- The total number of SMS sent globally tripled between 2007 and 2010, from an estimated 1.8 trillion to a staggering 6.1 trillion. In other words, close to 200,000 text messages are sent every second.
- Assuming an average cost of USD 0.07 per SMS, SMS traffic in 2010 is generating an estimated USD 812,000 every minute (or around USD 14,000 every second).
- In 2009, SMS revenue accounted for 12 percent of China's largest mobile operator's total revenue.
- The Philippines and the United States combined accounted for 35 percent of all SMS sent in 2009.

In Brazil, Vayon helps insurers get to market through SMS. The customer receives an SMS offer and then can respond in kind to start the purchase of life, home or funeral insurance products. A call center follows up after the customer purchases a product via SMS to complete the transaction so that the customer is well informed and all regulatory requirements are met. Valdemir Navarro, Vayon's CMO, says that "all scenarios allow insurance companies to sell microinsurance products with efficiency, low cost and market penetration." Navarro says that "while most of the elderly population is not used to these channels, the younger generation gets more and more comfortable with buying this way."

### **Implications for insurance**

Mobile payments and advertising enable insurance sales and service for customers that were prohibitively costly to interact with before:

- Signing up customers and collecting client information in hard to reach or remote areas in a standardized way using mobile phones;
- Collecting premiums from customers on a regular and convenient basis;
- Allowing clients access to policy data, including the payments realized, and submit changes to policy details;
- Paying claims directly to customers through mobile payment methods.

Mobile payments are not yet available everywhere – and work much better in some countries than others. This offers the opportunity to gather early experiences in front-runner markets, and prepare for business once mobile payments reach a higher penetration on a global scale.

### III. Infrastructure for everywhere: solar power and wireless networks

**Low-income clients in remote areas were once cut off from the modern economy – laying electricity or phone lines over hundreds of kilometers was just too costly and providers lacked resources. Solar power, other renewable energies and breakthrough technologies like stand-alone ATMs can now bring even the remotest villages ‘on line’ – and within the reach of insurance companies.**

Technology infrastructure in emerging markets has developed unevenly. While ATMs, Internet kiosks, wireless networks, and 3G data services are plentiful in wealthier urban neighborhoods, they are rare in rural settings and in “urban deserts” – places without formal economic activity. Things that seem natural, like communicating over the cell phone or withdrawing and depositing money at the next ATM, can become a hurdle when excluded from key infrastructure. This exclusion affects the financial sector as well: “One of the biggest challenges in the area of microinsurance is to solve the inclusion issue,” explains François-Xavier Hay, from MACIF, as “microinsurance exists because of exclusion – that is, people lack access to insurance facilities.”

Unlike the train tracks which first connected towns in developed markets decades ago, the new, inclusive infrastructure is laid wirelessly with solar-power and satellites. This connects communities and people more effectively. With these innovations to deploy infrastructure in less populated areas, consumers will gain access to basic technologies such as mobile networks and financial services at a reasonable cost.

#### Getting infrastructure in remote areas

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V. Vijay Babu, CEO of Vortex Engineering, has designed a low-cost, solar-powered ATM in India which runs profitably even in sparsely-populated areas. Vortex Engineering solved several problems inherent to developing ATMs for rural areas. First, the machine had to be energy efficient and run with off-grid electricity – here, supplied by solar power. It also had to accept and dispense notes and develop a cooling system. While ATMs might only be used for cash transactions in the beginning, Mr. Babu envisions the devices will be used to sell insurance products in the future with the customer’s bank account debited for premium collection. “Education about insurance products may have to happen outside the ATM network,” however, his ATMs would be the channel to execute the sale.

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Solar powered wireless networks may be rolled out and brought to scale in the near future to overcome the challenges of distance and high-cost infrastructure.

Krishna Sirohi, CTO of Vihaan Networks Limited, explains that since 2005 his company has been developing an inexpensive, solar-powered mobile network system for areas not yet served by telecom providers. Once the infrastructure is available, the basis is set for mobile banking providers. Krishna Sirohi further mentions that identity management can be implemented via the mobile phone system. A current government program in India, called "unique identity," will provide a unique identifier to everyone in rural areas. This can then be linked to mobile phones and numbers. The link from government ID to mobile number will enable other products where identity is key such as credit, savings, and insurance. For insurers this might be a chance to reach out to customers in hard to access areas and validate customer information in close to real time.

