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From insight to impact:
realizing the potential of innovation
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Foreword

Innovation has become a watchword for success in the boardroom these days. But the challenge for many companies is in knowing what to innovate and how to go about doing so. Relying on technological breakthroughs alone, for example, is simply not enough. Instead, innovation must be driven by a desire to deliver real meaning to the customer.

That meaning can be found first and foremost in addressing the important issues that people are facing today – and in the future. Our global population is growing in number and aging rapidly, which in turn is placing increasing demands on resources such as energy, food and water, as well as on our health care and education systems. We need a clear vision of the future, based on understanding these unprecedented challenges and how they affect individuals.

At Philips, our mission is to improve the lives of three billion people a year by 2025. We aim to do that by understanding our customers in the context of each of their lives, all around the world. The way we address individuals' needs – person by person – has a meaningful impact on the larger challenges. Increasingly, alongside new products, we are devising intelligent systems and services that adapt themselves to their user.

Our mission to deliver meaningful solutions to our customers has led us to collaborate with The Wall Street Journal Custom Content Studios on this white paper, 'From insight to impact: realizing the potential of innovation.' The paper highlights case studies of innovations that are dramatically improving people's lives in the fields of education, health care and financial services. It also explores the meaning and use of "high-impact innovation," which addresses individual needs and in turn tackles larger global challenges. The paper draws out insights and lessons from each of the case studies, which help us understand why they are effective and what is shaping their ability to reach their full potential.

Crucially, the paper examines the ingredients necessary for successful innovation and how companies can incorporate them into their own business. It also shows how striving to create innovations that truly help people to be healthy, live well and enjoy life is key to delivering the solutions that will change lives, both today and tomorrow.

Jim Andrew
Chief Strategy and Innovation Officer, Philips

Introduction

'From insight to impact: realizing the potential of innovation' explores three case studies of innovations that are in the process of dramatically improving people's lives, but which still have the potential to become more widely transformative. The three focus areas are:

- **Education**, looking at the impact of MOOCs (Massive Open Online Courses) on access to and the quality of higher education
- **Health care**, looking at the impact of personalized medicine and care on sickness and health
- **Financial services**, looking at the impact of mobile money in Africa on tackling financial exclusion.

The paper draws out insights and lessons from each case study, with the aim of contributing to a broader understanding of the factors that drive and hold back the potential of innovations to reshape the world. Readers who want to understand more about the three innovations can turn to the three case studies for concise overviews, outlining the promise, the progress and the challenges facing each one.

The research is based on in-depth interviews with key players and experts in the three fields and on discussions held at The Wall Street Journal's CEO Council in November 2013 in Washington, D.C. The themes developed in the report are designed to provoke further discussion at the World Economic Forum in Davos in January 2014, where delegates are discussing the forces reshaping the world.

We would like to thank all our interview partners for their willingness to share insights into both their successes and their failures – and we wish them all the best in realizing the full promise of the innovations they have helped to unleash.

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What is **high-impact innovation?**

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Innovation is on everyone's lips these days. It's seen as the key to companies' survival and to countries' ability to compete globally. But high-impact innovation that dramatically improves people's lives by successfully tackling big global challenges such as health, education and poverty is a rarer beast.

This report explores three innovations currently disrupting their respective fields and offering the promise of transformed lives and a reshaped world. Our aim is to understand what factors enabled these radical innovations to emerge successfully and what is shaping how and whether they can realize their full promise.

The innovations we focus on are:

- **Massive Open Online Courses**, or MOOCs, which have re-imagined how and when advanced learning takes place and for whom it is intended, opening the prospect of a revolution both in teaching and in global access to higher education (see page 14)
- **Personalized medicine and health care**, which is incorporating advances in genomics and data analytics to rethink the nature of disease, potentially opening the way to more effective and efficient tailored treatments (see page 17)
- **Mobile money schemes in Africa**, which are overcoming the lack of banking infrastructure and the constraints of poverty to offer financial services to anyone with access to a mobile phone – potentially putting an end to financial exclusion (see page 21).

