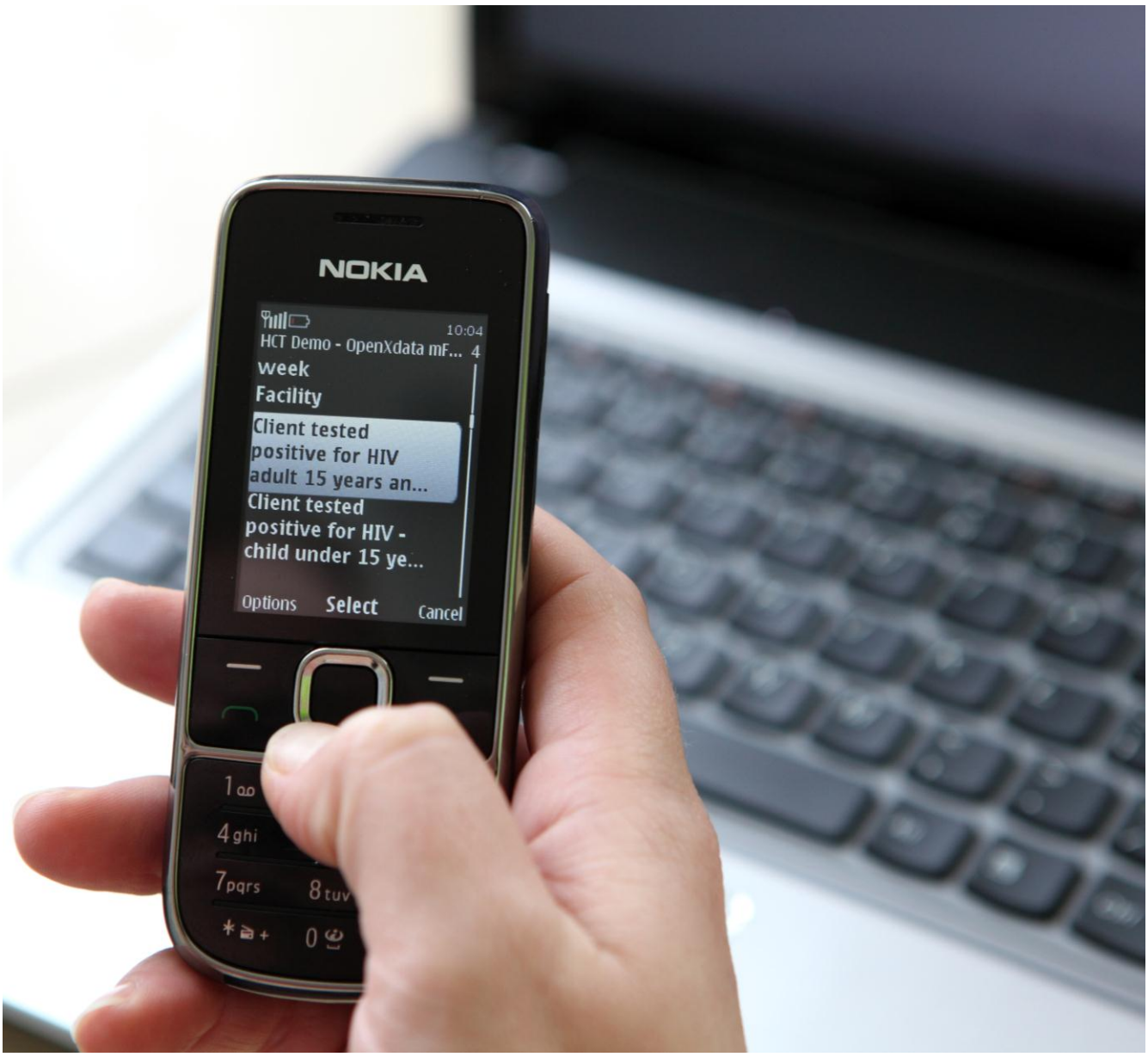
mHealth

Beyond Connectivity: The Role and Value of Mobile Operators in eHealth

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Executive Summary

The GSMA believes that mobile operators, through their evolving capabilities in creating meaningful connections between people, organisations and ultimately systems, can have a dramatic impact on the healthcare industry in improving access, reach and quality.

Within the first phase of the Pan African mHealth Initiative, the GSMA has introduced a collaborative initiative between mobile operators to reduce fragmentation and standardise delivery of validated health content/services to support universal health access in Africa. In the research piece on health hotlines, the GSMA examines ways in which connectivity between individuals and healthcare practitioners can be improved by providing the means and incentive for healthcare to occur over the mobile channel. This paper explores the emerging role of mobile operators in eHealth: the GSMA presents opportunities for mobile operators to play a significant role in integrating systems, organisations and people across the health system, effectively integrating mobile into the health patient pathway.

In just the last three years, the industry has witnessed significant strides that mobile operators have made in supporting the larger eHealth enterprise market. Orange, together with GE, has been awarded a contract to integrate the imaging needs of the most populous region in France, connecting over 90 hospitals and over 500 radiologists, covering over 12 million patients. AT&T has been awarded important contracts for the Indiana health information exchange as well as for Baylor Healthcare network, a large private healthcare network.

These mobile operators, and others, have clearly expanded their remit from direct-to-consumer health solutions, to solutions that support core clinical and operational processes within the hospital. From this traditional base mobile operators are moving to solutions that connect the various stakeholders in the healthcare system to the patients to provide fully integrated care. Effective and efficient integration of mobile technologies and infrastructure into the healthcare system creates significant value for both stakeholder groups.

The aims of this paper are to:

1) Provide a landscape of the eHealth market:
   - Overview of key eHealth consumers, their key priorities, and solutions which support them.
   - Drivers and barriers to growth in developed and developing markets.
   - Review of solution providers in the eHealth marketplace and their positioning in the market.

2) Outline the opportunities for mobile operators within the broader eHealth industry:
   - Shifting Supply: Cost and capability advantage in global business integration
     Mobile operators have been evolving their global business integration capabilities. As these apply to multiple industries, they create economies of scale in cost as well as capability that create a value proposition for healthcare.
   - Shifting Demand: Meeting of the healthcare industry's needs for integration and access
     The complexity of the stakeholders that make up the delivery as well as the financing of healthcare indicates an increasing need to provide integration between the component parts. Evidence has also shown that integrated delivery in healthcare is essential in the management of chronic diseases, which are proving to be the most significant cost driver in healthcare today. The suite of solutions that mobile operators can offer based on their core capabilities can support this integration.