Timothy Lyman, Senior Policy Analyst at CGAP (Consultative Group to Assist the Poor), describes conditions facilitating a weather index-linked insurance program in Mongolia. "We were 18 hours away from the capitol [Ulan Bator] and we did not encounter a single household without a mobile device. All of these households agreed that they would pay an insurance premium over the mobile device." Without mobile network coverage this would not be possible. The development of broadband data services, more stable networks, and telecommunication standards in emerging markets is a necessary condition to develop solutions like mobile payment. Twelve out of the 30 participants in the study noted this as a requirement for new applications to emerge. While network coverage and data services such as 3G are already available in big cities, they are not as developed in less populated areas – mostly due to the weaker cost/benefit relationship. Developing solutions that extend the infrastructure to less populated areas will provide access to customers that could not be reached before.

Once deployed in cities and less populated areas, kiosks and ATMs can also be used to help pay customers as quickly as possible in case of an emergency. Bank OCBC NISP in Indonesia plans emergency payments to customers for Dengue fever treatment via ATMs. The amount is pre-authorized, so the customer merely has to use his card to withdraw the money at an ATM and buy the necessary medication without waiting to file time-consuming paperwork. David Piesse from Unirisx reported on this case. He sees particular use for authorizing and paying claims via ATMs in case of natural disasters where emergency payments need to be provided as fast as possible.



### **Remote sensing and monitoring**

Infrastructure technology is invaluable when it comes to estimating and monitoring risks. Insurers and re-insurers rely on data about natural disasters to offer insurance against floods, earthquakes, or extreme weather conditions. Automated measuring of rainfall is not just required for natural disaster monitoring but also for index-based weather insurance which until recently had relied on local weather stations. Jerry Skees, President of GlobalAgRisk, mentions that satellites will play a key role in assessing and monitoring natural disasters, especially as deploying weather stations will not be profitable and would most likely not reach all regions.

Another way of monitoring rainfall has recently been developed by the Eawag aquatic research institute in Switzerland. Researchers have been able to measure rainfall using data supplied by mobile telecommunications companies. The new method offers more detailed information than traditional rain gauges or weather stations. The research team took advantage of what is essentially a nuisance for mobile network operators that raindrops interfere with microwaves between base station antennas. These disruptions are then used to calculate the intensity of rainfall along the path between two antennas. As mobile networks are available to 80 percent of the world population in rural areas, coverage is sufficient to monitor rainfall in less populated areas. The data might provide an opportunity for insurers to gain new insights into natural disaster and rainfall in areas where little data has been collected or where information is hard to get. As the infrastructure is already in place, it comes down to partnering with local mobile network operators and processing data.

### **Implications for insurance**

Having access to infrastructure in remote areas is a first step for customers to connect with the formal economy. That access also offers service providers a way to learn about those customers. Access to mobile networks can enable mobile payments (see chapter II), access to bank accounts and debit payments and communication on everything around the client's interaction with the insurance provider and sales channel.

#### IV. Rich media for poor communities: expanding high-quality services

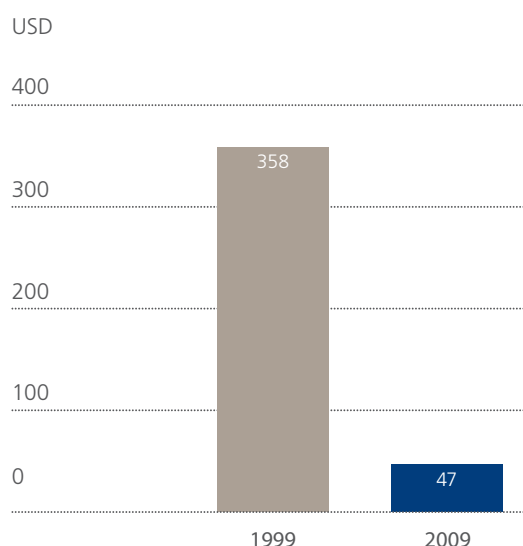
**While mobile communication first evolved around spoken and written text, 'rich media' allows for the exchange of a much broader range of visual and ambient information.**

"Rich media" is digital content that goes beyond plain text. Photo, audio and video become easier and cheaper to transfer as bandwidth increases and compression techniques improve. Interactive channels enable two-way communication, allowing clients to choose content and provide information on their needs and demands. Rich media can also open new avenues for providing services in remote areas.