In drawing out lessons from each of these case studies, we find that the key to creating innovative potential in these fields has been to radically redefine both needs and solutions. This often means bringing together previous innovations and initiatives in new combinations to address unmet demand. Getting the innovation to market, and to scale, requires not only time to experiment while business models remain unclear, but also new alliances and partnerships to reduce backlash from incumbents and encourage further transformative innovations.

Redefining needs and solutions:

creating the potential for high-impact innovation

Harvard professor Clayton Christensen dubs one of his most powerful theories of innovation the "job-to-be-done." Don't ask what kinds of people buy a particular product or service, he says, but why they buy it – what it actually brings to their daily life, expressed in simple terms. When experts talk about tackling the big global challenges, they tend to lose this granularity of insight and discuss people's needs in terms of broad categories. But one of the key lessons from the high-impact innovations explored in this report is that re-imagining need from the viewpoint of potential users is essential to impact.

Take the issue of financial exclusion. Following a high-level World Bank forum in October 2013, its president, Jim Yong Kim, released a press release entitled, "Universal financial access is vital to reducing poverty, innovation key to overcoming the enormous challenge." The analysis and ambition is excellent –the problem is that innovative technologies only work if they explicitly help people to achieve concrete goals. Gaining financial access is not a need that people who have no access to financial services recognize.

M-Pesa, the mobile money service introduced in 2007 by Safaricom, Vodafone's Kenyan subsidiary, and now used regularly by 12 million Kenyans who transfer the equivalent of 25% of the country's GDP each year, was originally conceived as a way to expand financial inclusion through microcredits. But during the unspectacular pilot project, launched by Vodafone and U.K. aid agency DFID in a Kenyan village in 2004, some of the team noticed that people were repurposing the scheme to send each other money. It was that insight, later developed by talking to dozens of people who explained how difficult it was to send cash home to their families using bus drivers, which led to M-Pesa's ground-breaking yet simple idea: it helped people send money home.

Meeting that need successfully was enabled by a clever new technology platform, the deep penetration of mobile phones and a brand that Kenyans already trusted. But Safaricom's crucial step was to translate mobile money into a solution that was tangible for its potential users. They spent a year before launching M-Pesa building a network of agents in every village, allowing people to hand over cash in one place and have someone pick up cash in another. In between, the cash became mobile electronic money, but that was not what people were looking for.

Since that first insight M-Pesa has broadened out its offerings, allowing people to pay bills and get paid without using cash – and more recently to open savings accounts and take out loans. In the words of the World Bank, M-Pesa has expanded financial access, but it did so by listening to the real needs of its customers and taking them along with it, step-by-step.

The wow behind MOOCs

A similar shift in defining needs can be seen with the MOOCs, hundreds of which are now offered by top universities around the world at any one time, reaching over seven million students in the past few years. Remote and online learning are not, of course, new concepts. Christian Terwiesch, a professor at The Wharton School who runs his own MOOC on the Coursera platform, says his school invested a sizeable amount in online learning 15 years ago, offering online business lectures for a hefty price. "Our idea was: we bring Wharton to you, but the demand was not there.

The wow behind the MOOCs was that they recognized that learning could happen anywhere." They reframed the need using the perspective of people – from high-school pupils to pensioners – that were looking for the chance to learn, not primarily for a degree.

The solutions offered by platforms like Coursera and EdX, which have catapulted MOOCs into the university mainstream, have not involved a fundamental revolution in education, to the disappointment of those who originally coined the term. But they have completely rethought how people can best learn online. Instead of long lectures, themes are broken into small 10-15 minute chunks, with instant quizzes to keep attention high. And instead of classes, there are global communities of people learning broadly at their own pace, but within a fixed space of time and connected by online discussion forums, to provide motivation and social interaction. Other innovations are virtual labs, peer-review grading and experimentation with online exam proctoring to avoid cheating.

"Innovation is a novel match between a solution and a need. You frame the problem more broadly and see better ways to address it."

"Innovation is a novel match between a solution and a need," says Prof. Terwiesch, who co-authored the 2009 book Innovation Tournaments. "Some innovation leaves the need unchanged, but high-impact innovation really redefines the need. You frame the problem more broadly and you start to see alternative and better ways to address it."