3) Analyse key lessons from existing mobile operator eHealth initiatives:
   - Develop a market-facing health organisation which is aligned to healthcare enterprise needs, with a compelling vision in healthcare.
   - Leverage mobile operator core capabilities across industries and geographies.
   - Invest in in-house health capabilities and encourage innovation.

4) Propose a market evaluation framework for mobile operators to assess the opportunities and challenges in entering the eHealth market, based on their capabilities and local market conditions – illustrating its usage with the GSMA's engagement with the QTel Group.

Introduction

The World Health Organization (WHO) defines eHealth as "the transfer of health resources and healthcare by electronic means", encompassing three main areas:

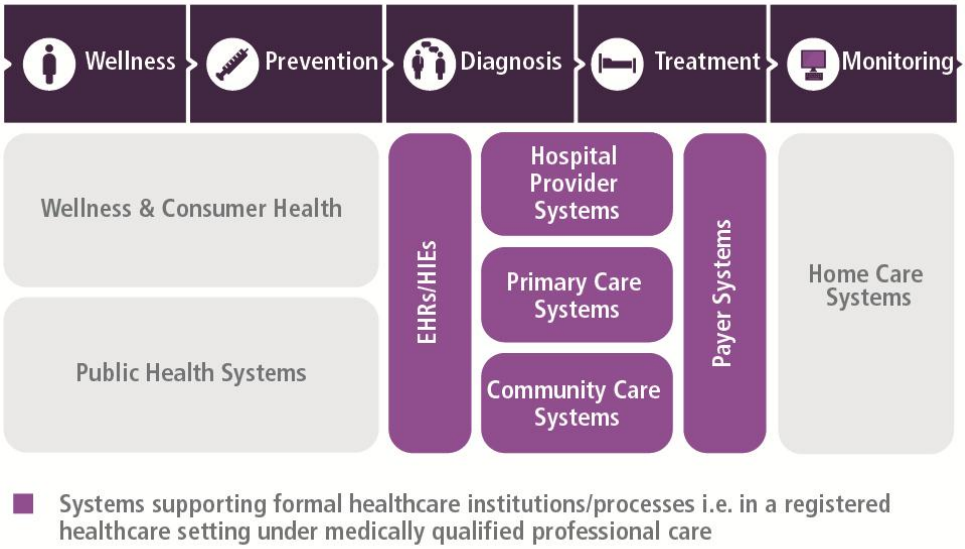
- The management and delivery of health information, for health professionals and health consumers, through the Internet and telecommunications.
- Using the power of IT and e-commerce to improve public health services, e.g. through the education and training of health workers.
- The use of e-commerce and e-business practices in health systems management.

mHealth[i] is defined as the subset of "electronic health (eHealth) and it is the provision of health services and information through mobile technologies such as mobile phones and PDAs (personal digital assistants)".

The size of the global eHealth market varies largely depending on the methodology and definition of what goes into eHealth. Estimates of recent market research range from $96B[ii] to $160B[iii], with 5 year growth rate of 12%-16% from 2010 to 2015. The same research estimates the US market as comprising close to 50% of this market due to the relatively high existing eHealth adoption and recent regulation driving specific funding in this area. Europe and the BRIC countries comprise the largest secondary markets with relatively less spending in developing countries.

Exhibit 1 shows the patient pathway[iv]. This begins with wellness, which refers to activities which maintain general fitness and health, followed by prevention of specific diseases, evolving to diagnosis and treatment of diseases, and finally to the monitoring and management of those diseases post the acute treatment regime.

Exhibit 1: The disparate elements of eHealth systems



The eHealth industry initially emerged from a focus on systems supporting the specific workflows and needs within a formal healthcare setting (the hospital or clinic), which are primarily in the stage of diagnosis and treatment. These include hospital provider systems, primary care systems and community care systems, and systems for payers (both public and private insurance). In time, the focus has expanded to meeting the needs of healthcare outside the hospital in the prevention and wellness space, to help patients and providers manage healthcare, ultimately reducing hospital and doctor visits. These include systems for the transmission of public health messages, wellness and consumer health resources. In parallel with an ageing population and growing burden of chronic diseases, a number of home care systems have also been developed to aid in the management of patients after discharge from the formal healthcare system.

In recent years, technology has enabled capabilities and solutions that are able to integrate these disparate elements, connecting the professionals and the patients both inside and outside the hospital[v]. The GSMA has seen increasing evidence of mobile operators developing solutions aimed at supporting this integration, with solutions that target the consumer, the healthcare enterprise, as well as the broader health systems.

Overview of the eHealth Market

Types of eHealth Solutions

There are four major customers of eHealth:

1. Healthcare providers
2. Payers (both public and private healthcare insurers)
3. Governments
4. Healthcare consumers, each of whom have different priorities and needs

Exhibit 2 illustrates the types of eHealth solutions currently developed in the market for each customer[vi].

Exhibit 2: Different types of eHealth solutions

Target	Priorities	Types of eHealth Solutions
Healthcare Providers	■ Improve operational efficiency by reducing paper and unnecessary processes through paper documentation. ■ Improve clinical audit and enforce clinical protocols. ■ Cut down on clinically adverse events through human error. ■ Improve customer satisfaction by cutting down on repeat collection of information. ■ Offer new community care services so providers can keep in touch with patients to manage their health and keep them out of the system. ■ Meet regulatory requirements for eHealth and/or avoid penalties and lowered reimbursement rates.	■ Operational - Patient registration - Scheduling of clinical and operational resources - Supply chain and inventory control - Coding and billing - Discharge management including planning for referrals, education for chronic disease patients - Clinical - Electronic medical records/health information exchange - Order entry ■ Specialty-specific solutions (e.g. for cardiology, surgery, ICU) - Closed-loop medications management - Ancillary systems e.g. radiology, PACS, pathology, pharmacy systems - Tele-diagnosis, tele-radiology, tele-pathology applications ■ Clinical decision support e.g. online formularies, condition-specific clinical pathways, adverse event-interaction checking.