Two factors have driven the rise of devices that carry rich media, like smartphones or tablets: smaller, cheaper devices and higher capacity data connections. These allow recording and transfer of video, audio, and application data in real time. The devices are more advanced than regular mobile phones and offer cameras, GPS navigation, and access to the Internet.

Although they are still too expensive for customers in developing countries, prices are dropping and many emerging consumer households are expected to purchase a smartphone instead of separate computers and phones. Production costs for mobile phones have decrease by around 90 percent over the last 10 years and the GSMA reports a similar trend in the area of smartphones. Jonathan Jackson, Founder & CEO of Dimagi says "Regarding technological limitations, you might have Edge connection in most parts of Africa, but you won't have 3G. Using the Internet or video would hence be too hard. Now, many countries are building up their 3G networks so in five years the conditions will be better and the issue will be solved."

#### Real cost of phones



Devices in figure are the RIM 850, which went on the market in 1999 with basic browsing, and the Samsung B100, one of today's cheapest.

Source: CGAP and DFID Focus Note: Scenarios for Branchless Banking in 2020, N:57, October 2009

In developed markets, smartphones are becoming a new service channel. Apple's and Google's concepts of "app stores" provide a unified and simple way of developing mobile services and distributing them to customers. Most of these services today are targeted at entertaining the user, getting emails, the latest news on Facebook or Twitter, but the potential of these devices has not been fully explored yet. Business processes implemented on smartphones and sales agents using them to offer services or sign documents electronically are expected in the near future. Similarly, insurers will need to send out claims adjusters less often when they can direct rural customers to take pictures and send documents over smartphones.

During the interviews 12 out of 30 participants mentioned smartphones and even tablet PCs as a major technology trend for emerging markets. Some of these participants noted that the devices will enable new services and applications such as remote medical diagnosis. The quality of health services may be improved and costs reduced when connecting medical experts with patients in remote places.

### Providing health services through telemedicine

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Sameer Sawarkar, CEO of Neurosynaptic Communications, develops solutions for remote diagnosis. Keeping in mind that medical support and treatment centers are rarely found in rural areas, he developed local stations in villages equipped with computer-based diagnosis tools. Treatment agents equipped with smartphones extend the reach of local treatment centers into even smaller villages. In this way medical data can be recoded and reported to hospitals in urban areas where service is significantly better. In addition, Neurosynaptic Communications can connect sensor technology from its local stations to an agent's smartphone to create a truly mobile diagnosis station. Finally, video conferencing can be brought to customers, as in the local stations, allowing face-to-face communication to build up trust.

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There are, however, limits to the role smart devices can play in bringing services to remote areas. Delwar Hossain Azad, from Grameenphone, explains: "Although our customers can do financial transactions via the mobile phone network in Bangladesh, consumers go to the nearby authorized booth operated by Grameenphone to have their transactions executed over the counter (OTC) by agents." This might reflect low confidence in the consumer's own skills or more trust in OTC to conduct the transaction correctly. It is clear that the human factor – physical contact with other people – remains a vital component when interacting with customers in the early stage of adaptation of a new leapfrog service.

### **Supporting distribution efforts**

Smartphones are currently at the outer limit of what most emerging consumers are ready to invest. However, it is increasingly feasible to equip a sales agent or local representative with such devices: Benjamin Lyon envisions that local agents could use smartphones to report claims, take pictures, and record the precise geographical position with GPS. This way the solid relationship with a trusted agent can be sustained while processes are simplified. Simon Ralphs suggests that giving a smartphone to an elder or a claims manager in a village could help to administer group or community policies.

Mobile devices can play a wider role in the selling process. Michael Roth, Senior Project Manager at GTZ, explains how mobile banking can solve issues of data quality: “When using agents or alternative distribution channels, the insurers know little about their customer and as a consequence, face poor or potentially mistaken customer information. Using data from mobile network operators can help to synchronize customer data with information the insurer already collected to improve data quality.”

Another breakthrough use of mobile phones is reported by Nathan Eagle, a research scientist with the Massachusetts Institute of Technology. He developed a mobile service called txteagle. In return for small payments he distributes jobs via text messaging. These jobs often involve local knowledge and range from checking what street signs say in rural Sudan for a satellite-navigation service to translating words into a Kenyan dialect for companies trying to spread their marketing. M-PESA is used to transfer money to a user’s phone as payment. As reported in an article from the Economist, a large media firm asked Nathan Eagle for help in monitoring its television commercials across Africa. The company was concerned that, although it had paid for broadcasting rights, its ads could be replaced with others by local television companies.