Getting innovations to market and to scale:

the role of alliances and partnerships

Both M-Pesa and the MOOCs saw explosive growth in their first few years of operation, with new players able to gain a firm foothold before incumbents were really aware of the competitive threat they entailed. That is what Dr. Christensen calls a "disruptive innovation," one that elicits a rather bemused response from competitors who move upmarket to protect what they're good at, allowing space for newcomers to grow. Others call it a "blue-ocean strategy" – diving into the space where no one is competing, to avoid a bloody battle that turns the sea red.

For personalized medicine, the going has been tougher. It has been 15 years since the first personalized drug was approved, raising the promise of the right treatment, for the right patient, at the right time, as it has come to be expressed. But it is only in the past three years that targeted treatments and relevant diagnostics tests have started to fill up pipelines and make an impact on clinical reality. And it is only now that regulators like the U.S. Food and Drug Administration (FDA) are really getting to grips with critical regulatory processes to facilitate the development of personalized medical products.

Part of the delay in shifting from insight to impact has been the complexity of understanding diseases at the molecular level. Part is also due to the time it has taken to speed up and cut the cost of gene-sequencing and data analytics in general. But researchers and drug-discovery firms have also had to battle against the inertia of the entire health care chain – doctors, drug-makers, labs, regulators, policy-makers and those who pay the bills – all fearing the impact of personalized medicine on their world.

"The issue with personalized medicine is not about people denying it's a good thing," says Iain Miller, CEO of Healthcare Strategies Group. "It's more about optimizing logistics, optimizing business models and getting more documentation on cost effectiveness." It's only in very recent years that a critical mass of incumbents has started to lend momentum to innovation.

For drug-makers, to cite one example, the challenge has been head-on. The premise of personalized medicine is that it makes more sense to develop targeted treatments for small, identifiable sub-groups of patients that would respond spectacularly well to them, rather than look for blockbuster medicines that could treat anyone. But with research productivity declining and targeted medicines requiring smaller clinical trials and significantly shorter approval times, drug-makers are reshaping their business models to take advantage of the innovation.

Some have bought up successful biotech firms and forged strategic partnerships with companies working in the diagnostics field to develop biomarker tests jointly with drugs. They are now pushing health systems to regulate tests as part of treatment and reimburse companion diagnostics – even accepting that existing drugs may have to be narrowed in their application, to reflect research findings.

Powerful partnerships

It's been a long haul, but the process of defining new business models and forging new alliances to bring the most innovative and flexible incumbents on board is ultimately common to all significant innovations – regardless of how long they can operate under the radar screen.

After the dramatic success of M-Pesa in Kenya, for

"The issue with personalized medicine is not about people denying it's a good thing. It's more about optimizing logistics, optimizing business models and getting more documentation on cost effectiveness."

example, the banks both inside the country and outside woke up to the reality that telecoms providers were able to offer a financial service that they had regarded as too costly to consider. Safaricom's perspective was different: the service was primarily perceived as a way of keeping its customers loyal as competition increased in its core mobile business. That gave M-Pesa time to build a sustainable business model without pressure. But it needed the banks to make mobile money work.

Safaricom had been careful to keep the central bank and finance minister informed of its intentions and

progress – helping them to regulate the service as it evolved, but also stopping a backlash from banks that briefly attempted to lobby M-Pesa out of existence. But Safaricom also forged partnerships with those banks that were willing to talk and helped them see how they could benefit from mobile money, which effectively sucks money out of the unbanked community and deposits it in banks. Selecting one bank as a partner, Safaricom then set up M-Shwari, its savings and credit scheme, unlocking access to millions of unbanked customers.

But outside of Kenya, mobile money has been something of a disappointment, despite similar challenges and needs in many countries. There are many reasons why M-Pesa worked so well in Kenya, but the failure in many places is due to pressure from banks on their regulators to keep telecoms companies from doing what they did in Kenya. In Nigeria, for example, the banks lobbied regulators hard to ban telecoms companies from running financial services, arguing that it would hold back full access to financial services. As a result, mobile money is restricted to banks or central bank licensed third parties. The central bank is now pushing its bank-led model of financial inclusion hard, but its decision to protect incumbents, rather than working creatively to protect innovation, undoubtedly slowed progress.