Target	Priorities	Types of eHealth Solutions
Payers	■ Monitor efficiency indicators so as to improve resource utilisation between clinical providers. ■ Optimise claims and maximise commercial potential for members. ■ Offer new community care services so providers can keep in touch with patients to manage their health and keep them out of the system.	■ Health management/monitoring ■ Electronic payment ■ Online claims management
Government	■ Collect national health data in order to target national health priorities, forecast future healthcare trends and support public healthcare goals (e.g. immunisations, epidemiology, disease tracking and minimisation). ■ Accurately collect clinical evidence in order to support reimbursement processes. ■ Promote standardisation of clinical practice and protocols according to national or international guidelines.	■ Public health messaging ■ Surveillance and epidemiology ■ Healthcare financing decision support (regulator) ■ Disaster response
Consumer	■ Gain access to one's own Personal Health Record, which is portable across different health providers and cuts down on needless record collecting and improves peace of mind. ■ Manage one's own health outside the health system and avoid unnecessary visits to the health system. ■ Have a collaborative, personal approach to healthcare service choices.	■ Health info-sites ■ Health messaging ■ Appointment scheduling and reminders ■ Personal health records ■ Home care services that rely on geo-location and sensing capabilities

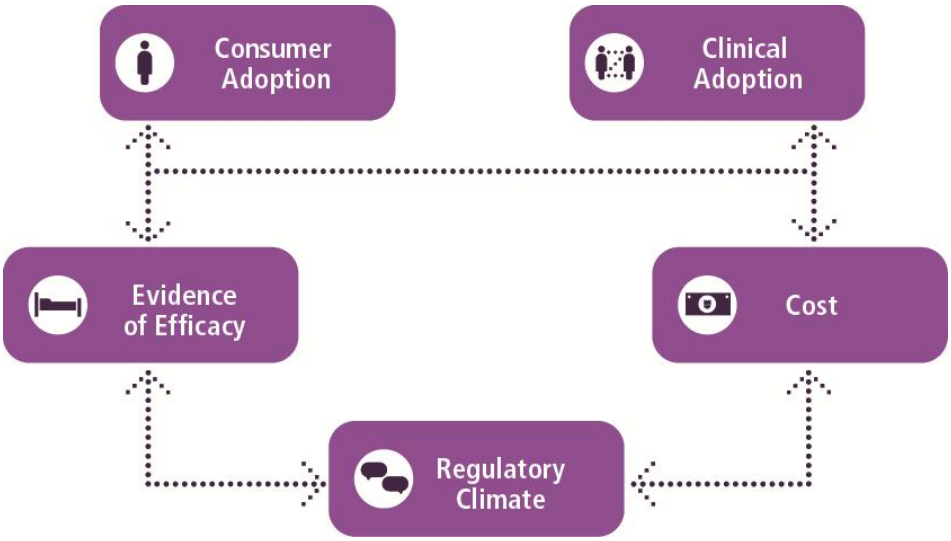
Drivers of eHealth Market

The drivers for e-Health can be categorised into five major areas:

1. Consumer adoption
2. Clinical adoption
3. Evidence of efficacy
4. Costs of deployment
5. Regulatory climate[vii]

While each individually impacts the market, each driver also has a degree of influence on another (**Exhibit 3**). For example, evidence and costs impact adoption both from the consumer as well as from the healthcare professional. Evidence and costs are also influenced by, and in turn influence the degree of regulation for eHealth in a particular marketplace.

Exhibit 3: Drivers of eHealth



The same drivers can be enablers or barriers, depending on local market conditions (see **Exhibit 4**).

Exhibit 4: Drivers of eHealth as enablers and barriers

Driver	As Enabler	As Barrier
Consumer Adoption	**Increased participation in healthcare beyond hospital care setting** ■ More people using health info online for quick access. ■ Demand for greater (self-) participation in healthcare. ■ Demand for more health access in more care settings (outside the hospital). ■ Demand for differentiated, targeted services.	**Consumer resistance**[viii] ■ Perceived loss of control over healthcare information. ■ Lack of the human element in healthcare (for remote diagnosis and treatment). ■ Fear of being monitored.

Driver	As Enabler	As Barrier
Clinical Adoption	**Increased awareness and acceptance among healthcare professionals** ■ More IT savvy healthcare professionals bringing IT into the workplace. ■ Increasing pressure on healthcare providers to improve clinical governance i.e. document and demonstrate historical patient, laboratory and inter-departmental workings. ■ More flexible eHealth systems developed to suit individual healthcare professional work styles. ■ Better engagement of healthcare professionals during implementation.	**Continued resistance to change from healthcare professionals**[ix] ■ Diverse stakeholder group ranging from administrative personnel to senior re-engineering of cross functional processes. ■ While evidence of the impact of eHealth exists, it's not perceived as conclusive enough in certain cases (depending on the scope of the system) to warrant change. ■ Lack of consistent executive sponsorship in projects.
Evidence of Efficacy	**eHealth showing impact in quality and costs**[x] ■ Evidence of ehealth in providing faster/instantaneous access to information/advice with less manual intervention. ■ Evidence of eHealth in reducing diagnostic, medication errors. ■ Evidence of eHealth in being integrated with workflows, reducing admin and operational costs, as well as health system costs in terms of reduction of length of stay.	**Inconclusive proof of efficacy in specific situations** ■ While evidence of the impact of eHealth exists, it is not perceived as conclusive enough in certain cases (depending on the scope of the system) to warrant change.
Cost to Deploy/Cost to Use	**Falling deployment costs**[xi] ■ Software as a service/cloud/hosted model can spread cost over multiple deployments. ■ Innovative deployment models (e.g. mobile deployment of eHealth). ■ Growing open source community.	**Technical difficulty and delivery risk**[xii] ■ Complexity of integrating current legacy systems and/or multiple external systems. ■ Lack of support infrastructure. ■ Lack of qualified technical staff to maintain system. ■ Traditional model of implementation incurs high fixed cost with many delivery risks. ■ In countries with no existing IT infrastructure or fixed line connectivity, traditional client-server EMR solutions may be exponentially difficult to deploy.