### **Implications for insurance**

The type and form of information available and transferable is crucial for insurance companies, with potential opportunities along the insurance value chain:

- Rich media is used to explain insurance products to clients – both through multi-media presentations, as well as through “video-conferencing” and other interactive features (e.g.: call centers using Skype with video).
- In sales, rich media is used to collect client photos or ID copies, as well as information on the insured assets (e.g. submitting photos and geo-coordinates of dwellings insured).
- Customers making claims can submit additional information digitally such as copies of death certificates or photos of damages to a property.
- Similarly, insurance companies can contact clients for rapid, technology-supported inspection of a claim’s validity and the damages incurred.
- For claims settlement, rich media can unlock services previously unavailable, especially in the areas of telemedicine and other expert-based services.

While smartphones and other devices for transmitting rich media content are not yet broadly available in developing countries, developing and refining rich media services for microinsurance could help insurance companies prepare for the new business models to be unlocked, and offer an additional incentive for customers to adopt these new technologies.

## V. The Internet of Things: connecting the physical and the virtual

**Computers and the physical world were once clearly separated. With the Internet of Things, however, virtual communication is being used to close that gap to preserve digital information in low-tech environments, get tangible products in clients' hands and to monitor insured assets.**

The basic idea of the Internet of Things (IoT) is that virtually every physical thing in this world can be connected to the Internet (ITU, 2005) with data devices. Such objects are often called "smart" because they can act smarter than things that have not been tagged with technology. For instance, a consumer good could be considered to be smart when tagged with a bar code. More advanced solutions might feature a time-temperature indicator that can be used to derive and communicate the product's state of quality, carbon footprint, or origin. The Internet of Things vision is not new. However, it only recently became relevant to the practical world, mainly because of the decline in the size, cost, energy consumption, and hardware dimensions of these devices over the last decade. As a result, the boundaries between real world objects and their virtual images are starting to blur.

During the interviews Mark Davis from Esoko mentioned that "the more fine-grained the information is, the less are the chances for fraud in insurance." IoT technologies help to provide a more fine-grained level of information for insurers. They offer a high-resolution view of the world by using sensory information and giving an identity to objects of any kind. Technologies that help to identify objects vary from simple barcodes to small RFID (Radio Frequency Identification) sensors that carry a unique number to distinguish products or objects on an item-level. Six of the 30 participants mentioned IoT technologies during the study, and gave detailed examples how to use them to overcome challenges in microinsurance.

### **Make insurance a tangible product**

The use of low-cost technology to identify objects dates back decades to the introduction of barcodes, scratch-cards and, later smartcards containing small microchips. Renata Rego from Zurich Financial Services Group reports on the simple and eye-catching use of pre-paid cards, or "scratch" cards, to sell insurance in Mexico and Bolivia. Sold at kiosks, gas stations and supermarkets, the card offers a tangible insurance product and can also be used to gain discounts in pharmacies and other retailers. Just like pre-paid phone cards, each card has a unique number. Customers provide this number to a call center which records their personal details and activates the insurance policy.

Syngenta Foundation for Sustainable Agriculture, UAP Insurance, and telecom operator Safaricom have reported on a more advanced use of IoT technologies to sell insurance in Kenya. Farmers there can minimize their risk of drought or excess rain by paying an extra 5 percent for a bag of seed, fertilizer or other input from local agro-dealers. The dealers have been equipped with a camera phone that scans a bar code at the time of purchase, which immediately registers the policy with UAP Insurance over the mobile data network. After the purchase, an SMS message is sent to the farmer's mobile phone confirming the purchase of the insurance policy. Some 30 weather stations in the region have been renovated with solar-powered automated systems capable of broadcasting regular updates on weather conditions and rainfall. When drought or other extreme condition (including excessive rain) is indicated by a particular station, all farmers registered with that station automatically receive payouts directly via the M-PESA mobile money transfer service, eliminating the need to file individual claims. In September 2010, the program paid out 100 farmers without a lengthy claims process. The payouts were commensurate with the farmers' projected losses. For example, a calculated 15 percent decrease in yield based on rain shortfalls recorded at the weather stations triggered a payment of 15 percent of the insured value. The largest



payout was for 2500 Kenyan Shillings (Kshs) or about USD 30. That is the equivalent of about 12 kilos of high-yielding maize seed, which is enough to plant one acre. Farmers who received a payout are now encouraged to insure more of their inputs in future, since a quick payout leads them to trust the insurance and the benefits they receive. The accuracy of the weather box technology and the high levels of customer satisfaction has encouraged more agricultural companies to participate in the program.