For the MOOCs, the backlash is just beginning. “People are scared of losing their jobs and all of a sudden MOOCs have become a political minefield, even though for student outcome and for quality of life for faculty, it’s a win,” says Coursera’s Ms. Koller. “My prediction is that, because of the politics of faculty jobs in the U.S., some of the emerging markets are going to adopt this technology much faster.” Beyond faculty pushback, some U.S. universities – particularly in the second and third tiers – will also start to see MOOCs eating into tuition fees.

As with the other innovations, a competitive battle of some sort is unavoidable. But as the MOOC platforms build their business models in the coming years, they too will need to focus on building even closer partnerships with those institutions interested in changes, showing their administrators and their faculty how it makes sense for them.

Shoulders of giants:

realizing the full promise of high-impact innovation

When Isaac Newton explained that he had been able to see further than others by "standing on the shoulders of giants," he expressed a truth about innovation that is often lost in the hype – every innovation builds on the successes and failures of others. But it is equally true that for an innovation to realize its full promise, it must act as the foundation for multiple new initiatives, leveraging its impact many times.

Each of our case studies has already led to creative rethinking in a number of areas. In Kenya, one of the most original mobile money initiatives comes from M-Kopa, a company set up by some of the original M-Pesa team. M-Kopa uses mobile payments technology to solve a different problem – making electricity affordable for the vast majority of Kenyan households, which rely on expensive and dangerous kerosene for light. By installing a rooftop solar panel with a GSM control box, for a deposit of around US$30, users can pay small daily amounts by M-Pesa, getting electricity for lighting and phone-charging for less than they pay for kerosene. Some 30,000 Kenyans have signed up in the first year, but the potential for such solutions is huge: around the world, 1.4 billion people lack electricity.

MOOCs, too, are igniting new thinking, despite their relative youth. The biggest shake-up so far is taking place in the campus classroom as teachers, using MOOCs to prepare their students before class, consider how they can best interact with their students when they don't need to lecture. K-12 schools in New York and California are already working on developing teaching curricula around the "flipped" classroom. But the most far-reaching developments are likely to take place in emerging ▶

▼ markets where educational capacity is limited, opening up room to leapfrog to new and potentially more effective systems of education.

In the field of personalized medicine, the biggest spin-off potential comes from the attempt to translate even wider categories of data into a far richer understanding of the characteristics and behavior that determine an individual's health. This could have significant implications for managing and preventing chronic disease – the major source of rising costs in developed health care systems – replacing occasional visits to the doctor and hospital, with remote but continuous monitoring of health, using everything from wearable sensors to smartphones that can detect a decrease in activity levels.

Conclusion

As the world's political and business leaders meet at the World Economic Forum in Davos to discuss the forces reshaping the world, there will be much talk of how best to tackle global challenges in areas like health care, education and poverty relief – and also much talk of technology and its role in providing innovative solutions.

Our focus on three innovations that are already having a significant impact on people's lives provides three lessons to bear in mind during these discussions. The first is that technology is merely the tool to think about solutions – the real innovation is in understanding the challenges people face in their daily lives in a deep yet simple way. The second lesson is that innovations driven by needs can be slowed and compromised, even if not stopped, by the fear of incumbents, the cowardice of regulators and the unwillingness of all sides to talk and form what may be, at times, uncomfortable alliances and partnerships. But everyone loses. Finally, successful innovations need to operate as fertile ground for new initiatives and rethinking if they are to achieve their full impact – remaining open to that possibility is core to high-impact innovation.

Case studies

Case study 1:

MOOCS reshape the university landscape

It's been just over two years since two leading Stanford University professors, inspired by Salman Khan's short math videos for children on YouTube, opened up participation in their hugely expensive artificial intelligence undergraduate course to anyone who was interested, via a Cloud platform. Around 120,000 students signed up from 175 countries around the world, ranging from school pupils to pensioners. That dramatic success has unleashed dozens of new MOOCs (Massive Open Online Courses) from the world's top universities and led to the creation of several competing platform providers, which have provided what used to be elite courses to more than seven million online students for free.