Driver	As Enabler	As Barrier
Regulatory Climate	**Improved regulatory climate for eHealth and improved support for interoperability** ■ Provision of specific funding for healthcare IT tied to adoption of eHealth[xiii]. ■ Increased requirements for adoption of interoperable standards to better support healthcare data exchange and support compliance to medico-legal practices[xiv].	**Regulatory concerns over security, privacy and lack of clarity over specific standards[xv]** ■ Security and privacy of medical records are still a major concern, and regulations on access of information, sharing of medical records and consent-taking in many countries have been designed for an age of paper records. ■ Data standards are evolving and there are still competing standards and proprietary formats in existing systems.

These drivers also play out differently between developed and developing countries:

eHealth in Developed Countries

In developed countries, where there is existing technical infrastructure and existing eHealth systems (albeit mostly legacy, disaggregated systems), investment will focus on replacing those systems and/or in services to integrate those legacy systems. There is a tendency towards a higher dedicated budget for these services due to higher patient revenues and reimbursement in the health system. The body of evidence for the efficacy of health IT is likely to be more comprehensive, and as a result, regulation for health IT is likely to be more advanced in terms of specific demands for data-driven outcomes and interoperability.

However, the issues of clinical adoption will also be higher due to the expectations of the medical community and exposure to health IT, which will drive up the change management component of deployment costs. In addition, integration costs to bring together different existing systems will also be higher compared to a fresh installation. Liabilities attached to service level contracts (due to the underlying litigation potential) are also correspondingly higher[xvi].

eHealth in Developing Countries

In developing countries, where there is comparatively less existing technical infrastructure and eHealth systems installed in hospitals, the focus will be on basic health data collection, basic ICT infrastructure such as connectivity, and health access. The potential for automation is therefore much higher. Clinical adoption issues (relative to the developed world) will be lower, although the degree of IT literacy will cause issues depending on the specific market.

However, budgets will also be correspondingly tighter, particularly in relation to eHealth systems which have been developed to cater more to the Western market, and particularly as health budgets will be devoted more to basic health provision, medical supplies and manpower. There also tends to be less direct evidence of eHealth impact in those markets, due to the relatively new adoption of such systems. There will be less demand for advanced clinical systems and more on systems which promote health access in remote areas, as well as innovative deployment models (leveraging mobile infrastructure) to circumvent the high fixed costs as well as fit for purpose systems to deal with specific disease areas[xvii].

Solution Providers in eHealth

There are a multitude of eHealth solution providers in the market due to the number of stakeholders in the healthcare system and the varying levels of need and complexity of their requirements. In the US alone, the Certification Commission for Health IT (which certifies for the eligibility for funding for health IT from the US government) lists over 300 vendors which satisfy various components for funding eligibility.

Due to the relative maturity of the eHealth market in the developed world, many of the major players in the marketplace will have solutions that are adapted to Western clinical workflow. However, many of these players are also growing their global footprint, adapting their products and service delivery models to different markets or selling their services through local partners. It is also important to note that many hospitals or national hospital networks also have home-grown IT systems, developed over time to meet their own requirements.

While it is not the purpose of this paper to provide a comprehensive catalogue of all the players in the market, what is presented here is a review of the key categories, with notable examples listed to illustrate typical capability and market positioning[xviii]. These vary by the range of capabilities and solutions, as well as in delivery model.

Full service eHealth

These providers possess the most comprehensive and sophisticated software suite of all the providers covering the full range of both administrative and clinical applications. They also generally possess their own implementation teams (or contract systems integrators to do so), and as a result bring much relevant expertise into the implementation process.

However, because of the depth of sophistication they are also the most expensive to implement, both from a deployment as well as an infrastructural footprint perspective. They also tend to be less easy to customise because best practices and workflows have been written into the applications. In expansion into the global footprint, they have also been criticised as having been developed with US workflow in mind, which does not necessarily confirm to local market needs.

Niche eHealth

Niche eHealth providers are those that focus on a specific area of eHealth, be it a specialty area like cardiology or oncology, a specific operational process like supply chain and billing, or a specific functional area like healthcare collaboration, geo-location for assets/people and facilities management. Hospital providers will approach these players if they have a specific functional or workflow need to address within their facilities, due to their specialist knowledge of that particular area.

However, due to the nature of the specialisation they are also less easy to integrate seamlessly, and hospital providers with a large number of niche eHealth systems in their IT portfolio often find their IT support and integration needs increasing exponentially over time.

Cloud

Cloud-based eHealth systems are gaining traction, as the number of locations of healthcare practice increase, along with the high cost of deployment and maintenance for traditional client-server models. These are particularly attractive to smaller clients with less complex needs, or clients with budget constraints.

However, there are still residual concerns with the security and reliability of using a fully cloud-based solution for mission-critical health applications. Security and reliability can often be obtained through more “private” clouds which offer dedicated resources and guaranteed access, which unfortunately reduces the core cost advantage which cloud systems are procured for.

Open Source

These are typically developed out of communities of practice, academic health centres, or existing government health systems and distributed into the community. Open source products include OpenMRS which is the base code upon which many developing country solutions are built. Another notable example was developed as a home-grown solution managing medical records for the Veteran’s Administration in the US (VisTa) and has now become the largest such system of its kind in the US.

While these solutions are more flexible and cheaper to maintain, it is difficult as yet to obtain consistent and high quality support for what is essentially a mission-critical piece of infrastructure. There is however a growing community of developers supporting such solutions.

Systems Integrators

Systems integrators are organisations that have the ability to select, procure, and integrate different technology solutions together. At one end of the spectrum are technology consulting firms with a strong presence in the implementation of eHealth (e.g. Accenture, Deloitte). They usually have solutions-specific teams (which have expertise in implementing many of the above solutions), and also have change management capability and project management skills. As they are well versed in different solutions, they are also a better neutral choice to perform package selection and to integrate a wide variety of both new and legacy systems.

At the other end of the spectrum are the large IT infrastructure players (e.g. IBM, Oracle, HP, Cisco) who usually have core competence in one or more of the large pieces of supporting infrastructure (be it networking, storage, databases). These have large professional service teams that are able to integrate specific partner applications into their core infrastructure with an ability to leverage national level cross-industry contracts to bid for and win large government deals.