## Identify triggers and claims

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A government-supported health insurance scheme in India uses IoT technology to provide insurance to low-income people. Health policies are distributed through grassroots organizations and community-based agents. Rishi Gupta, Director and CFO of FINO which provides the technology for the

product, explains: "Local agents register customers by taking photos and recording their fingerprint information. This information is stored on a smartcard and handed to the customer. Each smartcard has an approved limit of USD 600 from the insurance company. In case a customer requires medical treatment the hospitals ask for the client's smartcard and checks if there is enough money left on the account. After the treatment, the entire payment process is done electronically: the costs for the treatment are deducted from the customer's smartcard and an invoice is sent electronically to the insurer." The system is now running in more than 5,000 hospitals in India and the government aims to cover 100 million households in this way. This is a highly-subsidized government scheme: clients pay only USD 0.50 of the total premium of USD 12 and the government picks up the rest. However, it points the way to a technology-supported pre-approval process and electronic payment system that could also be used in financially sustainable schemes.

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IoT technologies are not only used to simplify the sale of insurance or handling claims. The ability to give any object a unique identity is being used to counter fraud. For example, IFMR Trust Holdings and HDFC Ergo GIC applied this technology to cattle insurance in India in 2010. If a cow from an insured herd dies, the insurance company needs to ensure that the animal was actually part of the insured group. This is hard to check and has led to fraud. One way to overcome this hurdle is by attaching small RFID sensors to the cow. This small electronic device carries a unique number which is connected to the insurance policy. If the identification number from the chip is matched with the numbers that are part of the insured cattle, the payment to the customer can be made without delay<sup>6</sup>.

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<sup>6</sup> Examples see: [http://www.ifmrtrust.co.in/downloads/et\\_article\\_09.pdf](http://www.ifmrtrust.co.in/downloads/et_article_09.pdf)

### **Implications for insurance**

Linking virtual information to tangible, physical items can have great benefits for insurance companies:

- In sales, smart cards and similar technologies (e.g. patches on bags) can act as a physical representation of a policy – important in areas where contract enforcement is difficult, and digital systems not always accessible.
- RFID chips can be used to track insured items – as in the cow example above – to identify legitimate claims and reduce fraud.
- Smart cards can also be used to identify customers eligible for claim payment or access to services, especially relevant in health insurance to reduce out of pocket payments of clients.

In all these examples, the Internet of Things is strongest when combined with the other technologies described in this study – for example, when analyzing the data generated by smart things to better understand customers, or when transmitting information by mobile to insurance companies.

## Drawing conclusions

### Usability

Design both technology and insurance with a focus on usability by early adopters among low-income consumers:

- Learn from client experience and behavior with regard to technology, and in particular with regard to financial products like insurance;
- Address language and literacy barriers in text-based marketing or sales tools;
- Scale down complexity for users (even though this can require more effort in design and manufacturing).

### Affordability

Anticipate and take steps to encourage affordability/adoption:

- Prepare for future price drops by piloting technology and planning for affordability and market breakthroughs (like the one exemplified by the iPad success);
- Realize economies of scale, especially when tapping large pools of microinsurance customers;
- Offer solutions that allow 'shared use' of infrastructure, for example signing up multiple clients via the same mobile phone;
- Leverage existing technologies already "paid for" by clients, like mobile phones, or apply technologies that offer clients additional benefits, like RFID chips that allow tracking vaccinations or productivity of cattle.

### Investment

While technologies might save money over the long term, they often require upfront investment to build and refine the system. Options for insurers include:

- Investing in cross-platform applications and pilot tests early to allow learning cycles;
- Partnering and co-investing with technology and infrastructure providers;
- Teaming up with other financial service providers and insurance companies to facilitate sector-level investments in shared infrastructure (electronic credit-bureaus, cross-provider platforms for mobile payments, etc.).