The speed of developments has produced lots of hype over the past couple of years, with much breathless talk of an educational revolution and free access to university education for the world's poor. More recently, it has also created a backlash among university faculty, in the U.S. especially, who argue that online learning cannot replace teaching and who worry about losing their jobs while policy-makers and university administrators look to cut the rising costs of education.

The reality is that education is undergoing the same challenge from virtualization as the media or retail sector. "You can think of a stable and rather ossified landscape that is now walking on quicksand," says Daphne Koller, CEO of Coursera, the largest for-profit MOOC platform. "It's not a pedagogical revolution, but a change of the educational system," says Pierre Dillenbourg, responsible for digital education at one of Europe's most active MOOC-producing universities, EPFL in Lausanne. "MOOCs are reshaping the university landscape and the relations between universities; the actors are being redefined."

Online and distance learning is not, of course, new and many universities have tried over the past decade to extend their reach with online lectures. Indeed, the term MOOC itself was coined in 2008, by Canadian professor George Siemens, to describe a new form of collaborative learning, using the Web to create a network of people who generate knowledge and solve major global problems together.

So why did none of these attempts lead to the proliferation of courses, platforms and rethinking that is now taking place around the world? The reason, according to Christian Terwiesch, a professor at The Wharton School who has been teaching his own MOOC and analyzing its progress, is that they "failed to re-imagine the need." New players, such as Coursera, EdX and Udacity, redefined the demand for learning and repackaged how people could best do it online. They realized "that the unit of analysis is not a 90-minute lecture, but short, focused talks and quizzes; that it's not a class but a community of learners, experiencing learning largely at their own pace but together."

Within this new format, the teaching has remained traditional. "An educator tries to ensure the student can duplicate his knowledge," as Dr. Siemens puts it: "They are not trying to foster creativity." But MOOCs have already brought two significant changes to education.

The first is an improvement in the quality of on-campus education thanks to what is being called the "flipped classroom," where students watch the lecture videos first, then spend the time in class discussing the content. ▶

Compared to parallel traditional classes, "we see better pass rates and better concentration in our initial pilots," says Anant Agarwal, president of EdX. "They're going at their own pace, with instant feedback and peer interaction online, and then having their questions answered in class."

But blended learning also brings with it significant challenges. "MOOCs are traditional, but flipping is the real pedagogical revolution," says EPFL's Mr. Dillenbourg. "What do you do with the students if they've already watched the lectures? How should teachers orchestrate the face-to-face activity?" This gets to the core of the disruptive challenge to universities, which need to think about what they can do that cannot be replicated digitally.

"It's not a pedagogical revolution, but a change of the educational system"

The challenge to faculty is even greater if MOOCs, especially those from other universities, are seen as a way of cutting spiralling costs. But that is what is exciting to administrators. "The potential exists to have new learning platforms that can drive down costs, improve learning outcomes and provide a broader reach of educational opportunities," says William Kirwan, chancellor of the University System of Maryland, but he also argues that there must be "incentives for faculty to experiment and consider alternative ways to deliver education."

The second big change is the dramatic increase in the reach of education. MOOCs have created what Ms. Koller calls "a new consumer for education," those that are currently left out of the market because they are deemed too old, too young, too poor or just unable to fit into a university schedule. It is also bringing a new wave of globalization into education – and not just by opening the doors to individuals world-wide. For developing countries with insufficient educational capacity, MOOCs offer a tool to leapfrog. "India wants to increase post-secondary completion to 30% from 13%," says Ms. Koller. "They would have to build 1,500 new academic institutions – one a week for 30 years. How would you staff them?"

The Chinese education ministry is already actively using EdX, an open-source platform created as a joint venture between Harvard and MIT, to provide its own MOOCs in Mandarin, while licensing and subtitling existing EdX courses for Chinese students. Local online teaching assistants, who provide exams and respond to questions on discussion forums, help these.