The Mobile Operator's Value Proposition in eHealth

Opportunities in eHealth for mobile operators

The GSMA believes there are two key developments that provide mobile operators with a unique value proposition in the eHealth industry:

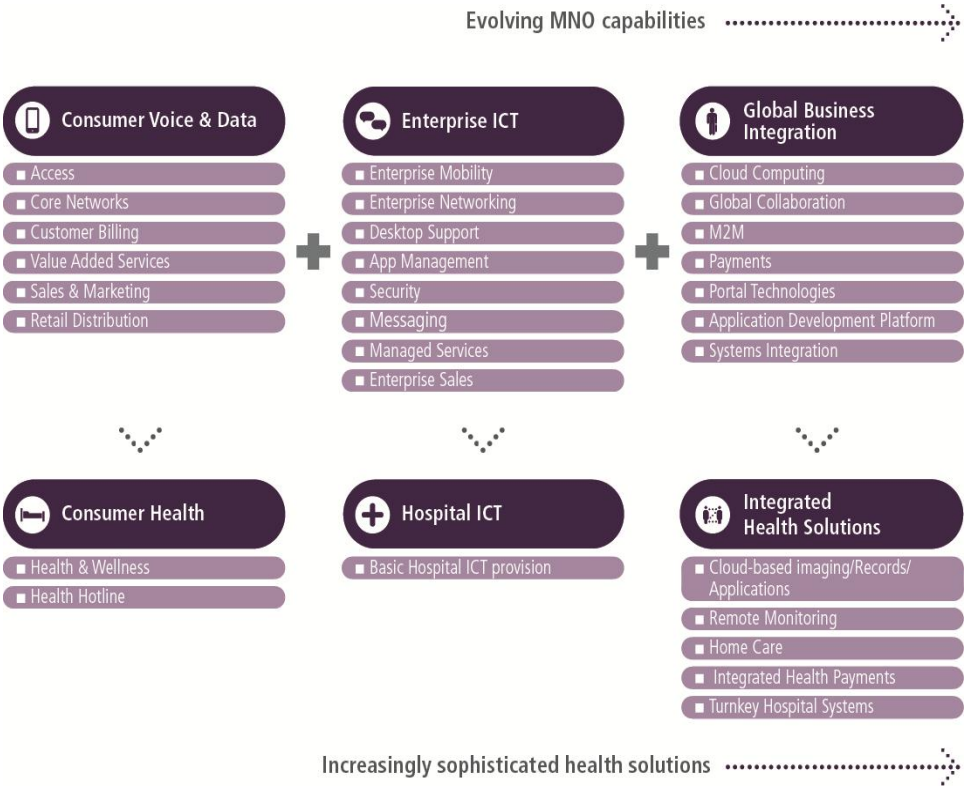
1. Shifting Supply: The Evolution of Global Business Integration Capabilities

Traditionally, the mobile operator value chain consists of those core capabilities that enable it to acquire customers through its sales and distribution network, set them up on the network, identify and connect consumers on a network, create value added services in both voice and data, and run sophisticated billing and tariff programs to optimise revenue per customer[xix]. These capabilities are the basis of the first mHealth services of health messaging or health hotlines. They are natural extensions of the value-added service model, developed by partnering with content providers or health service providers riding off the operator core network and customer billing capabilities.

In time, many mobile operators have also expanded from their core business of consumer-driven network services to provision of cross-industry enterprise ICT solutions, based on their core capabilities of connectivity, networking and large scale information management. These mobile operators are able to create a cost and capability advantage by investing in assets and capabilities which can scale across multiple industry offerings ranging from small/medium enterprises (SMEs), to government, aerospace, and financial services, and health. These allow the mobile operator to offer standard outsourced ICT services to hospitals, just as they would to other large enterprise players[xx].

In recent years, some mobile operators (particularly those with strong group operations) have developed specialised global business integration capabilities, ranging from cloud computing, portal technologies, payment mechanisms, Machine-to-Machine (M2M) platforms and solutions, and systems integration. These are the capabilities that allow the mobile operator to create solutions connecting the healthcare providers with the patient, as well as with other healthcare players in the industry, providing the industry level integration discussed above (**see Exhibit 5**).

Exhibit 5: The evolution of mobile operator capabilities in global business integration



In future, the possibility emerges of leveraging the mobile operator's retail distribution and consumer management capabilities. There are interesting parallels with the growth of the mobile money sector, which (when coupled with the right regulatory environment) allows the mobile operator's distribution points and agent network to become a new way for the people who would otherwise have no access to banking services to enjoy financial inclusion[xxi].

By way of comparison, explorations have also begun in testing those same distribution points potentially as touch-points for healthcare, particularly in areas with poor healthcare access but with rich telecom distribution coverage.

Clearly, there are significant operational considerations as well as regulatory hurdles to be overcome for these to even approximate reality, but the promise of being able to substantially address the problem of rural health access in a commercially sustainable fashion will be a compelling driver for this to move forward.

In developing these capabilities, which are meant to scale across different industries, economies of scale in cost as well as capability are created, which represent a significant value proposition for healthcare.

2. Shifting Demand: The need for Integrated, Participative Healthcare

Healthcare has in the past been primarily focused within the clinic or hospital setting. However, there is increasing evidence that there is potential to reduce a large proportion of healthcare cost burden by managing health outside this formal healthcare setting. This can be done either by keeping patients from entering the system through effective prevention and wellness, or by managing patients consistently after they exit the system through medication adherence, effective monitoring and post-discharge management, particularly in the case of chronic diseases[xxii].