### Regulation

Both insurance and technology are affected by regulations, which thus play a crucial role in enabling synergies between the two. Insurance companies should:

- Simplify products and run pilots to prove feasibility of remote and non-advice sale;
- Enter and strengthen dialogues with both financial and technology regulators to understand and remove barriers to applying new technologies for microinsurance;
- Showcase successful examples from other markets and the regulatory conditions enabling these.

## Appendix

- **Vijay Aditya** is a development professional with hands-on experience in institution development, development research, communication systems, and grassroots networking. He is co-founder and Chief Executive Officer of eKgaon. eKgaon designs and develops technologies and information systems to meet the needs of developing communities.
- **Delwar Hossain Azad** is the Head of Financial Services at Grameenphone. Grameenphone is the leading telecommunications service provider in Bangladesh with more than 28.7 million subscribers as of October 2010. In addition, Grameenphone started the Village Phone Program in 1997 which provides an income-earning opportunity to more than 210,000 majority female Village Phone operators living in rural areas.
- **Vijay Babu** has more than 20 years of experience working in start-ups and established companies. Vijay Babu is the CEO of Vortex Engineering Pvt. Ltd. founded with the focus of improving the quality of life of the rural population by building technology for practical use. Vortex is now changing the face of banking with its new low-power, rugged, and reliable low-cost ATMs.
- **Alexandre Badolato** is the former Director of Garantech, the joint venture between AIG and Whirlpool in Brazil. He is now a Principal of his own consulting firm, Alexandre Badolato Consultores.
- **Ken Banks**, Founder of kiwanja.net, devotes himself to the application of mobile technology for positive social and environmental change in the developing world, and has spent the last 17 years working on projects in Africa. Since 2003, kiwanja.net has been helping empower local, national, and international non-profit organizations to make better use of information and communications technology in their work.
- **Calvin Chin** is the CEO of Qifang Inc., an open platform and online community with the singular purpose of giving everyone a way to pay for their education. He has taught students, worked on Wall Street in the debt capital markets, and served in leadership roles in several technology start-ups for more than 12 years.
- **Mark Davies** is the Founder of Esoko. Esoko was started as TradeNet in 2005 with the encouragement of the UN, and in partnership with FoodNet2 in Uganda. Esoko is one of several new Market Information Systems emerging from the rapid distribution of cellphones in developing countries. Focused on agricultural marketing, it provides current market data via SMS and the web to stakeholders within the agriculture and trade sectors.
- **Eric Gerelle** is Director at IBEX Project Services. IBEX Project Services works with a worldwide network of consultants and organizations to help implement client projects. The consultants bring expertise in project financing, change management, and business modeling.
- **Rishi Gupta** is the Director and CFO of FINO. He is responsible for Corporate Finance, Fundraising, and Investor Relationships. FINO was founded in 2006, with the single objective of building technologies to enable financial institutions to serve the under-served and the unbanked sector.
- **Jonathan Hakim** is CEO of ARK Mobile Finance. He spent eight years as Managing Director at Lehman Brothers and is a former Director of the International Finance Corporation. ARK is a data and analytics company that utilizes mobile phone activity to identify behavioral patterns of individual customers.
- **François-Xavier Hay**, an actuary, joined MACIF group in May 2009 where he is Director of Partnerships and Microinsurance. MACIF is a French mutual insurance company, one of the leading insurers in France, comprising 11 self-managing regions administered by regional committees.
- **Jonathan Jackson** is the founder and CEO of Dimagi, Inc. He is an entrepreneur and innovator with extensive health technology expertise in both developed and developing countries. Dimagi is a technology company that helps organizations deliver quality health care to urban and rural communities across the world. Dimagi is a leader in open source software for healthcare including mobile health, SMS, care coordination, and data collection.
- **Vijay Kavalakonda** is a Senior Insurance Specialist at the World Bank. He works for the Insurance for the Poor Program, part of the Financial and Private Sector Development Department. Since joining in 1999, he has worked in a number of areas, including: Natural Disaster Risk Management Programs, Agriculture insurance including weather-index, and Health Insurance.
- **Richard Leftley** has served as President and CEO since the inception of MicroEnsure in 2005. He previously worked as a reinsurance broker for Benfield Grieg Ltd., the world's largest independent reinsurance brokerage group. MicroEnsure is an insurance intermediary dedicated to serving the poor throughout the developing world with an affordable and appropriate range of insurance products.