The Queen Rania Foundation for Education and Development, already active in innovative school reform in Jordan, is in the process of creating a MOOC platform for the Arab world, also using EdX. Known as Edraak, the platform is due to launch in 2014 with a combination of translated courses, backed by Arabic-speaking professors and teaching assistants, and courses commissioned from Arabic-speaking professors in leading universities around the world. In addition, the platform will feature high-profile Arab professionals speaking about their work – people like architect Zaha Hadid and film-maker Nadine Labaki – helping to create inspiring role models, especially for girls. It will also create courses in English providing new perspectives on the Arab world and is looking at ways to use the platform for early child-development and corporate training. "We felt this was an opportunity that the Arab world could pick up on – or be left behind again," says Haifa Dia Al-Attia, who runs the Foundation. "MOOCs offer an alternative where higher education cannot absorb the number of people who are interested or where, for whatever reason, they have no access, and that alternative adds a fresh way of thinking."

Case study 2:

Personalized medicine and health care:

re-imagining sickness and health

For all the marvels of medical advances, three big problems have emerged in recent decades. First, many patients don't respond treatment; second, the pharmaceutical industry is finding it harder and harder to develop effective new drugs; and third, the explosion of chronic diseases means that the costs of present-day health care systems have become unsustainable.

Watching countries around the world grapple with the complexities of tackling these challenges, it's clear there are no simple solutions. But the innovative insight embodied in the mantra of personalized medicine – the right treatment, for the right patient, at the right time – is starting to bring significant changes that are gradually seeping into clinical reality and suggesting powerful new ways to deal with the dilemmas of ensuring effective and affordable health care.

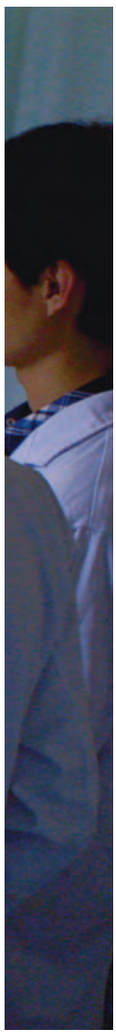
"The drivers are powerful, although the reality is slow to arrive," says Iain Miller, CEO of Healthcare Strategies Group, who has watched the tortured progress of personalized medicine since Herceptin, the first targeted therapy for a specific kind of breast and gastric cancer, was approved in 1998. The breakthrough with Herceptin was to identify a biomarker in the tumor, which, if present, indicated that the patient would not respond to ▶

"We are getting potent evidence of impact and seeing significant changes in health care and the way drugs are approved."

▼ the drug – yielding a significant change in the effectiveness of treatment.

Major scientific advances in gene sequencing followed, as the human genome was decoded amid massive publicity, raising hopes of a revolution in medicine as more and more genetic biomarkers were identified. Parallel advances in data analytics and computational power enabled researchers to process the growing reams of genomic information. "But for years, we had just this one story to talk about," Dr. Miller recalls. "Now, though, we are getting potent evidence of impact and we are seeing significant changes in both health care and the way drugs are approved."

The greatest progress has been made in cancer treatment. Around half of all oncology drugs coming on to the market



are now based on the presence or absence of biomarkers. With the focus on specific and sometimes tiny sub-sets of patients, who would have been invisible in a normal trial, the clinical and approval phase has halved in the past two years from an average of 8.7 years for standard drugs to 4.5 years for those with a personalized plan. The impact on extension and quality of life, especially for patients with advanced cancer, has been significant – not to mention the ability to withhold treatment that is both expensive and harmful where patients would not respond.

These successes reflect a completely new understanding of what cancer is – and increasingly of neurological, auto-immune and other diseases too. Rather than identifying the disease by the organ affected (lung or breast cancer, for example) and treating all patients as if they were the same, research at the molecular level has revealed a startling heterogeneity of types of cancer. That transformation in the perception of disease brings the promise of dramatically more effective treatment. However, it raises equally dramatic challenges to the entire health care industry, from doctors to regulators, drug companies to labs, and policy-makers to insurers.