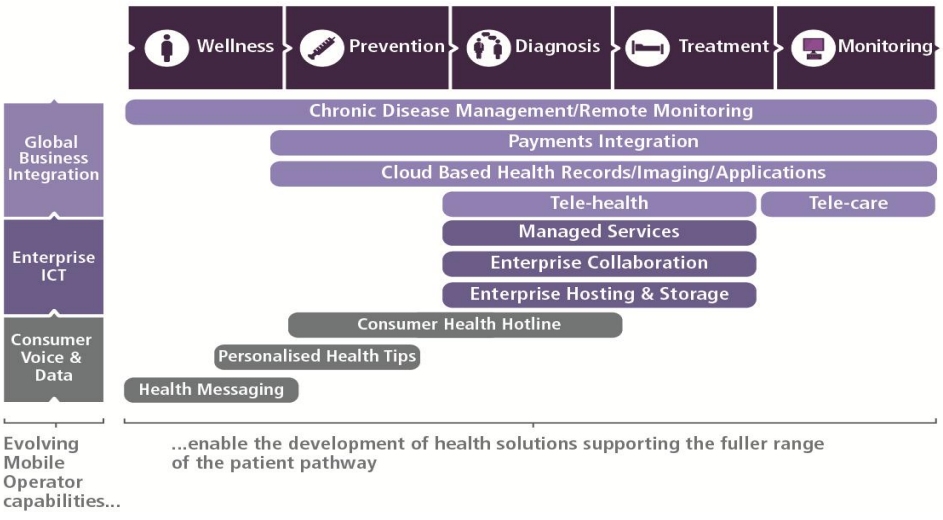
There have also been concomitant changes in the expectations of the healthcare consumer as well as in the way healthcare is delivered. There is now an expectation to be able to schedule and register from a number of external sources and multiple locations as opposed to a single desk within a hospital. Instead of a single clinician documenting, ordering and viewing a record, there is now an expectation to have multiple parties collaborating and viewing patient information.

In developing countries, the chronic shortage of healthcare professionals as well the prohibitive cost of building healthcare facilities in rural areas, are also indicators of a need for healthcare to develop beyond its traditional hospital-bound model.

The corresponding impact on the technologies supporting these processes are a need to support a wide variety of different devices both locally and remote, a broader notion of connectivity beyond the hospital, and lastly a broader definition of security and authentication which now need to be carried over a much larger range of channels and infrastructures.

With the growing capabilities by mobile operators targeting the health consumer, the healthcare enterprise as well as in solutions connecting enterprises and individuals, the GSMA believes that mobile operators are in a position to increasingly support the needs of the healthcare industry (see **Exhibit 6**).

Exhibit 6: Growing match between mobile operator capabilities and needs of healthcare



The Challenges for Mobile Operators

Differentiation

As mobile operators develop capability in the ICT space and begin to replicate the capabilities of an ICT infrastructure provider (such as IBM, EDS and Oracle). This may be acceptable in markets where the mobile operator has a natural incumbent advantage – but in other markets where this is not the case the key challenge then becomes one of differentiation.

Delivery risk

Due to the number of stakeholders involved and the complexity of the systems and workflows, delivery risk for eHealth projects is relatively high. Given the nature of medical liability (which depends on the scope of the system in question), eHealth implementations also have the potential for large financial and brand risk that is of particular concern to mobile operators, who take great care with their consumer brand.

Integration of value

The ability to deliver an integrated value proposition goes beyond the possession of the suite of ICT capabilities. It also means the appropriate integration of platforms, sharing of information and infrastructure between the various components, and ensuring that the separate pieces are fully leveraged to deliver new value to the end consumer. This is not necessarily an easy task considering the various health solutions will probably have been developed independently or acquired over time, instead of having grown organically from an original product.

Modes of entry

How these opportunities and challenges play out depend largely on their appetite for risk and local market conditions, which will impact what sort of position the mobile operator might wish to take within that particular market.

Enterprise ICT provision

This involves the offering of basic, less differentiated ICT services like desktop support, basic office productivity and messaging support, enterprise mobility and provision of networking. These services are common to all enterprises and therefore do not require a high level of specialised health expertise from the mobile operator's perspective apart from an ability to sell into this space.

However, these services are also not differentiated from any other basic ICT service provider and therefore depend a lot on the mobile operator's ability to differentiate on service levels or value for money, which in turn depends on its ability to derive economies of scale in these capabilities across its geographical and industry footprint.

Health solutions provider

Contingent upon the mobile operator's global business integration capabilities is its ability to offer health specific solutions e.g. Cloud-based PACS or records hosting, remote monitoring solutions to manage chronic diseases, or sophisticated tele-medicine capabilities incorporating collaboration technologies with remote diagnostic equipment. These will enable the mobile operator to differentiate its offering while leveraging on its core ICT capabilities. Depending on the mobile operator's business strategy, such capabilities can be developed either through internal development, partnering or acquisition. This strategy however requires greater internal investment in order to develop specialised health expertise, as well as to select suitable business partners with which there is mutual benefit.

Systems integration

Systems integration is less common a play due to the nature of the delivery risk, but possible in circumstances where the mobile operator has a clear market presence advantage over other systems integrators and has interest in a relatively wider range of the product suite being offered[xxiii].

The systems integrator role presents the mobile operator with an avenue to drive and demonstrate a true vertical integration between the various solutions and create value for the health system. An example would be a situation where geographical, infrastructural and economic realities make it difficult to roll out a traditional electronic medical record over the network, but where an eHealth system delivered completely over the mobile channel can be considered. SMART, a mobile operator based in the Philippines, recently rolled out a lightweight eHealth system in two major cities, with these constraints in mind. A mobile operator based in South Korea, has also recently developed a hospital information system that it plans to roll out across various sites in its home country, and currently considering expansion to China.

Lessons from Mobile Operators So Far

While mobile operators are still evolving their growing role in the healthcare industry, there are already some emerging lessons from some mobile operators in this area, based on feedback from both the healthcare industry as well as success stories in the field[xxiv].

#1: Develop a market-facing health organisation which is aligned to healthcare enterprise needs, with a compelling vision in healthcare

Orange set up their Orange Healthcare business unit in 2007, talks of "joining up healthcare", echoing the role of mobile operators in connecting both the healthcare enterprise and the patient, as well as helping to remove the boundaries between the increasing number of players in the healthcare industry. They have organised themselves into services supporting the patient (in terms of wellness and prevention), to services supporting the healthcare professional and hospital operations, to services connecting the two in order to better manage the number one problem driving healthcare costs globally, that of chronic disease management.

AT&T, in setting up their ForHealth business unit in 2010, spoke of a vision to "accelerate the delivery of innovative wireless, networked and cloud solutions specifically for the healthcare industry", organised around their Cloud-based solutions (their solution for medical imaging and records storage), Health Community Online (their health information exchange product), mHealth (which are all their remote monitoring products) and Tele-health (collaboration and tele-medicine).

Telefonica, which set up their global eHealth unit in 2009, speaks of their unit as being a "standard bearer for health products, pilot projects and knowhow", with three focus areas in Healthcare ICT, Tele-health, Tele-care and Prevention/Wellness. Grounded in the belief that healthcare both has a local context, as well as a need to cross-pollinate ideas and scale across geographies, their organisational strategy was to have separate individuals which have both a functional responsibility, as well as a country responsibility.