- **Timothy Lyman** is a Senior Policy Advisor leading the Government & Policy Team of CGAP. In this capacity, he focuses primarily on regulatory and supervisory issues in financial inclusion. He has worked in the area of microfinance-related policy and regulation in every region of the world and has been working in community development for over 25 years.
- **Benjamin Lyon** is Executive Director of FrontlineSMS:Credit. The mission of FrontlineSMS:Credit is to leverage mobile payment systems to bring financial services to the unbanked poor. His solution enables microfinance institutions to send and receive payments directly from the mobile wallet, significantly reducing the operational costs of issuing credit.
- **Brandon Mathews** is Head of Emerging Consumer Microinsurance at Zurich Financial Services Group. He is a member of the Steering Committee for the ILO's Microinsurance Innovation Facility which manages grants on behalf of the Bill and Melinda Gates Foundation. He is a member of the Executive Committee of the Microinsurance Network, the IAIS-CGAP Joint Working Group on Microinsurance, and the American Council on Germany.
- **Valdemir Navarro** is the President and CMO of Vayon, an insurance solution provider which aims to deliver new and innovative options to capture and collect microinsurance premium in Brazil. Vayon provides multi-channel distribution solutions which use new means of technology like SMS, Digital TV, and Social Networks.
- **David Piesse** is the Chairman of Asia Pacific Operations of Unirix. He has more than 30 years of global insurance, financial services, information technology, risk management, and telecommunications industry experience. Unirix was developed to provide an easy and low-cost way to launch, distribute, and manage insurance products anywhere in the world.
- **C. V. Prakash** is the Founder and CEO of Gradatim. He is a successful serial entrepreneur and expert in content management, data capture, and imaging technologies. Gradatim, a pioneer in the Business Process Utility (BPU) space, delivers evolutionary, on demand business process utilities to customers across industries.
- **Simon Ralphs** is the CEO of Telematicus. His company provides a global telematics solution that improves costs, accident and fatality rates, and environmental pollution for organizations operating vehicle fleets worldwide.
- **Renata Rego** is a Project Manager in the Emerging Consumer practice of Zurich Financial Services Group. In this role, Renata develops processes for Microinsurance businesses, helps existing business units work towards ideal franchise in serving the low-income segment. Renata brings a wealth of experience in operations, workflow development, and IT to profitably deliver high-volume, low-cost consumer finance products.
- **Brian Richardson** is CEO of WIZZIT, offering a secure and efficient payment mechanism to the unbanked and under-banked people in South Africa. The product is a low-cost, transactional bank account that uses cell phones to make person-to-person payments, transfer and pre-paid purchase, and a Maestro debit card for making payments in the formal retail environment.
- **Jim Roth** is Co-Founder and Partner of LeapFrog Investments, the world's first microinsurance fund. Formerly, he was Vice President of The Microinsurance Centre, ILO Chief Technical Advisor on microinsurance in India, and consultant to multinational insurance companies.
- **Michael Roth** is a Senior Project Manager at GTZ. The Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) is a federally owned organization, working worldwide in the field of international cooperation for sustainable development. GTZ has operations in 128 countries in Africa, Asia, Latin America, the Mediterranean and Middle Eastern regions, as well as in Europe, the Caucasus, and Central Asia.
- **Sameer Sawarkar** is the CEO of Neurosynaptic Communications Pvt Ltd, a Bangalore based company. Neurosynaptic believes that technology can enable access to essential resources at affordable prices to the masses. It is engaged in the development of low-cost technology for application in rural areas, focusing problems of healthcare delivery and agriculture.
- **Krishna Sirohi** is CTO of Vihaan Networks Limited (VNL) and has more than 20 years of experience in technology development leadership within both the telecom field and the defense sector. VNL makes a solar powered turnkey GSM system specifically made for rural areas, which is the first commercially viable GSM system that is independent of the power grid.
- **Jerry Skees** is the President of GlobalAgRisk Inc. and the H.B. Price Professor of Agricultural Policy and Risk at University of Kentucky. GlobalAgRisk specializes in developing innovative financial instruments for agricultural and weather risk management. This work includes designing, underwriting, actuarial analysis, and legal and regulatory advising to make new financial instruments viable in lower income countries.
- **Camilo Tellez** is an Analyst for the Mobile Money for the Unbanked (MMU) Program at the GSM Association. The GSMA Development Fund has initiated the Mobile Money for the Unbanked (MMU) program to accelerate the availability of mobile money services to the unbanked and those living on less than USD 2 per day.



## About Zurich

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