"Undoubtedly, the treatment of cancer has become more complicated," says Wolfgang Wein, former head of global oncology for the pharmaceutical company Merck. "Practising doctors and health insurers struggle to keep up with the flood of new cancer types and sub-types. The pharmaceutical industry also needs to react to new findings, which regulatory authorities will require of the industry."

The long delay between promise and reality in personalized medicine is partly to do with the need to transform perceptions of disease through rigorous research, and partly to do with coping with the fallout from this new understanding by optimizing regulations, logistics and new business models. Regulators, for example, are only just starting to comprehend the processes needed to combine medicine with diagnostic tests. Drug companies are still struggling with the need to

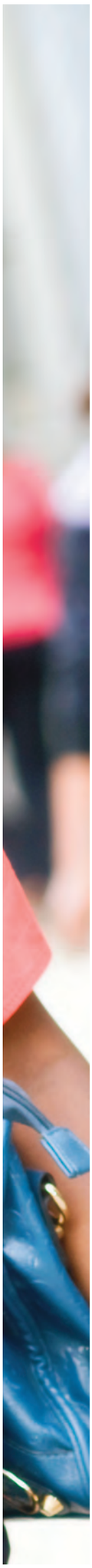
"Transformation in the perception of disease brings the promise of dramatically more effective treatment."

forge close partnerships with diagnostics and device companies as they develop personalized treatments. And policy-makers are still trying to work out whether personalized medicine will add to costs or reduce them.

But as personalized medicine starts to transform medical care by re-imagining the nature of disease, so the innovative insight behind it – that care should be tailored to individual characteristics and needs – is leading to a re-imagining of the nature of health and the needs of health care.

"Historically, we've thought of health care as episodic. We associate it with doctors and hospitals," says David Shaywitz, co-author of Tech Tonics and an expert on the potential and pitfalls of digital health. "This is not how we experience life or health." Increasingly, as smartphones and wearable sensors provide constant data on everything from individuals' levels of glucose to their levels of sociability, health care can become something continuous and preventative, taking place outside the walls of a doctor's office or hospital.

For now, most people still see personalized, digital health as a collection of gadgets and gizmos for self-absorbed techies. It is still difficult to see how best to integrate this technology with clinical realities, how to ensure that the possibility of more continuous monitoring improves lives rather than causing new burdens, and how to assess what will have most impact and what is just noise and hype. "It's similar to the beginnings of human genomics and personalized medicine," says Dr. Shaywitz, referring to two Nobel Laureates who warned that a gene sequence is not automatically a drug. "It's important to realize that information is not a cure. We need to do the groundwork to develop the potential, working with front-line providers. We need to make the data actionable."



Case study 3:

Mobile money: tangible benefits

If there is one single thing that has changed global perceptions of Africa's innovative potential in the past few years, it is M-Pesa, Kenya's first mobile money scheme, launched in 2007. As millions of Kenyans began registering with a network of agents across the country to send money to each other via a text on their mobile phone, the image of a hopeless, aid-dependent continent gave way to one of business potential and empowering technology.

Today, almost 12 million Kenyans use the service regularly, transferring the equivalent of 25% of the country's GDP each year, and Vodafone, which launched M-Pesa through its Kenyan subsidiary Safaricom, is rolling out M-Pesa in several other African markets and across India. Indeed, with dozens of competitors picking up on the potential for circumventing the lack of banking infrastructure by using far more ubiquitous mobile phones, sub-Saharan Africa hosts most of the large mobile money schemes in the world and is driving global innovation in the sector, according to GSMA, the international mobile association.[1]

Strange, therefore, to recall that M-Pesa began in 2004 as a response to a struggling campaign by the U.K.'s aid organization DFID to open up access to financial services to the 70% of unbanked adults in Africa. DFID was willing to put up seed funding of £1 million if a company would match the money. There were no takers until Vodafone agreed to let a small group of developers, who had been tinkering with the idea of using mobile networks in this way, to set up a joint pilot project, using mobiles to distribute microcredit in a Kenyan village, supported by Safaricom on the ground.

"The results were not quite what everyone expected," says Tim Harrabin, the person at Vodafone then responsible for Safaricom and M-Pesa and now senior advisor to Analysys Mason. "But the trial did provide unique insights into how consumers might use the technology."