#2: Leverage core capabilities which scale across industries and geographies

One key opportunity discussed earlier is the ability to take mobile operators' core capabilities and apply them inventively to solve healthcare problems both large and small. Telefonica talks of a 50% "lift and shift" economies of scale methodology whereby there is a rule about being able to re-use 50% of the investment made into any particular technology in another region. AT&T speaks of "utilising all of AT&T's core assets to apply to healthcare", and also of the importance of "scaling up" applications in both simple and complex settings, working from small to large scale.

Messaging

One illustration of this is in the basic ICT capability of messaging. This can range from simple messaging within a hospital between healthcare professionals which most mobile operators can provide, to more advanced cases of providing an all-purpose healthcare messaging platform which can be used for anything from appointment reminders, to alerting patients and healthcare professionals of test results, speeding up resourcing of replacement nurses, to medication adherence reminders. Orange, which has developed a Health Gateway (through partnership with iPlato) product for use in the UK, has estimated this could potentially save the NHS 300 million pounds a year in appointment costs. Telefonica, through O2, achieved a 40% drop in missed appointments with a similar service offering.

Networking and Security

In a similar fashion, the core capability of networking can be applied simply to that of the enterprise, or scaled up across a country's healthcare system for nation-wide impact. In France, Orange supplies the secured network and portal to enable the SESAM-Vitale system, a smartcard-based healthcare payments settlement mechanism which reduces the settlement time from 2 months, to just a few days, saving the healthcare system almost EUR1B a year. The mobile operator's expertise in networking and security also makes it an ideal partner for providing payment and third party insurance through its Almerys subsidiary, which is France's leading third party payment intermediary with over 12 million beneficiaries and 50 clients, covering 50,000 healthcare professionals. Another example of a mobile operator that has extended its expertise into the healthcare payments realm is SwissCom, through its CuraBill subsidiary.

Collaboration

Collaboration is another example of a capability that can apply both within the enterprise, between different healthcare institutions, as well as between the institution and the patient. At the simplest level, this can be web-enabled audio and video-conferencing solutions between physicians, to sophisticated solutions which incorporate both videoconference as well as peripherals which allow specialists to conduct diagnostic assessments to patients in remote areas. Cisco, for example, partners with both Telefonica and AT&T to provide such solutions. In Telefonica's case, the Health Presence product was introduced in order to alleviate the travel needs for patients in the Balearic Islands who previously had to travel to Mallorca for diagnosis. AT&T also has a similar suite of services ranging from video-conferencing (AT&T Virtual Care) to a full Telepresence Pod solution (currently in pilot mode) which is a self-contained diagnostic unit that includes a range of medical devices to complement the diagnostic process. On a direct-to-consumer model, many mobile operators are also utilising their basic competence in call centre management and their subscriber base to offer tele-orientation or tele-diagnosis services, connecting patients to healthcare professionals to provide basic medical advice (or limited diagnosis, depending on the regulatory conditions of that country.

Cloud/Portal

Using the Cloud to offer large scale, flexible and secure storage of heath information is a natural extension of many mobile operator cloud computing strategies. Cloud-based PACS i.e. the storage of medical-grade diagnostic images and video is the most common use-case because of heavy demands on bandwidth and storage.

Orange was recently awarded, together with GE, the contract to manage the PACS requirements of all the hospitals within the Ile de France region (including Paris), with the first phase to provide 30 hospitals with a fully cloud-based storage and archiving capability, along with a hosted Radiology Information System to cater to the workflow requirements of the radiologists in those hospitals. This will allow images to be shared between radiologists, helping balance staff limitations and dramatically reducing turnaround times. Both AT&T and Telefonica also have similar solutions, offering Cloud-based solutions specialise in medical imaging and information management, offering a vendor neutral archive for imaging combined with security services by pricing on an outsourced pay-as-you-go option.

A further use case for the cloud is in the hosting of health records or acting as a connector between different enterprise level EMR systems. AT&T's Healthcare Community Online product is a health information exchange based on cloud technologies, supporting collaborative care through secure messaging, access to multiple applications through one portal, integrating with the American Medical Association's own portal.

M2M (Machine to Machine)

Machine to machine technologies are most commonly placed at the centre of remote monitoring or chronic disease management solutions, because of their ability to transmit vital medical information from the patient wherever he or she is, to the healthcare professional, and potentially provide vital real-time feedback.

AT&T has developed a suite of services ranging from Vitality GlowCaps which is a medications adherence and reminder tool, to Diabetes Manager through its WellDoc acquisition, to solutions for heart disease, chronic obstructive pulmonary disease and cancer. Telefonica has a range of solutions ranging from those with medical applications e.g. their Telerehabilitation solution which provides real-time feedback on knee injuries, to non-medical applications with their solutions to monitor the conditions and whereabouts of elderly patients or people with high dependency needs. Orange has recently inked a deal with Sorin, a world leader in cardiopulmonary medical devices, to provide real-time monitoring and feedback on patients with embedded medical devices.

In the remote monitoring use case, it is particularly important to note how M2M builds on other capabilities in order to become fully functioning, integrated solutions. Their value is best realised when they are integrated with a cloud-based storage of the records, with a connectivity and collaboration solution for them to connect with their healthcare professional, and having the data transmitted securely through the network.

#3: Groom in-house healthcare expertise and innovation

While the mobile operator industry relies a lot on partnerships to get into the health industry and expertise, the more established players do recognise the need to create their own in-house health expertise.

When AT&T started their health business unit, for example, it hired 60% of their staff directly from the healthcare industry. Telefonica's head of eHealth in Spain, while an experienced telecom executive in his own right, was brought in partly with a view to his previous background in the pharmaceutical industry and experience in dealing with the healthcare provider priorities. Orange has 100 R&D professionals in healthcare in 4 Skill Centres globally in order to develop expertise tailored to healthcare systems in their global footprint. Telefonica centralises their resources in a Living Lab in Granada which houses all their healthcare application development expertise.

There is also a realisation that innovation can also be harnessed from the community. Telefonica has their own Venture Capital unit to fund innovations in this industry, and AT&T has set up an AT&T Development Centre specifically for healthcare, allowing the community a platform for developing new applications to leverage the data in their EHR.

Application as a Market Evaluation Framework

The mobile operator's evolving participation in eHealth will ultimately depend on the extent to which there is mutual value creation between the two sectors.

For the mobile operator, there is the promise of a new corporate segment, a means to better utilise and monetise their enterprise ICT capabilities, an opportunity to extend their brand in the healthcare industry, and provide more subscriber value in their own mHealth services as they better integrate into the enterprise healthcare sector.

For the healthcare sector, the mobile operator's involvement represents an opportunity to reap the large economies of scale of using mobile operators' significant IT investment, and partnering with an ICT player who is best placed in helping it extend its reach to the patient, wherever he or she is.

The GSMA believes the opportunities for mobile operators in the broader eHealth industry can only grow as mobile operators continue to develop their capabilities in connecting people, organisations and systems in increasingly more sophisticated ways. In the last 6 months, the GSMA has been working with the QTel Group in the application of the above frameworks and lessons learned to assess the opportunities and challenges within this industry (see **Annex**)

> "Through this engagement, the GSMA has helped us in two ways – firstly, in clarifying our strategy in healthcare and the products we should be considering for roll out in individual markets, and secondly, the relationship and synergies between the healthcare vertical and our core ICT capabilities across the group" - Irfan Goandal, QTel

The GSMA hopes the tools and lessons presented in this paper will help support mobile operators in their decision making process as they continue to examine their growing role in supporting the health industry's aim of increasing access, reducing cost and improving quality for the consumer.

Annex: Market Evaluation Framework in Practice – The QTel Group

In the last six months, the GSMA has been working closely with the QTel Group on their strategy in healthcare. This exercise was initiated in a Discovery workshop in Doha in Jan 2012, with all of their major subsidiaries in attendance. The overall approach was to:

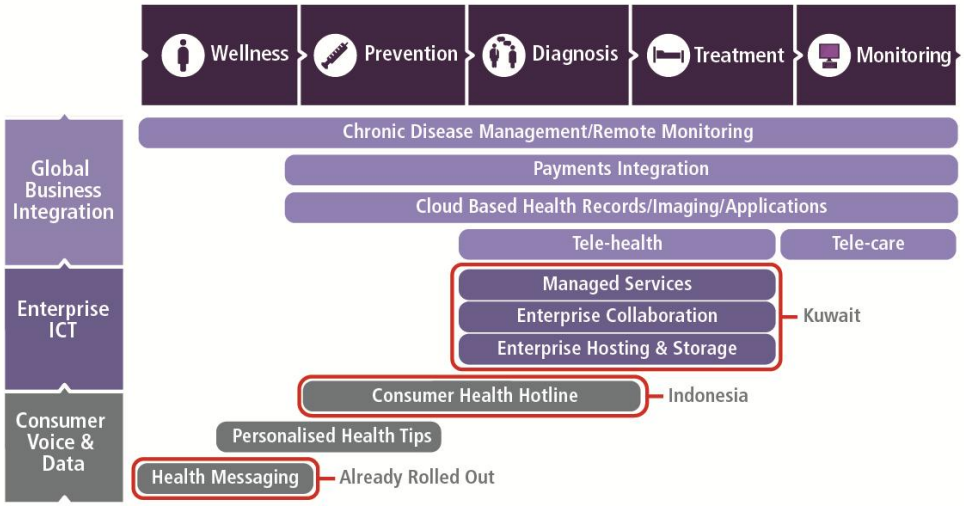
1. Examine the overall health needs and eHealth solutions in the market place and compare them to QTel's own capabilities.
2. Select two specific solutions for consideration, and evaluate them with respect to the market drivers in those countries.
3. Propose those solutions to the management in those countries for scaled roll out.
4. If these solutions are successful in those markets, to then evaluate them for roll out in multiple markets.

Exhibit 7: Approach for market evaluation within health



The solutions selected were health hotlines in Indonesia and ICT provision for hospitals in Kuwait. These were selected as part of a strategy to grow a base of capabilities that can support more advanced solutions in the future.

Exhibit 8: Selection of solutions and geographies for investigation



Market drivers were then analysed to assess that solution's suitability for that specific market, in terms of the opportunity, as well as the challenges:

Exhibit 9: Drivers and barriers

	Consideration	Health Hotline in Indonesia	Hospital ICY Provision in Kuwait
Drivers	Consumer Adoption	Meets consumer need for quality accessible healthcare given geographical dispersal of healthcare	Meets immediate need for healthcare access beyond borders to prevent outward flow of patients
	Clinical Adoption	n/a	Less complex, no need to work with clinical workflow
	Regulatory Climate	Excellent regulatory relationships at national level	Excellent regulatory relationships both at national and GCC level
	Costs/Investment Level	Uses IndoSat's existing voice/billing infrastructure	No need for integration/can optimise capacity utilisation on Wataniya's ICT expansion efforts
Barriers	Differentiation	There is no existing service in Indonesia that has been launched successfully yet	No existing systems integrator/Wataniya is the market leader
	Delivery Risk	Working through partners who have deep local market insight and clinical expertise	Relatively low as needs are less complex
	Value in Integration	Complementary skills between IndoSat (who provide market access, connectivity and billing) and the partner who brings clinical and domain expertise	No integration of solutions needed

Finally, an assessment was also made of QTel Group's own approach towards the development of their healthcare strategy with respect best practices:

Exhibit 10: Organisational strategy for QTel

Best Practice	QTel's Approach
Create a healthcare organisation that is matrixed against existing product organisation.	QTel Group's health function runs horizontally among the various OpCos and supports product teams in each geography.
Leverage core capabilities across geography and industry.	OpCo in Kuwait is using health as a means to justify broader investment in ICT provision. Experience in health hotlines in OpCo in Indonesia will provide model for similar services in other geographies.
Develop in-house capability and encourage innovation.	QTel Group brings capability to each OpCo through strategy team and engagement of external consultants. Workshops with OpCos to encourage innovation.

Following this exercise, the QTel Group will be using the findings from both workstreams to develop a business case for their entry into these two areas, for consideration by the senior management in both geographies. This exercise highlighted the importance of pooling resources across the group and using a common framework to align efforts across different geographies and verticals.

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