But Vodafone noticed that, while the users were not too enamoured by the microcredit opportunity, they had started to use the service to send money to each other. For three years, Safaricom worked on understanding this need better and developing it as an auxiliary service to keep its customers loyal and hold on to its huge market share as competitors entered the market.

The innovative insight that launched M-Pesa was embodied in its first marketing slogan: "Send money home." People were not interested in vague ideas about cashless payments and access to financial services – what they needed was an alternative to sending cash home to their families via unreliable bus drivers, something most

> "The image of a hopeless, aid-dependent continent gave way to one of business potential and empowering technology."

Kenyans have traditionally done. The M-Pesa solution was to build a vast network of agents across the country, which received commission to register users, take their cash, convert it to electronic money on their SIM cards and cash out at the other end.

Within nine months, M-Pesa had over a million customers, at which point it went viral and M-Pesa (Pesa means money in Swahili) came to mean transferring money. It still took Safaricom three years to turn a profit – but M-Pesa now represents 18% of the company's Kenyan revenues and 16% in Tanzania, its next most successful market. But with 79% of Safaricom's mobile subscribers now using M-Pesa, the company has been ▶

1 Mobile Economy Sub-Saharan Africa 2013, GSMA

> "With mobile phones it was like petrol on a bonfire – sales grew explosively in each country around the world. "

rethinking individuals' needs now that the problem of sending cash home has been solved. Last year, it introduced M-Shwari to provide savings and credit facilities, it has signed up schools and utilities so people can pay their fees and bills easily, and it is encouraging employers to use the service to pay their staff. To reflect the developments and its new insight into users' need for safer, more convenient transactions, it changed its marketing slogan to: "Relax, you've got M-Pesa."

But for all this success, there are two big question marks hanging over the global significance of Kenya's innovation. The first is the relatively limited success of most other mobile money schemes, even in countries that have the same pattern of limited banking infrastructure and high mobile penetration. According to the GSMA, in June 2013 there were just nine world-wide, with more than a million users. "It seems so obvious and yet you see spectacular success in so few places," says Mr. Harrabin. "With mobile phones it was like petrol on a bonfire – sales grew explosively in each country around the world. To date, mobile payments have been far slower and, to ignite the bonfire, several key things need to be in place."

In Kenya, these key things were a combination of factors: senior executives who believed in the potential of the project and gave it space to grow; regulators who worked closely with Safaricom to ensure sustainable growth while fending off attacks from incumbents; agents who were able to check identities; a huge market share that made the service relatively universal, and a brand that was trusted to keep the money safe. Compare that to Nigeria, where 18 schemes compete for customers. The largest, Paga, reached a million customers in November 2013, after two years of operation in a country of 170 million people. The regulator has ruled out telecom-led mobile money schemes, leaving the field open to banks and licensed third parties, such as Paga. No one has ID cards, people are used to using cash, and building out agents nationwide requires enormous investment. "There is an over-exuberance of expectation," says Tayo Ovisiu, CEO of Paga. "We will have access to 15 million people by 2015 and that will impact the lives of something like 50 million Nigerians who depend on them."

The second question mark is over the relationship between these mobile payments schemes that still rely crucially on cash and the gradual global trend towards digital wallets and a cashless economy for everyday purchases. On the surface, Africa's mobile money innovations seem to have little relevance to markets where the banking infrastructure is highly developed, most people have a selection of payment cards and mobile money is a relatively marginal matter of convenience and reducing the cost of cash.

But Jonathan Ledgard, director of the Afrotech Centre at EPFL in Lausanne, believes Africa could benefit more than elsewhere from creating a digital currency. Not only are large numbers of youth coming online, but also digital identities embodied in phones or bracelets are badly needed and mobile money schemes are still more suited to paying bills than to buying a mango. "Mobile money schemes have been rightly praised but are already archaic," Mr. Ledgard says. He's hoping to see the first identity-based digital value – a virtual currency dubbed the Impala –announced at Davos. That could provide a push to the sluggish adoption of alternatives to cash globally.

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